

iv. j avaxiSvil is sax. Tbil isis saxel mwifo universiteti
xel naweris ufl ebiT

rexviaSvil i ana il ias asul i

sisxl is wnevis cirkadul i profil is gavlena
hipertenziul pacientTa mikro- da makrocirkul aciaze

di sertacia

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medicinis mecn. doqtori, profesori winamZRvriSvil i beJan vaxtangis Ze



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i v. j avaxi Svi l i s sax. Tbi l i si s saxel mwifo uni versi teti
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Si nagan daavadebaTa kaTedra
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Tbi l i si s saxel mwifo uni versi tetis doqtorantis, eqimi-
kardi ol o gi ana rexviaSvi l i s medicinis doqtoris akademiuri
xarixis mosapovebl ad wardgenil i Sroma

**sisxl is wnevis cirkadul i profil is gavl ena
hipertenziul pa ci entTa mikro- da makroci rkul aci aze**

Tsu medi ci nis fakul tetis dekani ,
prof. al eqsandre ci skari Ze

Tbi l i si
2008

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Sesaval i

naSromis aqtual oba

aTwi eul ebis ganmavl obaSi j anmrTel obis dominantur probl emad kardiovaskul uri daavadebebi rCeba. 80-ian wl ebSi, aSS-Si kardiovaskul uri sikvdil obis wil i saerTo sikvdil obis struqturaSi 50%-s aRemateboda. sazogadoebrivi j andacvisa da farmacevtul i industriis didi mcdel obis Sedegad, 1999 wl isaTvis aRniSnul i procenti daaxl oebiT 40%-mde Semcirca. aSS-Si, kardiovaskul uri daavadebebiT miyenebul i zaral i 2002 wl istvis 199.5 miliard dol ars Seadgenda; Sesabamisad, daavadebaTa risk-faqtorebis kvl eva prioritetul mimarTul ebad Camoyal ibda rogorc aSS-Si, ise mTel s msofli oSi [272].

kardiovaskul uri daavadebebiT gamowveul i sikvdil obis did nawil Si aRiniSneba normal uri qol esterinis done. amasTan, mwvave sisxl ZarRvivani garTul ebebi, iseTi rogoricaa miokardiumis infarqti, uecari kardiul i sikvdil i da insul ti, upiratesad (70%-Si) viTardeba sisxl ZarRvebSi, romel Ta okl uziis xarisxi 50%-ze nakl ebia [293]. amdenad, mecnierTa yuradReba mimarTul ia axal i risk-faqtorebis Ziebisaken, romel Ta rol i vaskul ur garTul ebaTa ganviTarebaSi wamyvania, raTa mizanmimarTul i CareviT Tavidan iqnas acil ebul i avadobisa da sikvdil obis maRal i procenti.

warmoadgens ra vaskul uri garTul ebebis ganviTarebis umTavres risk-faqtors, ah ganixil eba rogorc sikvdil obis ZiriTadi mizezi mTel s msofli oSi. misi gavr cel ebis maCvenebel i mzardia da dReisaTvis daaxl oebiT 1 miliard adami ans moicavs.

miuxedavad bol o wl ebSi Catarebul i kl inikur-egsperimentul i kvl ebebis simravl isa, ah-iT gamowveul i garTul ebebis sixSire ar ikl ebs. amasTan, vl indeba zrdadobis tendenci ac. Sesabamisad, vaskul ur garTul ebaTa ganviTarebis axal i risk-faqtorebis gamovl enas gansakuTrebul i mni Svnel oba eniWeb a.

dReisaTvis arsebul i monacemebi endoTel iumis funqciuri mdgomareobis Sesaxeb esenciuri hipertenziis dros araerTgvarovania; amasTan, es ukanasknel i ganixil eba, rogorc saerTo da kardiovaskul uri

sikvdil obis ganviTarebis damouki debel prediqtori [42,44,58,59,61].
Sesabamisad, misi Seswavl a ah-is dros Semdgom kvl evebs saWi roebs.

bol o wl ebSi gansakuTrebuli juradReba eqceva aw-is cirkaduli
profilis Seswavl as, amastan sakiTxi misi monawileobis Sesaxeb ah-is
vaskulur garTulebaTa ganviTarebaSi jer kidev diskutabeluria.

winamdebare nasromSi Seswavliia aw-is cirkaduli profilis
gavl ena hipertenziul pacientTa hemoreologiada endoteliumis
funqciaze. hemoreologiuri da endoteliumis disfunqciis Sesazl
ogamovlenas non-diper individebSi didi praqtikuli mnisvnelobaeniweba.
aRniSnuli saSual ebas mogvcems gamovvinoT ah-is vaskulur garTulebaTa
ganviTarebis axali, potenciuri risk-faqtori da SevimuSavoT
mizanmi marTuli prevenciuli strategia.

zemoTqmulidan gamomdinare, vaskuluri garTulebebis marali riski
ah-is mqone pacientebSi, TviT tradiciuli risk-faqtores ararsebobis
SemTxvevasic ki, gansazRvavs axali "savaudo" risk-faqtores
gamovlenisa da dadgenis aucilebi obas, romlebic Sesazloa wamyvan rols
TamaSobdenen vaskulur garTulebaTa ganviTarebaSi da Sesazloa
real izdebodenen mikro- da makrocirkul atoruli darRvevebis gziT.

kvlevis mizani

hemoreologiada endoteliumis funqciis cvlilebebis Seswavl as
sisxlis wnevis sxxvadasxva cirkaduli profilis esenciuri hipertenziis
mqone pacientebSi sisxl ZarRvovan garTulebaTa ganviTarebis axal,
damatebit risk-faqtorTa gamovlenisa da dazustebis mizniT.

am miznis misaRwevad saWi ro iyo Semdegi amocanebis gadawyveta:

1. endoteliumis funqciur maxasiaTebel Ta kvleva Trombozuli bunebis
garTulebaTa ganviTarebis Seswavl is mizniT diper da non-diper
esenciuri hipertenziis mqone pacientebSi.
2. hemoreologiuri parametrebis (eritrocitebis agregadoba da
deformacia, Trombocitebis agregadoba da adheziuroba, hematokriti,
fibrinogenis plazmuri koncentracia, plazmisa da sisxlis sibil ante)
Seswavl as diper da non-diper esenciuri hipertenziis mqone pacientebSi.

3. dagvedgina kavSiri esenciuri hipertenziis xangrZl ivobasa da endoTel ur disfunqiasa da hemoreol ogiur darRvevebs Soris.
4. Segveswavl a damokidebul eba hemoreol ogiur da endoTel iumis funqciur maxasiaTebI ebs Soris esenciuri hipertenziis mqone pacientebSi.
5. gadanacvl ebis daZabul obasa da sisxl ZarRvis diameters Soris damokidebul ebis dadgena da sisxl ZarRvis diametris sididis gavI enis Seswavl a nakad-damokidebul i vazodil ataciis procentul maCvenebel ze.
6. Segveswavl a damokidebul eba erTis mxriv arteriul i wnevis cirkadul profil sa da meores mxriv esenciuri hipertenziis xarisxsa da xangrZl ivobas Soris.

mecnierul i siaxl e

1. novacias warmoadgens Sromis Sedegad dadgenil i kanonzomiereba: esenciuri hipertenziis pacientebSi xdeba arteriul i wnevis diperi cirkadul i profil is non-diperi profil iT Canacvl eba, romel Tac diperisagan gansxvavebiT gaaCniaT ufro mkveTrad gamoxatul i hemoreol ogiuri darRvevebi da endoTel iumis disfunqcia.
2. dadginda, rom arteriul i hipertenziis xangrZl ivoba ar korel irebs endoTel iumis disfunqciis xarisxTan.
3. kvI evaSi gamovl inda mxol od sisxl ZarRvTa kunTovani Sris disfunqciis sarwmunod maRal i korel acia arteriul i wnevis xarisxTan da garkveul wil ad xangrZl ivobasTanac.
4. normotenziul non-diper individebSi (rodesac Ramis saaTebSi ar xdeba arteriul i wnevis daqveiteba 10-20%-iT) aRiniSna agreTve hemoreol ogiuri parametrebisa da endoTel iumis disfunqciis xarisxis matebis tendencia, romel mac sarwmunoebas ver miARwia; magram Cveni azriT, es tendencia sagul isxmo faqtad unda miviCni oT, radganac normotenziul pacientebSic sisxl ZarRvovani garTul ebebis ganviTareba SesaZl ebel ia garkveul wil ad axsnil i iqnas. ra sakvirvel ia, aRniSnul i faqti Semdgom kvI evas saWi roebs.

praqtikul i Rirebul eba

1. esenciuri hipertenziis mqone pacientebSi non-diperi cirkadul i profil is mqone pirebi miuxedavad arteriul i wnevis xangrZl ivobis, xarisxisa da sqesisa saWiroeben intensiur meTval yureobas. pacientTa am jgufSi gamovl enil i hemoreol ogiuri darRvevebi da endoTel iumis disfunqcia xdeba prevenciul i RonisZiebebis da adeqvaturi medikamenturi koreqciis samizne sisxl ZarRvovani garTul ebebis Tavidan acil ebis mizniT Ramisa da dil is ew. kritikul i saaTebis dros.
2. non-diperi cirkadul i profil i hipertenziul pacientebSi SesaZl ebel ia ganixil ebodes, rogorc damoukidebel i risk-faqtori, romelic mZime sisxl ZarRvovani garTul ebebis ganmsazRvrel ia, rac saWiroebs Semdgom dakvirvebas prospeqtul i kvl evis reJimSi.
3. reaqtul i hiperemiit gamowveul i vazodil ataciis xarisxis gamokvl eva miCneul unda iqnas sisxl ZarRvTa reaqtul obis gamomavl inebel da Semafasebel stres-testad esenciuri hipertenziis mqone pacientebSi.

naSromis aprobacia

disertaciaSi asaxul i kvl evis monacemebi avtorma warmoadgina moxsenebebis saxiT samecniro konferenciebsa da kongresebze:

- evropis hipertenziis sazogadoebis me-19 Sexvedra. 12-16 ivnisi, 2009. milani, italia.
- xmel TaSua zRvis qveynebis me-6 saerTaSoriso kongresi. 24-28 marti, 2009. antalia, Turqeti.
- kardiovaskuluri kvl evis refl eqsuri jgufis 26-e saerTaSoriso Sexvedra. 2-3 april i, 2009. nensi, safrangeTi.
- safrangeTis hipertenziis sazogadoebis me-2 saerTaSoriso kongresi. 18-19 dekemberi, 2008. Parizi, safrangeTi.
- evropis hipertenziis sazogadoebis me-18 Sexvedra. hipertenziis saerTaSoriso sazogadoebis 22-e samecniro kongresi. germaniis hipertenziis ligis yovel wliuri Sexvedra. 11-19 ivnisi, 2008. berl ini, germania.
- kardiologTa msofi io kongresi. 18-21 maisi, 2008. buenos-airesi, argentina.

- xmeI TaSua zRvis qveynebis me-5 saerTaSoriso kongresi. 23-27 april i, 2008. izmiri, Turqeti.
- safrangetiS hipertenziis sazogadoebis I saerTaSoriso kongresi. 13-14 dekemberi, 2007. parizi, safrangeti.
- evropis hipertenziis sazogadoebis me-17 Sexvedra. 15-19 ivnisi, 2007. milani, italia.
- hipertenziisa da kardiovaskulur daavadebaTa prevenciis centraluri evropis Sexvedra. 11-13 oqtombri, 2007. krakovi, poloneTi.
- azia-wynari okeanis hipertenziis me-6 kongresi. hipertenziisa da masTan dakavSirebuli daavadebebis me-9 saerTaSoriso simpoziumi. 16-19 noemberi, 2007. pekini, CineTi.

publikaciebi

sadisertacio Temis irgvliv gamoqveynebulia 25 samecniero Sroma.

disertaciis struqtura da moculo

disertacia warmoadgens nabeWd Sromas, romelic Seicavs Sesavals, literaturis mimoxilvas, kvlevis masal as da metodebs, kvlevis Sedegebsa da matganxilvas, daskvnebs. nasromi moicavs nabeWd teqsts 142 gverdze, ilustrirebulia 29 cxrilit da 11 grafikit. Seicavs 5 damatebis furcel s.

Tavi 1. Literaturul i mimoxil va

1.1. arteriul i hipertenziis gavr cel eba da prognozul i aspeqtebi

arteriul i hipertenzia (ah) aris erT-erTi yvel aze adre arweril i kl inikuri mdgomareoba (Nei Jin by Huang Ti, Cvens wel Tarrixvamde 2600 wl is win). dReisaTvis ah ganxil eba, rogorc neirohumoral ur, hemodinamikur da metabol ur faqtorTa erTobl ioba, romel Ta urTierTqmedebac iwvevs ara marto arteriul i wnevis (aw) maRal i cifrebis SenarCunebas, aramed samizne organoebis paTol ogiur cvl il ebebs da Sesabamisad prognozis gauaresebas.

ah mniSvnel ovnad aCqarebs aTeroskl erozul i procesis progresirebas da Sesabamisad, wamoadgens aTeroTrombogenul i insul tisa da miokardiumis infarqtis ganvitarebis safuzvel s [1]. epidemiol ogiurma kvl evebma aCvena Zl ieri wrfivi damokidebul eba fardobiT kardiovaskul ur risksa da mosvenebis sisxl is wnevis dones Soris popul acieur doneze [2]. Framingham-is kvl evam [3], romel ic emyareboda 12 wl iani dakvirvebis monacemebs, aCvena rom optimal uri wnevis cifrebis mqone individebTan SedarebiT, maRal i normul i wnevis mqone mamakacebs gaaCniaT 1.6-j er, da qal ebs 2.8-j er ufro maRal i kardiovaskul uri garTul ebebis ganvitarebis riski.

amerikis SeerTebul i Statebis JNC 7 "gaidl ainis" mixedviT ah gavr cel eba msofli oSi daaxl oebiT erT miliard adamians moicavs da ah Tanmxl ebi sikvdil obis wl iuri maCvenebel i 7.1 mil ions Seadgens. msofli o j andacvis organizaciis monacemebiT, suboptimal uri sisxl is wneva (sistol uri wneva >115 mm.vvy.sv.) pasuxismgebel ia cerebrovaskul ur daavadebaTa 62%-sa da gul is iSemiuri daavadebis 49%-is ganvitarebaze, mcire sqesTaSorisi variaciiT. cnobil ia, rom 40-dan 89 wl amde asakis pirebSi arteriul i wnevis 20/10 mm.vvy.sv.-iT mateba asocierebul ia insul tiTa da gul is iSemiuri daavadebiT ganpi robebul i sikvdil obis gaormagebasTan. ah-is gavr cel eba izrdeba asakis matebasTan erTad; misi gavr cel eba 50%-s aWarbebs 60-69 wl is asakis pacientTa Soris, da individTa 3/4-ze mets moicavs 70 wel s gadaSorebul asakSi.

bol o dros gansakuTrebul i yuradReba eqceva ah da endoTel iumis funqciuri mdgomareobis Seswavl as rasobriv-eTnikuri kuTxiT [4-6]. aSS-Si mcxovrebi popul aciiis epidemiol ogiuri kvl evebiT gamovl inda, rom Savkani an pirebs TeTrkani an subieqtebTan SedarebiT aReniSnebaT ah-is [3,7, 8], Saqriani diabetisa da sxva kardiovaskul uri risk-faqtores gavr cel ebis maRal i done [363]. ah-Tan asocierebul i kardiovaskul uri da cerebrovaskul uri garTul ebebis ganviTarebis al baTobac statistikurad sarwmunod maRal ia Savkani anTa popul aciaSi [8]. Treiber et al. [5,9] kvl evam gamoavl ina mniSvnel ovani eTnikuri da sqesobri vi gansxvaveba mwwave stresis sapa suxod ganviTarebul i vazokonstriqciis mxriv. mkvl evarebma gamoavl ines rom axal gazrda, j anmrTel Savkani an pirebs aReniSnebaT rogorc endoTel ium-damokidebul i, ise endoTel ium-damokidebel i vazodil ataciis darRveva [3,10]. aRniSnul is sawinaaRmdegod, Gokce et al. [11] kvl evisas ar gamovl inda rasobri vi sxvaoba kunTovani tipis arteriebis nakad-damokidebul i vazodil ataciis (FMD) procentul maCvenebl ebs Soris. miuxedavad intensiuri kvl evebisa, eTnikuri winaswarganwyoba hipertenziisa da misi garTul ebebis ganviTarebis mxriv ar aris srul ad Seswavl il i [12].

1.2. sisxl ZarRvTa endoTel iumi da misi disfunqcia

1.2.1. sisxl ZarRvTa endoTel iumis struqtura da funqcia

sisxl ZarRvis sxva SreebTan SedarebiT, endoTel iums ukavia strategiul ad mniSvnel ovani pozicia da ganicdis meqanikuri da hormonul i faqtores pirdapir zemoqmedebas. 70 kg. wonis mamakacSi endoTel iumi daaxl oebiT 7 km. sigrZisa da 1600-1900 gr. masis organoa [13,14]. endoTel iumi moiazreba rogorc endokrinul i, autokrinul i da parakrinul i organo, romel ic mTavar rols TamaSobs sisxl ZarRvovani tonusis SenarCunebaSi.

20 wel ze meti gavi da mas Semdeg, rac Furchgott da Zawadzki kur dRI is aortis magal iTze aCvenes endoTel iumis aucil ebl oba acetil qol iniT ganpirobebul vazodil ataciaSi [15]. maT aRmoacines axal i substancia, romel sac endoTel ium-damokidebul i rel aqsaciuri faqtori uwodes; aRniSnul i SemdgomSi identifi ci rda, rogorc azotis oqsidi (NO).

NO gamoiyofa endoTel uri uj redebidan sisxl is nakadiT Seqmnil i gadanacvl ebis daZabul obis sapsuxod da pasuxismgebel ia mraval i receptoris aqtivaciaze [15,16]. NO aris biol ogiuri membranebis gavli unaris mqone, Tavisufal radikal uri airi ramdenime wami *in vivo* sicocxl is xangrZl ivobiT [15]. endoTel iumidan gl uvkunTovan SreSi difuziis Semdeg, NO iwvevs intracel ul arul i cikl uri guanozin-monofosfatis koncentraciis matebas enzim guanilatcikli azas aqtivaciis gziT da Sesabamisad gl uvkunTovani uj redebis rel aqsacias anu vazodil atacias. sisxl ZarRvebSi NO mudmi vad sinTezirdeba L-argininisagan, da Sesabamisad NO-s mudmivi bazal uri gamoyofa gansazRvravs periferiul sisxl ZarRvovan tonuss [17].

funqciuri Tval sazrisiT, NO-s ZiriTadi antagonisti endoTel inia. endoTel ini aRmoCenil iqna 1988 wel s Yanagisawa et coworkers mier [18,19], rogorc endogenuri 21 aminomJavasagan Semdgari Zl ieri vazokonstriqtorul i peptidi. endoTel ini-1 uSual o monawil eobas iRebs NO-s, al dosteronis, vazopresinis da adrenomedul inis sekreciis autoparakrinul kontrol Si.

endoTel iumis funqciebidan aRsani Snavia [15,20,21,22,322]:

- sisxl ZarRvTa tonusze momqmedi vazoqtiuri agentebis gamonTavisufl eba;
- antikoagul aciuri moqmedeba;
- fibrinol izSi monawil eoba;
- imunuri funqciebi;
- fermentul i aqtivoba;
- gl uvkunTovani uj redebis zrdis procesSi monawil eoba;
- gl uvkunTovani uj redebis dacva vazokonstriqtorul i zegavl enisagan.

endoTel iumis gansakuTrebul i poziciis gamo, endoTel iocitebi ganicdian 3 ZiriTadi xasiaTis meqanikur zemoqmedebas: a) wneva – rasac qmnis sisxl is hidrostatikuri Zal a sisxl ZarRvis SigniT; b) garSemoweril obiTi anu periferiul i gaWimva da g) gadanacvl ebis daZabul oba anu sisxl is nakadiT Seqmnil i gamwevi xaxunis Zal a. mocemul

Zal Ta Soris gadanacvl ebis daZabul oba ganixil eba, rogorc yvel aze mniSvnel ovani hemodinamikuri Zal a, rameTu igi astimul irebs vazoaqtiuri substanciebis gamonTavisufI ebas, genTa eqspresias, uj redTa metabol izmsa da morfol ogiur cvl il ebebs [23].

cnobil ia, rom endoTel uri uj redebi mgrZnobiarea sisxl is nakadis siCqaris mimarT. gadanacvl ebis daZabul oba iwvevs endoTel iocitebis deformacias. aRniSnul deformacias aRiqvaven gaWimvisadmi mgrZnobiare endoTel iocitebis ionuri arxebi, rac iwvevs citopl azmaSi Ca^{2+} Semadgenl obis zrdas da NO-s produqcias [14]. Sesabamisad, sisxl is nakadis zrdisas magistral uri arteriebi farTovdebian, xol o Semcirebisas – viwrovdebian. aRniSnul i fenomeni l okal uri xasiaTisaa da ar aris damokidebul i arc humoral ur da arc nervul zemoqmedebaze.

normal ur pirobebSi, j anmrTel i endoTel iumis vazodil atatorul i substanciebiT stimu acia iwvevs NO-s sinTezis aqtivacias da l okal urad azotis oqsidis koncentraciis zrdas. NO SeaRwevs ra subendoTel ur SreebSi, mohyveba sisxl ZarRvTa rel aqsacia, anu vazodil atacia [2].

nakad-damokidebul i dil atacia damokidebul ia ara mxol od NO-s warmoqmnaze, aramed aseve NO-s inaqtivaciasa da qvemdebare gl uvkunTovani uj redebis mgrZnobel obaze mis mimarT.

1.2.2. endoTel iumis disfunqcia

endoTel uri disfunqcia (ed) – es upirvel es yovl isa disbal ansia vazodil atatorul , angioproteqtorul , antiprol iferaciul faqtorebsa (prostaciklini, qsovil ovani pl azminogenis aqtivatori, natriurezuli peptidis C tipi, endoTel uri hiperpol arizaciuli faqtori) da vazokonstriqtorul , proTrombozul , prol iferaciul faqtorebs (endoTel ini, superoqsid-anioni, Tromboqsani A, qsovil ovani pl azminogenis aqtivatoris inhibitori) Soris [20,24].

vazodil ataciur stimu aciaze sisxl ZarRvTa rel aqsaciis uunaroba an Sesusteba SesaZl oa ganpirobebul i iyos vazokonstriqtorul i substanciebis gazrdil i aqtivobiT da/an vazodil atatorul i substanciebis mimarT endoTel iumis mgrZnobel obis daqvei Tebi T.

Mitchell et al. [25] ačvenes, rom mxris arteriis FMD-s Semcireba SesaZI oa aixsnas ara sisxl ZarRvTa endoTel iumidan NO-s gamoyofis darRveviT, aramed reaqtikul i hiperemiis dros endoTel iumis stimul aciis arasakmarisi doniT, rac Tavis mxriv sisxl is nakadis sičqarisa da gadanacvl ebis daZabul obis daqveiTebis Sedegia.

endoTel uri disfunqciis mTavari komponentebia:

1. NO-s biOSeRwevadobis darRveva:
 - eNOS-s eqsprezia/inaqtivaciis darRveva da NO-s sinTezis Semcireba;
 - endoTel uri uj redebis zedapirze receptorebis ganl agebis raodenobis/simWi drovis Semcireba, romel Ta gaRizi aneba normaSi NO-s warmoqmniis stimul acias iwvevs;
2. NO-s degradaciis gazrda;
3. endoTel iocitebis mier endoTel ini-1-isa da sxva vazokonstriktorul i substanciebis produqciis zrda;

endoTel iumis mZime dazianebisas irRveva endoTel iumis mTli anobac da intimaSi čndeba deendoTel izebul i ubnebi, romel Ta gavliT neirohormonebi usual od zemoqmedeben gl uvkunTovan uj redebze da iwveven maT SekumSvas.

1.2.3. endoTel iumis funqciis kvlevis istoria da meTodebi

vazomotorul i tonusis regul aciis Seswavl is mizniT, 1980 wl amde kvleebi izol irebul ad gl uvkunTovani uj redebis Sreze fokusirdeboda. endoTel iumi ganixil eboda, rogorc sisxl ZarRvis hemostatikuri barieri. Furchgott da Zawadzki iyvnen pirvel ebi, romel Tac ačvenes sisxl ZarRvovani endoTel iumis mniSvnel oba acetil qol inis mimarT ganvitarebul vazodilataciaSi [15,26]. U. PhoI, J. Holtz (1985w.) gamoavl ines endoTel iumis wamyvani roli in vivo sisxl ZarRvis sanaTuris regul aciis procesSi [14].

pirveli arwera epikardiul i koronarul i arteriebis ed-sa ekuTvnis Ludmer et al. (1986 w). mas Semdeg ed-is Sefasebis koronarografiul i meTodi, damyarebul i acetil qol inis intrakoronarul infuziaze, iTvl eba ed-is kvlevis "oqros standartad" [27]. Celermajer et al. iyo pirveli, romel mac 1992 wel s, aTeroskl erozis riskis mqone bavSvebsa da zrdasrul ebSi arwera

arainvaziuri ul trabgeriTi nakad-damokidebul i dil atacia endoTel iumis funqciuri mdgomareobis Sefasebis mizniT [28].

endoTel iumis funqciuri mdgomareoba SesaZl oa Sefasdes sxvadasxva mi dgomi T, kerZod:

- (1) sisxl ZarRvis kedl is morfol ogiuri da meqanikuri maxasiaTebI ebis gazomva (kerZod, intima-medias sisqe, damyol oba, gaWi mvadoba, remodel irebis indeqsi);
- (2) I laboratoriuI i meTodi, anu endoTel uri marker eebis gansazRvra sisxl is Sratsa da SardSi. biol ogiur sistemebSi NO wadmoadgens ukiduresad arastabil ur SenaerTs, romel ic swrafad gardaimneba nitritis ionad, xol o rkinis arsebobisas ki ufro stabil ur, nitrat is ionad. I laboratoriuI i meTodiS ZiriTadi nakl ia is, rom sisxl Si arsebul i nitratebisa da nitritebis daaxl oebiT 50% organizmSi sakvebTan erTad xvdeba da gamoiyofa Sardis gziT [29,30].
- (3) cirkul atorul i sistemis konkretul ubanze sisxl ZarRvTa tonusis endoTel ium-damokidebul i regul aciis Sefaseba, romel ic izomeba, rogorc sisxl ZarRvis vazodil atatorul i pasuxi fizikur da farmakol ogiur stimul aciaze (gadanacvl ebis daZabul oba, acetil qol ini, bradikinini, substancia P, serotonini) [31]. arsebobs sisxl ZarRvTa tonusis endoTel uri regul aciis Sesafasebel i 2 ZiriTadi meTodi: invaziuri, anu pirdapiri (koronarul i da periferiuI i arteriebis) da araivaziuri, anu arapirdapiri (venuri okl uziuri pl etizmografia; maRal i rezol uciis ul trabgera; fazur-kontrastul i magnituri rezonansi).

miuxedavad imisa, rom arsebobs FMD-s kvI evis angiografiul i da fazur-kontrastul i magnitur rezonansuri meTodebi [32,33], ul trasonografiul i meTodi kvI av rCeba yvel aze farTod gamoyenebad meTodad endoTel iumis funqciis Sefasebis mizniT [28,34,35,36]. real ur droSi gamokvl eva, dabal i fasi, meTodiS simartive, gamosaxul ebis simkveTris gaZl ierebis mizniT kontrastul i nivTierebebis gamoyenebis saWi roebis ar arseboba, pacientis riskisa da diskomfortis dabal i done aris is ZiriTadi faqtorebi, romel Ta gamoc ul trasonografiul meTods mkvl evarTa umravl esoba upiratesobas aniWebs [37].

1992 wl idan 2001 wl amde gamoqveynebul i 250 kvl evis Sedegebze dayrdnobi T, Bots et al. [38] Seiswavl es endoTel iumis funqciuri mdgomareobis kvl evis ul trasonografiul i meTodis teqniki aspektebi. maT gamoavl ines, rom kvl evaTa Soris FMD-s mniSvnel oba saSual od 1.9%-dan 19.2%-is fargl ebSi varirebs (j anmrTel ebi, gul is iSemiuri daavadeba, Saqriani diabeti); arsebul i sxvaoba avtorebma gazomvaTa teqniki aspektebiT axsnes, kerZod okl uziis xangrZl ivobiTa da okl uziuri manJetis l okal izaciiT. maTive daskvniT, aparaturis tips, gazomvis adgil sa da okl uziur wnevas wamyvani mniSvnel oba ar eniWeba.

Silber et al. [33,39] fazur-kontrastul i magnituri rezonansis gamoyenebiT daadastures puazel is kanonis gamoyenebis Sesazl ebl oba tranzitorul i postiSemiuri hiperemiis dros.

1.2.4. endoTel uri disfunqciis prognozul i aspektebi

ed-is prognozul i mniSvnel obis Sesaxeb pirveli monacemebi l iteraturaSi prospektul i kvl evis "Men born in 1914" kogortis kvl evis Sedegad gaCnda, sadac 1968-1970 wl ebis periodSi venuri okl uziuri teqniki gamoyenebiT Seiswavl es pul suri tal Ris amplituda reaqtul i hiperemiis dros. 21 wl iani dakvirvebis Sedegad, mkvl evarebma daadgines, rom darRveul i endoTel uri funqcia asocierebul ia kardiovaskul uri garTul ebebis ganvitarebisa da saerTo sikvdil obis maRal sixSiresTan [40]. Neunteufel et al. [41] gamokvl ies nakad-damokidebul i vazodil ataciis 5-wl iani prognozul i mniSvnel oba gul mkerdis areSi tkivil is mqone pacientebisaTvis. kvl evis Sedegad gamovl inda, rom pacientebis 10%-ze nakl ebi nakad-damokidebul i dil ataciiT aReniSnebaT statistikurad sarwmunod maRal i kardiovaskul uri riski. mWidro korel acia koronarul i arteriebis disfunqciasa da kardiovaskul uri garTul ebebis ganvitarebis al baTobas Soris gamovl inda sxva [42-55] kvl ebebSic. Fathi et al. [56] mniSvnel ovani kardiovaskul uri riskis mqone 444 patientis mxris arteriis endoTel ium-damokidebul funqciis kvl eviT daadgines, rom pacientebis romel Ta FMD% nakl ebia 2%-ze, aReniSnebaT normal ur (>6.3%) da mcired darRveul (2.1 dan 6.3%-mde) FMD% maCvenebl is mqone individebTan SedarebiT kardiovaskul uri garTul ebebis ganvitarebis mniSvnel ovnad maRal i riski.

Suwaidi et al. [42] acetil qol inis intrakoronarul i infuziis safuZvel ze aCvenes, rom koronarul pacientebis mZime ed-iT gaaCniT kardial uri garTul ebebis ganviTarebis 14%-iT gazrdil i riski. paTogenezuri kavSiri koronarul endoTel ur disfunqciasa da kardiovaskul ur garTul ebebs Soris naCvenebi iqna Suwaidi et al [42] da Schachinger et al. [43] mi er. Lind et al. [57] Seiswavl es endoTel iumis funqciis kvl evis invaziuri da arainvaziuri teqnikiuri midgoma da daaskvnes, rom rogorc winamxris invaziuri, ise arainvaziuri ul trasonografiul i kvl eva damoukidebl ad korel irebs momatebul koronarul riskTan.

dadgenilia, rom rezistentul i [44,58,59] da kunTovani tipis arteriebis [60], maT Soris koronarul i arteriebis [42,61] ed saerTo da kardiovaskul uri sikvdil obis damoukidebel i prediqtoria. kardiovaskul uri risk-faqtoresi, kerZod asaki [62], hipertenzia [44,63,64,65], simsuqne [58], hiperqol esterinemia, diabeti [66,67], homocisteinemia [38] da mwevel oba [68] asocierebul ia sistemur endoTel ur disfunqciastan. Clarkson et al. [69] daadgines, rom adreul i kardiovaskul uri avadobis oj axuri istoriis mqone j anmrTel axal gazrdebs aReniSnebaT FMD-s darReva kardiovaskul uri risk-faqtores ar qonis SemTxvevaSic ki. Celermajer et al. [70] kvl evebi miuTitebs, rom ed-is ganviTarebis riski izrdeba risk-faqtores raodenobriv zrdasTan erTad. Celermajer et al. [70] da Deng et al. [71] mkvl evarebma gamoavl ines pirdapiri korel acia asaksa da FMD-s Soris, rac ar gamovl inda Schroeder et al. [72] kvl evaSic.

amasTan, avtorTa meore j gufi risk-faqtorTa diferencial uri midgomis momxrea, rac gul isxmobs imas, rom zogierT risk-faqtors SesaZl oa erTad aRebul ramdenime risk-faqtorTan SedarebiT bevrad ufro didi mniSvnel oba gaaCndes ed-is ganviTarebis mxriv. avtorTa garkveul i j gufi endoTel ur disfunqciastan ganxil avs, rogorc kl inikur sindroms, romel ic *per se* asocierebul ia kardiovaskul uri garTul ebebis ganviTarebis momatebul riskTan [73]. Shroeder et al. [74] monacemebi T, FMD xasiaTdeba gul is koronarul i daavadebis prediqciis mimarT 71%-iani sensi tiurobi Ta da 81%-iani speci fikurobi T. Perticone et al. [44] gamoavl ines endoTel iumis funqciuri mdgomareobis korel acia hipertenziul pacientTa prognozTan.

Stenborg et al. [75], Volpe et al. [76], Targonski et al. [77] avtorebi endoTel ur disfunqcias ganxil aven, rogorc insul tis ganviTarebis erT-erT umniSvel ovanes risk-faqtors. Targonski et al. [77] Seiswavl es kavSiri koronarebis endoTel ur disfunqciasa da cerebrovaskul uri garTul ebebis ganviTarebis risks Soris. kvl evis Sedegebze dayrdnobiT, maT daaskvnes rom koronaruli arteriebis ed damoukidebel kavSiSi cerebrovaskul uri garTul ebebis ganviTarebis momatebul riskTan. kerZod, pacientebS endoTel ium-damokidebul i vazodil ataciis darRveiT aReniSnaT insul tisa da tranzitorul i iSemiuri Setevis ganviTarebis 4-jer ufro maRali riski normal uri endoTel uri funqciis mqone individebTan SedarebiT.

1.2.5. gadanacvl ebis daZabul oba

sxvadasxva nivTierebebSi meqanikur zewol asa da gaWimvas Soris aresbul i kavSiris sabaziso principebis aRweris pirvel i mcdel oba Robert Hooke-s ekuTvnis (1635-1703).

endoTel iumi moqmedebS rogorc meqanogadamcemi, romelic aRiqvavs gd-is cvl il ebebs da SemdgomSi gamoyofs dil atatorul faqtorebs [25]. sakiTxi imis Sesaxeb Tu ra meqanizmiT xdeba meqanikuri Zal ebis deteqcia da biol ogiur impul sebad gardaqmna dReisaTvis auxsnel ia. mraval i mkvl evaris azriT, meqanikuri Zal ebis deteqciasa da biol ogiur impul sebad gardaqmnas axorciel eben e.w. "meqanoreceptorebi" [104].

Jean Poiseuille (1799-1869) iyo pirvel i, romel mac aRwera siTxis moZraoba cil indrul mil Si, rac cnobil ia puazel is kanonis saxel wodebiT. puazel is kanoni sisxl ZarRvebSi sisxl is nakads ganxil avs, rogorc swor, myari kedl ebis mqone mil Si, arapul sirebad, mudmivi gadanacvl ebis daZabul obis pirobebSi niutonuri siTxis moZraobas [105]. Haagen-Poiseuille-s tol oba *in vivo* pirobebSi gamosadegia mxol od Semdeg daSvebaTa pirobebSi:

- sisxl i unda CaiTval os niutonur siTxed;
- sisxl ZarRvis ganivi kveTis farTobi aris cil indrul i;
- sisxl ZarRvi aris swori mil i arael astikuri kedl ebiT;
- sisxl is nakadi aris mdore da l aminerul i.

literaturaSi arseobs gadanacvl ebis daZabul obisa da gadanacvl ebis siCqaris gamosaTvl el i formul ebis garkveul i simravl e. avtorTa erTi j gufi Dammers et al. [105] sisxl ZarRvTa kedl is gadanacvl ebis siCqarisa da gadanacvl ebis daZabul obis Sesafasebl ad upiratesobas puazel is kanonze dafuZnebul formul as aniWebs, kerZod:

$$\gamma_p = \frac{2n \cdot MV}{D}$$

sadac γ_p aris sisxl ZarRvTa kedl is gadanacvl ebis siCqaris saSual o maCvenebel i, MV – sisxl ZarRvis centrSi sisxl is nakadis saSual o siCqare, n – gasadavebis faqtori dadgenil i siCqaris profil isaTvis da D – sisxl ZarRvis diametri. miRebul ia, rom roca n -is mniSvel oba udris 2, siCqaris profil i iZens parabol ur formas, rac Seesabameba puazel is kanons.

sisxl ZarRvTa kedl is gadanacvl ebis daZabul obis gamosaTvl el ad Dammers et al. [105] iyeneben formul as:

$$\tau = WBV \cdot \gamma$$

sadac τ aris sisxl ZarRvTa kedl is daZabul obis saSual o maCvenebel i, WBV – sisxl is saerTo sibl ante da γ – gadanacvl ebis siCqare.

saerTo sisxl is sibl antis gamosaTvl el i formul a SemuSavebul ia Weaver et al. mi er. aRniSnul i parametris gamosaTvl el ad avtorebi iyenebdnen, minis kapilarul i viskozimetrebis saSual ebiT gazomil pl azmis webovanebas (η_0 ; mPa · s), hematokrits (Hct, %) da sisxl ZarRvTa kedl is gadanacvl ebis siCqaris saSual o maCvenebel s (γ_p ; s⁻¹).

$$\log WBV = \log \eta_0 + (0.030 - 0.0076 \log \gamma) \cdot Hct$$

gd-is gansazRvrisaTvis amerikul i skol is mecnierebi upiratesobas Hagen-Poiseuille-is formul is Semdegnair interpretacias aniWeben [106]:

$$\tau = 4 \mu Q / \pi r$$

sadac τ – gadanacvl ebis daZabul obaa, Q sisxl is nakadi, μ – arapirdapiri gziT gazomil i sibl ante, r – sisxl ZarRvis radiusi.

berZnul i skol a gadanacvl ebis siCqarisa da daZabul obis gamosaTvl el ad upiratesobas Hagen-Poiseuille-is kanonze damyarebul Semdeg formul ebs aniWebs:

$$\gamma = 32 Q / \pi d^3$$

sadac γ - gadanacvl ebis siCqarea, Q - saSual o mocul obiTi siCqare da d - sisxl ZarRvis diametri da,

$$\tau = 32 \cdot \eta \cdot Q / \pi d^3 \quad \text{an} \quad \tau = 8 \cdot \eta \cdot u / d$$

sadac τ - gadanacvl ebis daZabul obaa, Q - vol umetrul i nakadis saSual o siCqare, u - saSual o siCqare da d - sisxl ZarRvis diametri.

Pyke et al. [107], Gnasso et al. [108] avtorebi mocemul parametrTa gamoTvl isaTvis upiratesobas Semdeg formul ebs aniWeben:

$$\gamma = V/D; \quad \text{da} \quad \tau = \eta V/D;$$

sadac γ - gadanacvl ebis siCqarea; τ - gadanacvl ebis daZabul oba, η - sisxl is sibl ante, D - sisxl ZarRvis diametri, V - sisxl is nakadis saSual o siCqare.

sisxl ZarRvis SigniT momqmedi yvel a Zal a zegavl enas axdens sisxl ZarRvis samive Sreze. am mxriv gamonakl isia gd, romelic izol irebul ad sisxl ZarRvis endoTel uri uj redebis Sreze zemoqmedebis [332]. sisxl ZarRvis diametris cvl il eba sisxl is nakadis cvl il ebis mixedviT ganisazRvreba gd-is doniT, rac damokidebul ia kedl is el astiurobasa da endoTel iumis funqcional ur mdgomareobaze [104]. Verbeke et al. [109] wamoayenes hipoteza, rom daqveitebul i nakad-damokidebul i vazodil ataciis macvnebel i SesaZl oa ganpirobepul i iyos aramarto endoTel iumis dazianebiT, aramed asaxavdes gd-is Sencirebul mniSvel obasac. amastan, gd Ziritadi faqtoria, romelic CarTulia sisxl ZarRvTa remodel irebis procesSi da zegavl enas axdens arteriaTa meqanikur maxasiaTebI ebze [110,111]. Dammers et al. [105] kvI evam gamoavl ina pirdapirproporciul i damokidebul eba sisxl is wnevis simaRl esa da gadanacvl ebis daZabul obas Soris.

Dammers et al. [105] mier Catarebul ma kvI evam janmrTel individebze gamoavl ina, rom gd-is, iseve rogorc sisxl is sibl antis mniSvel oba sisxl ZarRvovani sistemis sxvadasxva doneze gansxvavebul ia da gd-is regul acia l okal urad xorciel deba. fiziol ogiuri Tval sazrisiT, siTxis gd pasuxismgebel ia endoTel uri uj redebis sicocxl is

unarianobasa da maT mier substanciebis produqciaze [106]. Sesabamisad, gd-is mudmiv doneze SenarCuneba wamyvania sisxl ZarRvTa normal uri struqturul i da funqciuri Tavisburebebis SesanarCunebl ad [106,110,111,319].

Kamaya da Togawa eqsperimentul ad gamoavl ines kavSiri gadanacvl ebis daZabul obis mateba-Semcirebasa da arteriis diametris cvl il ebas Soris. Sesabamisad, sisxl ZarRvis kedl is gd aris arteriul i diametris umniSvnel ovanesi determinanti, romel ic mniSvnel ovania gd-is saSual o maCvenebl is mudmiv doneze SesanarCunebl ad [112-115].

Framingham Heart Study Offspring Cohort kvl evam gamoavl ina mxris arteriis sawyis da gansakuTrebiT reaqtul i hiperemiis Semdgom arsebul l okal ur gd-sa da mxris arteriis FMD-s Soris Zl ieri korel acia [25].

1.2.6. nakad-damoki debul i vazodil atacia

endoTel iumi ukiduresad mniSvnel ovania sisxl ZarRvTa tonusis mudmivobisatvis. igi monawileobs qsovil ovani da organul i moTxovnil ebebis Sesabamisad sisxl is nakadis regul aciaSi. nakad-ganpirobebul i vazodil atacia ganxil eba, rogorc endoTel ium-damoki debul i procesi, romel ic asaxavs kunTovani tipis sisxl ZarRvTa rel aqsacias gazrdil i sisxl is nakadis sapsuxod, romel ic Tavis mxriv asocierebul ia gd-is zrdasTan.

sisxl ZarRvis SigniT sisxl is nakadis zrdis sapsuxod ganvitarebul vazodil atacias nakad-ganpirobebul i vazodil atacia ewodeba [108]. aRniSnul i fenomeni pirvel ad Schretzenmayer et al. mier iqna aRweril i. nakad-damoki debul i dil atacia aris l okal uri sisxl ZarRvovani pasuxi, romel ic axasiaTebis adami anTa yvel a mxvil arterias [16,116,320].

erT-erTi umniSvnel ovanesi meqanikuri stimuli, romel ic iwvevs endoTel ium-damoki debul vazodil atacias aris gd, rac endoTel uri uj redebis gaswvriw sisxl is moZraobiT ganisazRvreba [117]. amasTan, kvl evebiT dadasturda, rom mxris arteriis nakad-damokidebul i dil atacia damoki debul ia rogorc gd-is cvl il ebebze, ise sisxl is webovanebis doneze [118].

Leeson et al. [98] kvl evam gamoavl ina, rom sisxl is nakadis cvl il ebis piki maqsimal ur mniSvnel obas sisxl ZarRvis 1.5 wuTiani okl uziis Semdeg

aRwevs, maSin roca sisxl ZarRvis maqsimal uri dil atacia miRweva mxol od 4.5 wuTiani okl uziis Semdeg. amas garda, Sorenson et al. [36] gamoavl ines, rom arteriis 4.5–5 wuTze ufro xangrZl ivi okl uzia ar zrdis vazodil ataciis maqsimal ur mniSvnel obas. Sesabamisad, eqspertTa rekomendaci iT nakad-damokidebul i vazodil ataciis misaRebad mizanSewonilia arteriis 4.5-5 wuTiani okl uzia.

Stenborg et al. [75] Seiswavl es endoTel ium-damokidebul i vazodil atacia insul tian pacientebSi. dazianebul i endoTel ium-damokidebul i vazodil atacia aRiniSna rogorc insul tian, aseve hipertenziis mqone sakontrol o jgufis pacientebSi; amasTan dazianebul i endoTel ium-damokidebul i vazodil atacia gamovl inda mxol od insul tian jgufSi. aRniSnul i miuTitebs insul tian pacientebSi vazodil ataciis ufro mZime xarisxis dazianebis arsebobaze, rac avtorebma axsnes aw-is ufro maRal i cifrebis arsebobiT insul tianTa qvej gufSi.

mraval gzis dadginda, rom nakad-damokidebul i dil atacia mniSvnel ovnadaa damokidebul i arteriaTa zomaze [28,72,119,120]. es ukanasknel i ki farTod varirebs TviT j anmrTel popul aciaSic ki [34,121]. mkvl evarebma gamoavl ines damokidebul eba kunTovani tipis sisxl ZarRvis sawyis diametrsa da nakad-damokidebul i vazodil ataciis procentul maCvenebel s Soris [33,70,72,108]. kerZod, rac ufro mcirea arteriis diametri, miT ufro Zl eria misi dil atacia. Silber et al. [39] monacemebiT, aRniSnul i aixsneba erTidaigive stimul ze ufro didi hiperemiul i gd-is warmoqmniT mcire zomis arteriebSi. Silber et al. [33] avtorTa mtkicebiT, aRniSnul i ar asaxavs mcire diametris sisxl ZarRvis mqone popul aciaSi endoTel iumis funqciis ukeTes statuss. Mitchell et al. [25] da Pyke et al. [107] monacemebiT, FMD maCvenebel ze garda sisxl ZarRvis diametrisa, gavl enas axdens gd-is donec mosvenebul mdgomareobaSi. amasTan, rac ufro maRal ia gd-is mniSvnel oba mosvenebul mdgomareobaSi, miT ufro didia nakad-ganpirobebul i vazodil ataciis maCvenebel ic. Celermajer et al. [28] kvl eviT aCvenes, rom hiperemiul sisxl is nakadTan, da Sesabamisad gd-Tan SedarebiT nakad-damokidebul i vazodil ataciis procentul i maCvenebel i xasiaTdeba ufro maRal i mgrZnobel obiT.

Harris et al. [89] აცხადებს, რომ ნაკად-განპირობებულ ი ვაზოდilatაციის მნიშვნელობა პრაქტიკულად არ იცვლება კვლევის 2 საათიანი პერიოდის განმავლობაში; და მეორეც, განმეორებით რეაქტიული ჰიპერემიის დროის 2 საათიანი პერიოდის განმავლობაში (30 წუთის შემდეგ) არანაირი ეფექტი არ გაცნობა FMD-ს მნიშვნელობაზე.

ლიტერატურაში არ არსებობს ნორმული ნაკად-დაზიანებული ი ვაზოდilatაციის პროცენტული მანუშის მკაცრი მნიშვნელობა. ამასთან, დადგენილია, რომ ჯანმრთელი მოხალისეების მხრის არტერიის მაქსიმალური ცვლილება ნაკად-დაზიანებული ი dilatაციის დროს მერყეობს 10-20%-ის ფარგლებში [34].

სისხლძარღვთა ფუნქციური მდგომარეობის შესაფასებლად, ექსპერტების მიერ რეკომენდებულია ნაკად-განპირობებულ ი ვაზოდilatაციის პარალელურად ენდოთელიუმ-დაზიანებული ი ვაზოდilatაციის გამოკვლევა, რაც სისხლძარღვთა გლუვკუნთოვანი უჯრედების ფუნქციური მდგომარეობის განმსაზღვრელია [122]. დადგენილია, რომ კარდიოვასკულური რისკ-ფაქტორების რაოდენობრივი მატება ასოცირებულია ნიტროგლიცერინის ეფექტის შემცირებასთან, მიუხედავად ენდოთელიუმ-დაზიანებული ი ვაზოდilatაციის დონისა, რაც განსაკუთრებით მნიშვნელოვანია რისკის სტრატეგიაში.

1.2.7. ენდოთელიური ფუნქციის რიტმული ვარიაციები

ზუსტად უცნობია, და შესაბამისად ადამიანში ცირკადული რიტმი განისაზღვრება ენდოგენურ "პეისმეიკერში", კერძოდ ჰიპოთალამუსში მოთავსებული სუპრატალამური ბირთვი. პინეალური ჯირკვლის არის ნეიროენდოკრინული გადამცემი, რომელიც რეტინალური ფოტორეცეპტორებიდან რეტინოჰიპოთალამური ტრაქტი მიხედვით ინფორმაციას სპასუხოდ ინფორმაციას პირდაპირ სუპრატალამური ბირთვიდან იღებს. რეტინადან მოვდებული ინფორმაციის სპასუხოდ სუპრატალამური ბირთვი ანიჭებს პინეალურ ჯირკვალს, რომელიც თავის მხრივ გამოყოფს hormoneბს: სეროტონინს – დრისინს და მელატონინს – რამინს [123].

დადგენილია, რომ სისხლძარღვოვანი სისტემის ზოგიერთი კომპონენტი (მაგ. ენდოთელიური უჯრედების აქტივობა, ლეიკოციტებისა და ტრომბოციტების ურთერთქმედება, ლიპოპროტეინების მეტაბოლიზმი) აქტივობა დრე-რამურ რეგულაციას ექვემდებარება. შესაბამისად, არნისული პროცესები ექვემდებარებიან

endogenur cirkadul saatsa da egzogenur faqtorebs, rogoricaa sinaTI esibnel is cikli. endoTelium-damokidebul i vazodil ataciac meryeobs dRis ganmavl obaSi. aRniSnul i ritmul oba dakargul ia dadgenil i koronarul i daavadebis mqone individebSi da TviT aTeroskl erozis adreul safexurebzecki [123].

cirkadul i ritmi CarTul ia kardiovaskul uri da cerebrovaskul uri daavadebebis ganviTarebis paTogenezSi. miokardiumis infarqtis, kardial uri arITmiis, uecari kardiul i sikvdil isa da insul tis SemTxvevaTa pikuri maCvenebel i dil is saatebSi aRiniSneba (06:00-dan 12.00-mde), xol o yvel aze dabal i maCvenebel i Ramis saatebSi [124]. kvl evebma aseve gamoavl ina l eikocitebis aqtivaciisa da endoTel uri funqciis droze damokidebul i cvl il ebebi, rac Sesazl oa wamyvan rols TamaSobdes Trombozsa da anTebiTi cvl il ebebis ganviTarebaSi. zemoaRniSnul i Sesazl oa aixsnas avtonomiuri nervul i sistemis momatebul i aqtivobita da mocirkul ire kateqol aminebis gazrdil i doniT dil is saatebSi, rac asocierebul ia gazrdil sisxl ZarRvovan tonustan, mocirkul ire sisxl is mocul obasa da wnevasTan.

Walters [123] mier naCvenebi iqna, rom estradiol is fiziologiuri done iwvevs koronarul i arteriebis rel aqsacias da astimul irebs endoTel uri uj redbis mier NO-s produqcias. Hashimoto et al. [125], Taddei et al. [325] avtorebma ki gamoavl ines, rom mxris arteriis endoTelium-damokidebul i vazodil atacia izrdeba menstruaciis fazidan gvian fol ikul ur fazamde, mcirdeba adreul i l uTeinuri fazidan da kvl av izrdeba gviani l uTeinuri fazisas. aRniSnul i absol uturad Seesabameba sisxl Si estrogenebis Semcvel obis dones menstrual uri cikl is ganmavl obaSi.

endoTeliumis funqciuri mdgomareobis Sesafasebel i dReisaTvis momqmedi gaidl ainis mixedviT, yvel a zemoaRniSnul i faqtori unda iqnas maqsimal uri sizustiT gaTval iswinebul i real uri Sedegebisa da kvl evis maRal i sarwmunoobis mi saRebad.

1.2.8. sisxl ZarRvTa endoTel iumis funqciuri mdgomareoba arteriul i hipertenziisa da kardi o-vaskul uri risk-faqtores arsebobis dros

mecnierTa Soris ar arsebobs erTiani azri da sarwmuno mtkicebul eba ed-is arsebobis Sesaxeb ah-is dros [17,52,78,79,80,81,82,371]. avtorTa umravl esoba adasturebs, rom nakad-damokidebul i vazodil atacia darRveul ia ah-is mqone periferiul da koronarul i cirkul aciis kunTovani tipis arteriebSi [56,83]. amastan, literaturaSi arsebobs aRniSnul is sawinaaRmdago monacemebic. Cockcroft et al. [84] avtorTa j gufma kvl evis Sedegad aCvena, rom ah-is mqone pacientebS SenarCunebul i aqvs endoTel ium-damokidebul i vazodil ataciis unari da ed-is arsebobis ganzogadeba yvel a hipertenziul pacientze, arakoreqtul ad mi iCnies. sawinaaRmdago daskvnamde mividnen Sainani da Maru [85], romel Tac kvl evis Sedegebze dayrdnobiT daadgines, rom ed Tan axl avs ah-is TviT msubuq formebsac ki. amastn, bol o drois Framingham Heart Study-m [86] ver gamoavl ina ed-is mizezobrivi kavSiri ah-is ganviTarebaSi.

mkvl evarTa Soris ar arsebobs erTiani azri ed-s, ah-is xangrZl ivobasa da xarisxs Soris damokidebul ebis Sesaxeb. Lauer et al. [87] kvl evisas ar gamovl inda kavSiri nakad-ganpirobebul vazodil ataciasa da aw-is xangrZl ivobas Soris. aRniSnul i avtorebma axsnes imiT, rom ah-is xangrZl ivoba fardobiTi sididea da misi zusti gansazRvra praqtikul ad SeuZl ebel i.

ed-is ganviTarebis paTogenezuri meqanizmi ah-is dros ar aris srul ad axsnil i. literaturaSi cnobil ia, rom ed SesaZl oa win uswrebdes da monawil eobdes ah-is ganviTarebaSi.

Plavnik et al. [88] daaskvnes, rom janmrTel , aTeroskl erozis tradiciul i risk-faqtores armqone normotenziul popul aciaSi sistol uri wnevis mcire matebasac ki SeuZl ia endoTel iumis funqciuri mdgomareobis gauareseba. Bonetti et al. [73], Harris et al. [89] ed-s ganixil aven, rogorc maRal i riskis pacientebis identifikaciisaTvis saWi ro diagnostikur iaraRs. Iiyama et al. [79], Palmieri et al. [90], Zizek et al. [91] monacemebiT, erT-erTi yvel aze adreul i cvl il eba romel ic vl indeba TviT 1 xarisxis ah-is dros an hipertenziis oj axuri istoriis mqone maRal i

normul i wnevis mqone indivi debSi, aris endoTel iumis dazianebul i pasuxi reaqtiul hiperemiaze. Lauer et al. [87] kvl evis Sedegad daaskvnes, rom ah-is mqone pacientebS aReniSnebaT nakadis Sencirebul i rezervi. Rizzoni et al. [92] kvl evis Sedegebze dayrdnobiT gaakeTes daskvna, rom ed damokidebul ia ara sisxl ZarRvTa struqturul dazianebase da hipertenziis etiologiaze, aramed hemodinamikur cvl il ebebze. Gokce et al. [11] avtorebma gamoavl ines, rom ah-is dros aRiniSneba rogorc endoTel ium-damokidebul i, aseve endoTel ium-damoukidebel i vazodil ataciis darRveva, rac metyvel ebs srul iad sisxl ZarRvovan da ara romel ime konkretul i Sris disfunqciaze. Lauer et al. [87] azriT, ah-is dros mxris arteriis endoTel ium-damoukidebel i vazodil ataciis darRveva ganpirobepul i unda iyos ara sisxl ZarRvTa gl uvkunTovani uj redebis dil ataciis unaris daqvei TebiT, aramed kunTovani tipis arteriebis remodel irebiT, kerZod sisxl ZarRvis gazrdil i sawyisi diametriT mosvenebis mdgomareobaSi. Perticone et al. [44] kvl evis Sedegad pirvel ad dadginda, rom winamxris ed aris kardiovaskul uri garTul ebebis ganvitarebis Zl ieri prediqtori ah-is dros.

Dzau da Gibbons Teoriis mixedviT, kardiovaskul ur daavadebaTa praqtikul ad yvel a risk-faqtors SeuZl ia sisxl ZarRvovani endoTel iumis dazianeba, NO-s qronikul i deficitis gamowveva da aTeroTrombozisa da aTeroskl erozis srul i kaskadis CarTva [14]. dReisaTvis ar arsebobs erTiani azri endoTel uri disfunqciis pirvel adi Tu meoradi ganvitarebis Sesaxeb ah-is dros. ed ganxil eba rogorc faqtori, romel ic amZimebs ah-is mimdinareobas da auaresebs prognozs [14]. endoTel ium-damokidebul i vazodil ataciis dazianebis meqanizmi ah-is mqone pacientebSi SesaZl oa aixsnas [1,25,87]: a) NO-s Sencirebul i warmoqmna da gamoyofa; b) NO-s gazrdil i inaqtivacia/degradacia Tavisufal i radikal ebis mier; g) membranul i receptorebis mgrZnobel obis Sencireba gadanacvl ebis daZabul obis mimarT; d) vazokonstriqtorul i substanciebis momatebul sintezi.

endoTel uri funqcia SesaZl oa gauaresdes kardiovaskul uri sistemis tradiciul i risk-faqtorebis [93-96,328], oj axuri hiperqol esterinemiis [97], mwevel obis, Saqriani diabetis da hiperhomocisteinemiis [56], aqtiuri da pasiuri mwevel obis [98] Tanaarsebobs dros. Vita et al. [99] mtkicebiT,

kunTovani da rezisi tiul i tipis arteriebis vazodil atatorul i funqciis darRvevas gaaCni a udidesi prognozul i mniSvnel oba.

Taddei et al. [100] ed-is arseboba gamoavl ines hipertenziul pacientTa j anmrTel STamomavl obaSi. Taddei et al. [101,102], Некрутенко и др. [103] kvl evi s Sedegad mividnen daskvnamde, rom asakis mateba kavSirSia endoTel iumis acetil qol inze pasuxis SesustebasTan rogorc hipertenziul aseve normotenziul pacientebSi.

1.3. arteriul i wnevis cirkadul i variabel oba da misi klini kur-prognozul i mniSvnel oba arteriul i hipertenziis mqone pacientebisaTvis

1.3.1. arteriul i wnevis gazomvis istoria da meTodebi

arteriul i wnevis gazomvis istoria 1733 wl idan iwyeba Reverend Stephen Hales-is aRmoCeniT, romel mac cxenis arteriaze dadebul minis mil akSi sisxl is donis matebis tendencia gamoavl ina. aw-is sazomi xel sawyos Seqmnis pirveli mcdel oba S. Basch-s (1876w) ekuTvnis. meTodis daxvewil i versia da gaumj obesebul i manJeti SemoTavazebul i iqna italiei i mecnielis Scipione Riva-Rocci-is (1896) mier, romel ic iTvl eba tradiciul i sfigmomanometris Semqmnel ad. riva-roCis manJeti sul raRac 4-5 sm siganis iyo da iZl eoda 30 mm.vvysv-iT ufro maRal monacemebs real urTan SedarebiT. manJetis modifikacia F. Reckling-hausen-is mier ganxorciel da, romel ic 12 sm. siganis iyo da praqtikul ad bol o wl ebamde ar Secvl il a [126]. 1905 wl amde, aw-is gazomva izol irebul ad pal paciur meTods efuZneboda. korotkovi aris aw-is gazomvis auskul taciuri meTodis fuZemdebel i, romel mac garkveul wil ad Caanacvl a pal paciuri meTodi da farTod dainerga klini kur praqtikaSi. aw-is 24-saaTiani intraarteriul i invaziuri ambul atoriul i monitoringi ganxil eba rogorc "oqros" standarti da yvel a arainvaziuri monitoringis aparatebi saWiroeben masTan val idacias.

arteriul i wnevis ambul atoriul i monitoriebis (awam) meTodis fuZemdebl ad Maurice Sokolow, San Francisco, California (1950-iani wl ebi) iTvl eba.

aw-is ambul a toriul ad gasazomi pirvel i arainvaziuri aparati gamogonebul iqna 1962 wel s. meTodi naxe vr ad-avtomaturi iyo, ramdenadac haeris Catumbva manJetSi uSual od pacientis mier manual urad xdeboda. aparatis moqmedebis principi auskul taciur fenomenze, kerZod korotkovis tonebis aRqmaze iyo dafuZnebul i. ingl isSi, oqsfordis universitetSi eqim Frank Stott-is mier Sei qmna pirvel i srul ad avtomaturi sisxl is wnevis sazomi monitori, romel is saSual ebi Tac pirvel ad ganxorciel da wnevis gazomva Zil is periodSi.

1.3.1.1. arteriul i wnevis ambul a toriul i moni tori rebis aparat Ta tipebi

dRes arsebul i awam-is aparatebi msubuqia, advil ad satarebel i, zusti, uxmauro, avtomaturi, programirebadi da kompiuterTan adaptirebul i [127,128]. awam-is teqnika emyareba oscil ometrul an auskul taciur principis. awam-is auskul taciur principze dafuZnebul i aparatebis dadebi T mxared iTvl eba is, rom xel is moZraoba ar asoci rdeba cdomil ebasTan. amasTan, garemoSi arsebul i bgerebis mimarT aparati mgrZnobiarea, rac cdomil ebis mizezi SesaZl oa gaxdes. oscil ometrul i awam-is aparatebi mgrZnobiarea aw-iT ganpi robebul i sisxl ZarRvTa vibraciis mimarT. oscil ometrul i meTodi ar reagirebs garemoSi arsebul xmaurze, Tumca xel is sivrceSi gadaadgil eba an izometrul i datvirTva SesaZl oa cdomil ebis mizezi gaxdes. orive teqniki s gamoyenebisas manJetSi haeris Catumbvisa da gamoSvebis siCqare, gazomvaTa sixSire, maqsimal uri da minimal uri Catumbvis wnevis programireba sistemaSi SesaZl ebel ia eqimi-mkvl evaris Sexedul ebaTa mixedviT [129].

1.3.1.2. arteriul i wnevis ambul a toriul i moni tori rebis Catarebis Cvenebebi da rekomendaci ebi

awam-is Catarebis Cvenebebi araerTgvarovania meTodur rekomendaciebsa da eqspertTa mosazrebebSi. amasTan, miuxedavad garkveul i SezRudvebis arsebobisa, pacientTa kontingenti, sadac unda Catarades awam, mzar di xasiaTisaa. kl inikuri mdgomareobani, romel Ta dros rekomendirebul ia

awam-is Catareba, garkveul wil ad gansxvavebul ia JNC 7-isa da ESH/ESC 2007- is gaidl ainebSi. amasTan, kl inikur mdgomareobaTa CamonaTval i, romel ic saWiroebs awam-is Catarebas, ufro vrcel ia evropis gaidl ainSi (ix. *damateba 1*).

garda gaidl ainebiT gaTval iswinebul i Cvenebebisa, hipertenziis dargSi momuSave eqspertebis rekomendaciebiT, awam unda Catardes Semdeg SemTxvevebSi [130]:

- yvel a axl ad diagnostirebul hipertenziul pacientSi, romel Tac diagnozi daesvaT kl inikur gazomvebze dayrdnobiT [127];
- mosazRvre da labiluri hipertenziis mqone pacientebSi [131,132,133];
- pacientebSi, sadac aRiniSneba samizne organoTa dazianebis progresireba, miuxedavad adeqvaturi sisxl is wnevis kontrol isa, ofisis sisxl is wnevis gasinj vebis monacemebiT [131,132,133];
- maRal i riskis pacientebSi (mag. gadatanil i insul ti, Saqriani diabeti) ah-is kontrol is donis Sesafasebl ad [131];
- mkurnal obis taqtikis gansazRvris mizniT moxuc pacientebSi [131];
- “TeTri xal aTis normotenziis” anu “SeniRbul i hipertenziis” gamosaricxad [134].

imisaTvis, rom monacemebs gaaCndeT maRal i sizuste, awam-is Catarebisas mkvl evarTamier dacul i unda iqnas eqspertTa rekomendaciebi awam-is Catarebis Sesaxeb, rac mocemul ia Sesabamis gaidl ainSi (ix. *damateba 2*).

1.3.1.3. arteriul i wnevis 24-saaTiani monitori rebis Catarebis teqniki aspektebi

dadgenil ia, rom awam wnevis kl inikur gazomvebTan SedarebiT ukeT korel irebs samizne organoTa dazianebasTan [135,136]. amasTan, is erTaderTi meTodia, romel ic iZl eva Ramisa da cirkadul i wnevis variabel obis Sefasebis saSual ebas.

T. Pang and M. Brown [137] mīer Catarebul i kvl evis Sedegebma ačvena, rom pacientis asaki, wona, sqesi, mxris garSemoweril oba da hipertenziis xarisxi korel irebs awam-is aparaturis SecdomasTan, amasTan aRniSnul i cdomil eba Zal ian mcirea imisaTvis, rom zegavl ena moaxdinos kl inikur Sedegebze. arteriul i wnevis mateba asocierebul ia sifxizl es, mental ur da fizikur aqtivobasTan; xol o daqveiteba mosvenebasa da Zil is periodTan [135,138]. awam-as mniSvnel ovania Zil isa da RviZil is periodebis zusti Sefaseba. amisaTvis zogi avtori upiratesobas dRiuris Sevsebas aniWebs, zogic drois fiqsirebul i interval ebiT kvl evas [139]. O'Brien [140], Rachmani et al. [141] rekomendacias uweven msubuqi sedativebis gamoyenebas awam-is Catarebis periodSi, diskomfortis Tavi dan acil ebis mi zni T.

Conen et al. [142] hospital izebul pacientze Seiswavl es aw-is 24-saaTiani monitoringis meTodis Catarebis upiratesobani hospital ur pirobepSi. kvl evis Sedegad maT daaskvnes, rom hospital ur pirobepSi monitorireba ufro Sedegiana aradiagnozirebul i hipertenziis gamosavl enad. maT mier gakeTebul daskvnas hyavs mraval i oponenti, romel nic sxvadasxva kvl ebebze dayrdnobiT upiratesobas ambul atoriul pirobepSi Catarebul monitorirebas aniWeben da mocemul avtorTa SemoTavazebas "moul odnel s" uwodeben.

dargis eqspertebis daskvniT, awam kl inikur-prognozul i aspeqtebi dan gamomdinare ufro farTod unda gamoiyenebodes yovel dRiur kl inikur praqtikaSi. amasTan, aucil ebel ia misi Catareba pacientisaTvis Cveul garemoSi da ara kl inikur pirobepSi [142,143].

eqspertTa rekomendaciiT imisaTvis, rom awam-iT miRebul i Sedegebi fl obdes did kl inikur da prediqtorul mniSvnel obas, aucil ebel ia gamoyenebul i aparati zustad Seesabamebodes 1987 wel s The Association for the Advancement of Medical Instrumentation (AAMI) mīer gamoqveynebul rekomendaciebs el eqtrul i an aneroidul i sfigmomanometrebis standartebis Sesaxeb, romel ic British Hypertension Society-s [144,350] 1990 wl is protokol is Semadgenl obaSia Sesul i. 1993 wel s arsebul i reviziis dros, standartebi mowonebul iqna da dResac aqtual uria mocemul dargSi [145]. amas garda, Blood Pressure Monitoring Group of the European Society of Hypertension-ma gamoqveyna

gamartivebul i protokol i awam-is standartizaciis Sesaxeb mwarmoebel TaTvis da mkvl evarTaTvis [146].

1.3.14. arteriul i wnevis cirkadul ritmze moqmedi faqtorebi

aw metad variabel uri parametria. maRal ia misi fl uqtuacia dRe-Ramis ganmavl obaSi; gansakuTrebiT maRal ia dil as, gaRviZebis saaTebSi da minimal ur mniSvnel obas Ramis saaTebSi, Zil is dros aRwevs [143]. normaSi, dRis wnevis maCvenebel ebi aRemateba Ramis wnevis dones. aRniSnul i asocierebul ia simpaTikuri nervul i sistemis aqtivobis matebasTan sifxizl is saaTebSi. dadgenil ia, rom 24 saaTian sisxl is wnevis profil ze gavlenas axdens garemosa da qceviTi faqtorebi [349]. janmrTel pirebze Catarebul ma kvl ebebma, sadac minimumamde iyo dayvanil i garemos zegavl ena individze, gamoavl ina rom egzogenuri faqtorebi wamyvania aw-is ritmul obaSi [147,364].

Cavelaars et al. [148] aw-is 24-saaTiani invaziuri gamokvl eviT Seiswavl es fizikuri aqtivobis (wola, jdoma, dgoma da siarul i) gavlena aw-is cirkadul ritmze. kvlevis Sedegad gamovl inda, rom dRis aw mniSvnel ovnad aris damokidebul i fizikuri aqtivobis tipze. kerZod, siarul i dakavSirebul ia sistoluri wnevis dRe-Ramuri variabel obis zrdasTan da diastoluri sisxl is wnevis cirkadul i variabel obis SencirebasTan. Cavelaars et al. [148] Sedegebis anal izisas miuTites, rom diperobis fenomeni ar aris dakavSirebul i fizikuri aqtivobis tipsa da raodenobasTan, romelic Seasrula pirma dRis ganmavl obaSi; Sesabamisad, fizikuri aqtivoba ar aris wamyvani faqtori diperoba/non-diperobis statusis gansazRvraSi. amasTan aRsaniSnavia, rom cal keul individiSi sisxl is wnevis Ramis dawevis xarisxi mniSvnel ovna da damokidebul i droze, romelic daijarja cal keul i aqtivobis Sesasrul ebl ad dRis ganmavl obaSi. garda aRniSnul isa, Cavelaars et al. kvlevis Sedegad daaskvnes, rom aw-is Ramis dawevis xarisxe moqmedebis Ramis ganmavl obaSi arsebul i fizikuri aqtivoba, uziloba, Zil is apnoes sindromi, xvrinva, Zil is sxvadasxva saxis darRvevebi. da bol os, non-diperebSi arsebul i cirkadul i profili Sesazl oaganpirobepul i iyos manJetis gabervisas Seqmnil i diskomfortiT Zil is ganmavl obaSi.

cnobil ia, rom garda fizikuri aqtivobisa, aw-ze gavl enas axdens fsiqo-emociuri gadaZabva da stresebi. pirovnebis fsiqol ogiuri tipi garkveul wil ad gansazRvravs e.w. "TeTri xal aTis" anu "izol irebul i ofisis" hipertenziisa [149-151] da e.w. "TeTri xal aTis normotenziis" anu "SeniRbul i hipertenziis" gamovl inebasac [152,153].

1.3.15. arteriul i wnevis ambul atoriul i monitorirebis upiratesobani arteriul i wnevis diagnostikis sxva meTodebTan Sedarebi T

mraval ma kvl evam gamoavl ina aw-is 24-saaTiani ambul atoriul i monitorirebisa da saxl is pirobebSi gazomili wnevis klini kur-prognozuli upiratesoba e.w. "ofisis wnevasTan" Sedarebi T [143]. hipertenziis mocemuli dargis eqspertebi mkacr rekomendacias uweven, rogorc aw-is 24-saaTiani ambul atoriul i monitoringis, ise saxl is pirobebSi wnevis TviTgazomvis ganxorciel ebas ah-is diagnostirebis mizniT, gansakuTrebiT im pirebSi, sadac arsebobs eWvi "TeTri xal aTis hipertenziis arsebobaze" [154]. riskis Sefasebisas da mkurnal obis taqtikis SerCevisaTvis mniSvel ovania izol irebul i klini kuri hipertenziis anu e.w. "TeTri xal aTis hipertenziis" diagnostireba. misi prognozuli mniSvel obis Sesaxeb azri eqspertebs Soris urTierTsawinaaRmdgoa. zogierTi avtori aRniSnuli hipertenziis gavrcel ebis did procentze miuTitebs, rac Mancia and Parati [155] azriT real obas mokl ebul ia da gazomvebSi daSvebul i Secdomebis bral ia.

pirovnebis individual uri riskis SefasebisaTvis da prognozuli Tval sazrisiT Seucvl el meTods awam warmoadgens, radgan aw-is cirkadul variabel obas dReisaTvis udidesi prediqtorul i mniSvel oba eniWeba. amasTan, dReisaTvis, aw-is SemTxveviTi klini kuri gazomvebi hipertenziis skringisa da diagnostikis qvakuTxedad rCeba.

1.3.2. arteriul i wnevis cirkadul i profil i normasa da paTol ogiis dros

O'Brien [139] da Stolarza [156] aw-is 24 saaTian profil Si ganasxvaveben 3 fanj aras, kerZod: a) saRamos b) Ramis anu bazal uri da g) gaRviZebiswina anu dil is fanj ara. normaSi, saRamos fanj araSi aRiniSneba aw-is daqveiTebedRis wnevasTan SedarebiT, romel ic pl atos bazal ur fanj araSi aRwevs ("diperi" profil i) da Semdgom isev imatebs dil is fanj araSi da aRwevs dRis wnevis dones.

TiTqmis yvel a individs axasiaTebis aw-is erTidaigive variabel oba, kerZod aw-is piki viTardeba dil as, gaRviZebis momentSi, Semdeg TandaTan ikl ebs da minimal ur mniSvnel obas SuaRamisas aRwevs [138].

rogorc j anmrTel , ise hipertenziul pirebSi sistol uri da diastol uri wnevis cifrebi Ramis periodTan SedarebiT ufro maRal ia dRis ganmavl obaSi [157]. normaSi, saRamos dadgomasTan erTad iwyeba wnevis mdgradi daqveiTeba, ise rom minimal ur mniSvnel obas SuaRamis 0⁰⁰-dan 2⁰⁰ saaTamde aRwevs. Ramis 2⁰⁰-saaTidan iwyeba wnevis nel i, magram myari mateba, romel ic 4⁰⁰ saaTis Semdeg xdeba ufro mkveTri manam, sanam ar miaRwevs dRis dones. wnevis dil is mateba iSviaTad aRemateba 20/15 mm.vwy.sv-s da praqtikul ad ar aWarbebs 140/90 maCvenebel s. awam aris erTaderTi meTodi, romel ic iZl eva dil is hipertenziisa da wnevis dil is matebis detal urad Seswavl is Sesazl ebl obas.

arteriul i wnevis Ramis daqveiTebis xarixxis gamosaTvl el ad eqspertTa mier [138] mowodebul ia formul a: wnevis Ramis daqveiTebis xarixxi = $(1 - \frac{saSual o Ramis wneva}{saSual o dRiuri wneva}) \times 100$.

dil is presorul i aweva, anu e.w. "dil is presorul i tal Ra" aris sisxl is wnevis moul odnel i mateba dil iT, adami anis gaRviZebis momentSi [158]. dReisaTvis eqspertTa Soris ar arsebobs konsensusi "dil is presorul i tal Ris" gansazRvris Sesaxeb. upiratesad igi ganisazRvreb orgvarad: a) Ramis ganmavl obaSi wnevis yvel aze Zl ieri vardnisa (dil is sistol ur wnevas minus umdabl esi sistol uri wneva Ramis ganmavl obaSi) da b) gaRviZebiswina (dil is sistol ur wnevas minus gaRviZebamde arsebul i wneva) wnevis cifrebis mixedviT. mkvl evarTa umetesoba meore variants ani Webs upiratesobas [138]:

“dil is presorul i tal Ra” = gaRviZebidan 2 saaTis ganmavl obaSi arsebul i saSual o sistol uri wneva - gaRviZebamde 2 saaTis ganmavl obaSi arsebul i saSual o sistol uri wneva.

Gibson et al. [159] ganixil avs ori saxis dil is hipertenzias: 1) pacientebi, romel Tac aReniSnebaT dil is hipertenzia, rogorc Ramis saaTebSi momatebul i wnevis uwyveti komponenti, anu e.w. nondiperi pacientebi da 2) e.w. “dil is presorul i tal Ra”, rac garkveul wil ad kavSirSia aw-is zezRurbl ovan daqveiTebsTan Ramis saaTebSi. am pacientebisaTvis, Ramis wnevis daqveiTebs xarisxi dRis wnevasTan SedarebiT aRemateba 20%. normaSi janmrTel, normotenziul individebs aReniSnebaT aw-is dil is mateba gaRviZebis saaTebSi, rac gaRviZebidan ramdenime saaTSi ganicdis normal izacias [160].

1.3.3. arteriul i wnevis kl asifikacia 24-saaTiani ambul atoriul i moni tori rebis mixedvi T

1.3.3.1. kl asifikacia arteriul i wnevis dRe-Ramuri ritmis mixedvi T

dadgenilia, rom sisxl is wneva mniSvnel ovnad varirebs dRe-Ramis ganmavl obaSi, magram am cvl il ebaTa prognozuli mniSvnel oba jer ki dev diskusiis sagnad rCeba [129,161]. individTa umetesobas Ramis saaTebSi, kerZod Zil is dros aReniSneba aw-is daqveiTeba, rasac Tan axl avs gul iscemis sixSiris gaiSviaTebac [154,162]. normaSi, Zil is rem-fazis (Tval is kaklebis swrafi moZraobis faza) dros, romel ic xasiaTdeba xSiri gamoRviZebebiT, aw imatebs daaxl oebiT 5%-iT. xolo Zil is non-rem-fazis dros, romel ic Seadgens Zil is 75-80%-s da Warbobs Ramis pirvel naxevarSi, aRiniSneba arteriul i wnevis 5-14%-iani daqveiTeba dRis wnevasTan SedarebiT [163]. amastan gamovl inda, rom individTa garkveul nawil Si ara Tu ar aRiniSneba wnevis daqveiTeba Zil is periodSi, aramed SeiniSneba matebis tendenciak ki. aRniSnuli faqti daedo safuZvl ad aw-is cirkadul i profil is mixedvi T SemuSavebul kl asifikacias.

sisxl is wnevis diperi/non-diperi kl asifikacia pirvel ad 1988 wels, O'Brien et al. mier iqna SemoRebul i, mas Semdeg rac retrospeqtul i anal iziT

pacientebSi non-diperi wnevis profil iT diper profil Tan SedarebiT insul tis maRal i riski gamovl inda.

diperisa da non-diperis gansazRvra araerTgvarovania sxvadasxva kvl evaSi [164-166]. kl asifikaciisaTvis arsebobs ramdenime meTodol ogiuri midgoma. kerZod, Verdecchia et al. [167] azriT kl asifikaciur struqturas safuZvl ad unda edos wnevis 10%-iani daqveiTeBa Ramis saaTebSi dRis wnevasTan SedarebiT. dReisaTvis normad miCneul ia aw-is Ramis dawewis xarisxi 10-19%, anu diperi sisxl is wnevis cirkadul i profil i.

dReisaTvis momqmedi aw-is cirkadul i profil is kl asifikacia aseTia [157]: eqstremdiperi (sistol uri wnevis Ramis dawewis xarisxi $\geq 20\%$); diperi (sistol uri wnevis Ramis dawewis xarisxi 10%-dan 19%-mde); aradiperi (sistol uri wnevis Ramis dawewis xarisxi 0%-dan 9%-mde) da Sebrunebul i diperi (sistol uri wnevis Ramis dawewis xarisxi $< 0\%$ an aRiniSneba misi mateba).

25-dan 74 wl amde asakis pirTa wnevis cirkadul i profil is Seswavl am gamoavl ina, rom wnevis dawewis saSual o maCvenebel i Ramis saaTebSi erTgvarovania sxvadasxva asakobriv j gufSi [168,169]. Verdecchia et al. [170] monacemebiT, mosaxl eobis 10-40%-Si aRiniSneba nondiperi sisxl is wnevis cirkadul i profil i.

kvle vaTa umravl esobam aCvena, rom is pacienti roml ebic iyven diperi sistol uri wnevis cifrebis mixedviT, miekuTvnebodnen aradiper sisxl is wnevis cirkadul profil s diastol uri wnevis cifrebis mixedviT. Sesabamisad, mecnierTa Soris arsebobs araerTgvarovani azri diperobisa da non-diperobis gansazRvraSi; diskusiis sagans warmoadgens, Tu romel i wneva - diastol uri Tu sistol uri - unda iqnas aRebul i kl asifikaciisaTvis.

Staessen et al. [169] diperoba/non-diperobis gansazRvrisaTvis iyenebdnen sistol ur wnevas; maTi mTavari argumenti iyo is, rom non-diper wnevis profil i ufro xSirad aisaxeba sistol ur wnevaze diastol urTan SedarebiT. O'Shea et al. [172] mosazrebiT, Ramis ganmavl obaSi anomal uri unda iyos rogorc diastol uri, ise sistol uri wnevis daqveiTebis xarisxi, raTa pacienti miekuTvnos non-diper kl asifikaciur erTeul s. Grote et al. [171], Mansoor et al. [173] kl asifikaciisaTvis saSual o wneva gamoiyenes.

ukanasknel ma "Consensus Conference on Ambulatory Blood Pressure Monitoring" aw-is cirkadul i profil is mixedviT kl asifikaciisaTvis daamtka sistol uri wnevis gamoyenebis aucil ebl oba [165].

diper/non-diper kl asifikacias hyavs Tavis mowinaaRmdegenic, romel nic gaumarTI ebl ad miicneven individTa aseT diqotomiur dayofas. magram bol o drois kvl ebebma gamoavl ina kavSiri nondiperobasa da marcxena parkuWis hipertrofiyas [167,174,175,176,177], cerebrovaskul ur daavadebebs [178,179], mikroal buminurias [180,181], Tirkml is dazianebas [182], kardiovaskul uri avadobasa [183] da sikvdil obas [184] Soris, ramac gaamyara arsebul i kl asifikaciis sandooba da gamoyenebis aucil ebl oba kl inikur praqtikaSi. diperobis profil is waSI aseve dafiqsirda pacientebSi Tirkml is ukmarisobiTa da Saqriani diabetiT, roml ebic aseve asocirdebian maRal kardiovaskul ur avadobasa da sikvdil obasTan [185-187].

1.3.3.2. Kl asifikacia arteriul i wnevis dRe-Ramuri cifrebi mixevi T

miuxedavad kl inikuriArteriul i wnevis kl asifikaciaTa simravl isa (ESH 2007, JNC 7, British, WHO-ISH da a.S.), dReisaTvis ar arseboobs awam-is kl asifikacia, damyarebul i wnevis doneze.

mraval ma kvl evam [188-193] aCvena, rom rogorc hipertenziis mqone, ise normotenziul i individebis saSual o dRe-Ramuri wneva kl inikur wnevasTan SedarebiT ufro dabal ia, rac ganpirobepul i unda iyos wnevis daqveiTebiT Ramis saatebSi. Sesabamisad, awam-iT miRebul i Sedegebis anal izisas, dauSvebel ia kl inikuri wnevis kl asifikaciebiT sargebl oba.

Bur et al. [194] iyvenen pirvel ebi, romel nic kl inikuri hipertenziis kl asifikaciaze dayrdnobiT Seecadnen awam-is kl asifikaciis SemuSavebas. maT mier aw-is normis zeda zRvrad 132/81 mm.vvy.sv. CaiTval a. Staessen et al. [195] bel giis mosaxl eobisaTvis normis zeda zRvrad 129/80 mm.vvy.sv. miicnies, kvl eva PAMELA-Si ki normad 128/82 mm.vvy.sv. CaiTval a [196,197]. amasTan saerTaSoriso monacemTa bazaSi normis zeda zRvrad dafiqsirebul ia 133/82 mm.vvy.sv. [198]. McGrath et al. [250] rekomendaciaTa Tanaxmad, sisxl is wnevis normal uri cifrebi zrdsrul i adami anisaTvis aris <135/85 mmHg dRis

ganmavl obaSi, <120/75 mmHg Rami s ganmavl obaSi da <130/80 mmHg dRe-Rami s (24-saaTis) ganmavl obaSi.

O'Brien et al. [145] SemuSavebul i rekomendaci ebis mi xedvi T, ambul atoriul ad gazomi l i wnevis kl asi ficireba aseTia:

a) dRis wnevis mi xedvi T:

- optimal uri wneva - <130/80
- normul i wneva - <135/85
- hipertenzia - >140/90

b) Rami s wnevis mi xedvi T:

- optimal uri wneva - <115/75
- normul i wneva - <120/70
- hipertenzia - >125/75

Sej erebul i kl asi fikaci is ararsebobis gamo, mi uxedavad awam-is saWi roebisa, ah-is xarixi unda ganisazRvros kl inikuri wnevis gazomvi T mi Rebul i cifrebis mi xedvi T.

1.3.4. arteriul i wnevis cirkadul i profil is prognozul i aspeqtebi

kardiovaskul uri garTul ebebis ganviTarebis sixSire dReRami s ganmavl obaSi variabel uria. miokardiumis infarqtis, uecari kardiul i sikvdil is, iSemiuri da hemoragiul i insul tis ganviTarebis piki dil is saaTebze modis (6⁰⁰-dan 12⁰⁰-mde), amasTan minimal uri sixSire Rami s saaTebSi registrirdeba [326,366]. Framingham Heart Study-s monacemebi T 7⁰⁰-dan 9⁰⁰-mde uecari kardiul i sikvdil is ganviTarebis al baToba 70%-iT imatebs. Kario et al. [199], Fagard et al. [367] gamoTqves varaudi, rom dil is saaTebSi kardiovaskul uri garTul ebebis al baTobis zrda Sesazl ebel ia ganpi robebul i iyos Trombocitebis agregaci is, hematokritis, fibrinogenis donis matebi T da Sesabamisad, Trombogenuri garemos Seqmni T.

Perloff et al. 1983 wel s Catarebul i kvl eva iyo pirvel i, romel mac gamoavl ina arteriul i wnevis ambul atoriul i monitorirebis kl inikur gazomvebTan Sedarebi T ufro Zl ieri prediqtorul i mniSvel oba. Dolan et al. [200] kvl evis mizans warmoadgenda awam-is prediqtorul i mniSvel obis gansazRvra saerTo da kardiovaskul ur sikvdil obaSi. saSual od 8.4 wl i ani prospeqtul i kvl evis Semdeg maT daaskvnes, rom awam-iT mi Rebul i Sedegebi kl inikur gazomvebTan Sedarebi T kardiovaskul uri sikvdil obis ufro

Zl ieri prediqtoria. SYST-EUR (The European Study on Isolated Systolic Hypertension in the Elderly) kvl evaSi [201] wnevis kl inikur gazomvebTan SedarebiT sikvdil obisa da kardiovaskul ur garTul ebaTa ganviTarebis prediqciis mxriv upiratesoba awam-s mieniWa. igive dadasturda iseT kvl evebSi, rogoricaa ELSA (European Lacidipine Study on Atherosclerosis), PHYLLIS (The Plaque HYpertension Lipid-Lowering Italian Study) da INSIGHT (International Nifedipine Study Intervention as a Goal in Hypertension Treatment (INSIGHT) study) [202]. kl inikur gazomvebTan SedarebiT, aw-is 24-saaTiani ambul atoriul i monitoringis SemTxveviT kl inikur gazomvebTan SedarebiT ukeTes prediqtorul mniSvel obaze gamosavl is prediqciis Tval sazrisiT miuTitebs mraval i sxva kvl evac [203-210]. amasTan, kvl evaTa umetesoba mcire masStabebiT gamoirCeva.

organoTa dazianebsa da 24-saaTiani awam-iT miRebul monacemebs Soris kavSiris gamovl enas mieZRvna mraval i kvl eva [211,212]. maT Soris aRsaniSnavia kvl eva SAMPLE (the Study on Ambulatory Monitoring of Pressure and Lisinopril Administration), romel mac gamoavl ina kavSiri aw-is 24-saaTiani ambul atoriul i monitoringis Sedegad miRebul dRis, Ramis da 24 saaTian saSual o wnevasa da samizne organoTa dazianebas Soris hipertenziis mqone pacientebSi.

mraval ma kvl evam daadastura dRis wnevasTan SedarebiT Ramis wnevis ukeTesi prediqtorul i mniSvel oba [177,184,213,214,215]. amasTan, pacientebi aw-is non-diperi cirkadul i profil iT, diperebTan SedarebiT xasiaTdebian kardio- da cerebrovaskul uri garTul ebebis ganviTarebis ufro maRal i al baTobiT [216,217].

R. Khattar et al. [218] kvl evi s mizans warmoadgenda 24-saaTiani invaziuri intraarteriul i sisxl is wnevis ambul atoriul i monitoringiT miRebul i dRe-Ramuri sistol uri, diastol uri, pul suri da saSual o wnevis prognozul i mniSvel obis gansazRvra saSual o da asakovan hipertenziul pacientebSi. 688 pacientze 10 wl iani meTval yureobis Sedegad mkvl evarebma gamoavl ines, rom ambul atoriul i sisxl is wnevis prognozul i mniSvel oba damokidebul ia asakze. diastol ur wnevas gaaCnda ukeTesi prognozul i mniSvel oba saSual o asakis individebisaTvis, xolo pul suri wneva yvel aze Zl ier prediqtorul xasiaTs moxucebSi avl enda, rac Sesazl oa

ganpi robebul i iyos hipertenziis hemodinamiki s Tavi seburebebi T sxvadasxva asakobrivi j gufis pacientebSi.

aw-is 24-saaTiani monacemebis sqesobriv gansxvavebaTa Seswavl as mieZRvna [219,220] kvl ebebi, sadac gamovl inda rom mamakacebSi qal ebTan SedarebiT ufro maRal ia saSual o 24-saaTiani arteriuli wneva.

Scholze et al. [221] fotopletizmografiuli metodis gamoyenebiT, aCvenes rom j anmrTel kontrol Tan SedarebiT ah-is mqone pacientebSi Ramis pirvel naxevarSi aRiniSneba sistemuri sisxl ZarRvovani tonusis mniSvel ovani zrda. Panza et al. [222], Taddei et al. [329] monacemebi T, endoTel iumis disfunqciis xarisxi korel irebs aw-is zrdasTan. Higashi et al. [223] gamoavl ines darRveuli endoTel ium-damokidebuli vazodil atacia non-diper pacientebSi. amasTan, endoTel ium-damoukidebeli vazodil atacia praqtikul ad ar gansxvavdeboda diperebsa da nondiperebs Soris. miuxedavad cal ekeul mkvl evarTa mcdel obisa, dReisaTvis nakl ebadaa Seswavl ili kavSiri aw-is 24-saaTian profil sa da endoTel iumis funqciur mdgomareobas Soris, rac Semdgom kvl evas saWiroebs.

awam-is irgvl iv arsebuli kvl evaTa umetesoba aris gamosavl is surogatul markerebze (mikroal buminuria, marcxena parkuWis hipertrofia) damyarebuli da ara kardiovaskulur sikvdil obaze orientirebuli prol ongi rebuli kvl eva [145], ris gamoc metodis farTo, rutinul klinikur praqtikaSi danergva j er ver ganxorciel da.

1.3.4.1. arteriuli wnevis Ramis dawevis xarisxis prognozuli mniSvel oba

monacemebi Ramis wnevis profil is prognozuli mniSvel obis Sesaxeb xangrZlivi drois ganmavl obaSi diskusiis sagans warmoadgenda, Tumca bol o drois gamokvl eebze dayrdnobiT eWvs ar iwvevs misi damoukidebeli risk-faqtorul i mniSvel oba kardiovaskulur sikvdil obaSi [145,224]. aRweril iqna, rom aw-is Ramis dawevis xarisxi SesaZl oa atarebdes insul tit avadobisa da sikvdil obisaTvis prediqtorul mniSvel obas [225,339]. amasTan, non-diperi sisxl is wnevis cirkaduli profil is paTogenezuri meqanizmi bol omde gaurkvel ia da ucno bia, SesaZl ebel ia

Tu ara darRveul i dRe-Ramuri wneviTi cikl is mkurnal obiT patientis prognozis gaumj obeseba [165,166,226].

aw-is Ramis daqveiTebis xarisxis risk-faqtorul i mniSvnel oba dReisaTvis ucnobia da mosazrebani mis Sesaxeb urTierTsawinaaRmdegoa. pirvel i prospeqtul i kvl eva, romel mac aCvena non-diperi profil is risk-faqtorul i mniSvnel oba kardiovaskul ur sikvdil obaSi miuxedavad aw-is cifrebisa 24 saaTis ganmavl obaSi, iyo Ohasama Study (2002w), romel mac iaponel mosaxl eobaze aCvena rom Ramis wnevis dawevs xarisxis yovel i 5%-iT Semcireba asocierebul ia kardiovaskul uri sikvdil obis 20%-iT zrdasTan. Ohkubo and colleagues 4.1 wl iani dakvirvebis Semdeg, gamoaqveynes Ohasama Study-is, iaponiis 1542 macxovrebel ze 9.2 wl iani dakvirvebis Sedegebi. maT gamoavl ines xazobrivi ukukavSiri aw-is Ramis dawevs xarisxsa da kardiovaskul ur sikvdil obas Soris, TviT normotenziul individebSi c ki [227]. aRniSnul is sawinaaRmdegod, Kario et al. [138] aCvenes Ramis saaTebSi aw-is mniSvnel ovani daqveiTebis risk-faqtorul i mniSvnel oba insul tis ganviTarebaSi.

Dublin Outcome Study-Si gamovl inda, rom Ramis saSual o sistol uri wnevis 10 mm.vwy.sv-iT zrda sikvdil obas 21%-iT zrdis [200]. mcire kvl evaSi, romel ic grZel deboda 31 Tve da moicavda 116 hipertenziul patients, Zweiker et al. [183] gamoavl ines statistikurad mniSvnel ovani kavSiri nondiper cirkadul profil sa da kardiovaskul ur garTul ebaTa ganviTarebas Soris.

Stergiou et al. [228] Seiswavl es awam-is monacemebi da gamoavl ines, rom gamokvl eul patientTa 75%-Si aRiniSna SuadRis Zil i. mocemul i periodi asocierebul i iyo wnevis mniSvnel ovan daqveiTebsTan da TiTqmis utol deboda Ramis Zil is dros wnevis daqveiTebis maCvenebebs [229,230]. Sesabamisad, aRniSnul pirebSi vl indeboda ori piki – dil isa da saRamos piki. kvl evs Sedegebze dayrdnobiT avtorebma daaskvnes, rom fizikuri aqtivobis uecari Sewyveta aris ara marto dRe-Ramuri variabel obis 2 pikis ZiriTadi determinanti, aramed aseve cerebrovaskul uri garTul ebebis ganviTarebis mniSvnel ovani xel Semwyobi c.

1.3.4.2. dil is wnevis/dil is presorul i tal Ris prognozul i mniSvnel oba

dadgenilia, rom dil is saaTebSi maRal i aw asociardeba kardiovaskuluri daavadebebis arsebobis maRal al baTobasTan [157,348]. amasTan, dil is saaTebSi maRal i aw SesaZloa ganpirobepuli iyos ara marto dil is presorul i tal RiT, aramed non-diperianew. naiTpikeri (anu SebrunebiTi diperi, reversdiperi) wnevis cirkaduli profil iT [231]. bol o droisklinikurma kvle ebma acvena gazrdili dil is wneviTi tal Ris riskfaqtorul i mniSvnel oba iSemiuri da hemoragiul i insul tis ganviTarebaSi [158,232,233,234].

Ohasama Study (2006w) [157,368] saSual od 10.4 wliani prospektuli kvle evaiyo, romelic moicavda 40 wel ze meti asakis 1430 patients; kvlevis drosar gamovlinda mniSvnelovani kavSiri insul tis saerto risksa da awis Ramis dawebis xarixs Soris, iseve rogorc kavSiri insul tis saerto risksa da dil is wneviT tal Ras Soris. Tavis tvinis infarqtis ganviTarebis riski mniSvnelovnad maRal iyo pacientebSi Ramis wnevis dawebis xarixiT <10%, SedarebiT im pirTagan, romel Tac aReniSnebodaT Ramis awis 10%-ze maRal i xarixiT daweva. mocemul kvle vaSi kavSiri dil is wneviTi tal Ris mniSvnel obasa da cerebraluri infarqtis ganviTarebis risks Soris ar gamovlenila.

Kario et al. [179] kvle vaSi, Ramis ganmavl obaSi wnevis yelaze Zlieri vardnis mixedviT gansazRvrul ma dil is wneviTi tal Ris matebam gamovlinda moukidebeli Zlieri kavSiri insul tis ganviTarebis riskTan. amasTan, dil is wneviTi tal Ris 10 mm.wy.sv-iT mateba asociardeboda insul tis riskis 22%-ian zrdasTan. gaRviZebamde 2 saatis ganmavl obaSi arsebul is wnevis mixedviT gamovlil ma dil is wneviTma tal Ram aseve gamovlinda insul tis ganviTarebis riskTan asociacia, TumcaRa aRniSnul ma ststistikur sarwmunoebas ver miarwia (P=0.07). kvlevis Sedegad avtorebma gaakeTes daskvna, rom Ramis ganmavl obaSi wnevis yelaze Zlieri vardnis mixedviT gansazRvruli dil is wneviTi tal Ra ukeT asaxavs aRniSnuli parametrisklinikur mniSvnel obas.

Marfella et al. [235] gamovlindes dil is wneviTi tal Ris matebis kavSiri aTerosklerozuli folaqis destabilizaciasTan. miuxedavad imisa, rom awis dil is mateba, anu dil is tal Ra fiziologiuri fenomenia, hipertenziul

pacientebSi aRiniSneba misi mkveTri zrda, rac warmoadgens aTeroskl erozul i procesisa da samizne organoebis dazianebis damoukidebel risk-faqtors [232]. Head et al. [236] kvl evis ZiriTadi Sedegi iyo is, rom avtorebma normotenziul individebisagan gansxvavebiT, hipertenziul pacientebSi gamoavl ines sisxl is wnevis 30-40%-iani zrda dil is saaTebSi, rac SesaZl oa kardiovaskul uri riskis zrdasTan iyos asocierebul i.

Gosse et al. [233] aRweres, rom dil is arteriul i wneviTi tal Ris yovel i 1 mm-iT mateba asocierebul ia kardiovaskul uri garTul ebebis ganviTarebis riskis 3.3%-ian zrdasTan. Kario et al. [199] kvl evam ki aCvena, rom aw-is dil is yovel i 10 mm.vwy.sv-iT mateba insul tis ganviTarebis risks 22%-iT zrdis. aRniSnul is sawinaaRmdegod, Staessen et al. [201] kvl evis Sedegad aCvenes, rom gazrdil i dil is wneviTi tal Ra asocierdeba kardiovaskul ur garTul ebaTa ganviTarebis dabal riskTan.

Tatasciore et al. [237] kvl evis mizans warmoadgenda "gaRviZebis" sistol uri wnevis variabel obasa da samizne organoebis dazianebas Soris kavSiris gamovl ena hipertenziul pacientebSi. kvl evis Sedegebze dayrdnobiT, mkvl evarebma daaskvnes, rom sisxl is wnevis arainvaziuri ambul atoriul i monitorirebiT miRebul i gaRviZebis sistol uri wneva, saSual o wnevis mniSvnel obisagan damoukidebl ad korel irebs samizne organoebis subkl inikur dazianebasTan. kvl evis avtorebis mtkicebiT, ah TviT daavadebis adreul etapzec ki ukve asocierdeba samizne organoebis (vaskul uri da kardiul i) dazianebasTan, rac ganpirobebul ia erTis mxriv uSual od sistol uri wnevis gazrdil i variabel obiT da meores mxriv, saSual o aw-is matebiT. mocemul kvl evaSi kavSiri wnevis Ramis variabel obasa da samizne organoTa dazianebas Soris ar gamovl inda. Sesabamisad, aRniSnul is axsna SesaZl ebel ia erTis mxriv 30 wuTiani interval ebiT wnevis zomvis araefekturobiT da meorec, dRisa da Ramis wnevebis sxvadasxva prognozul i da diagnostikuri mniSvnel obebiT [237].

Mancia et al. [155] azriT, prognozis gaumj obesebis mizniT, mkurnal oba mimarTul i unda iyos ara dil is wnevis Semcirebisaken, aramed 24 saaTis ganmavl obaSi wnevis saerTo daqveitebisa da kontrol isaken, raTa ar aRiniSnos mkveTri wneviTi gadasvl ebi cirkadul ritmebTan dakavSirebiT.

1.3.4.3. sistol uri da diastol uri wnevis prognozul i mniSvnel oba

Jer ki dev 1971 wels, Framingham Study-s monacemebi miuTitebdnen, rom 45 wl amde asakis mamakacebSi diastol uri sisxl is wneva yvel aze ukeT korel irebs koronarul i gul is daavadebis riskTan; xolo aRniSnul asaks zeviT izrdeba sistol uri wnevis prognozul i mniSvnel oba orive sqesis individebSi.

dReisaTvis, klinikuri sisxl is wnevis pirdapiri kavSiri sisxl ZarRvovan sikvdil obasTan dadasturebul ia; kerZod, sistol uri wnevis yovel i 20 mm.vwy.sv-iT zrda 115 mm.vwy.sv -s zeviT da diastol uri sisxl is wnevis 10 mm.vwy.sv-iT zrda 75 mm.vwy.sv zeviT minimum 2-jer zrdis insul tiTa da koronarul i daavadebiT gamowveul sikvdil obas [238,239]. amas garda, 61 prospeqtul i kvlevis metaanal iziT, romel Sic CarTuli iyo 1 milion adamianze meti gamovlinda, rom sistol uri wnevis 10 mm.vwy.sv-iT da distol uri wnevis 5 mm.vwy.sv-iT mateba asocierebul ia insul tit ganpirobebul i sikvdil obis riskis 40%-ian da kardiovaskul uri daavadebebiT ganpirobebul i sikvdil obis 30%-ian zrdasTan [238].

The Dublin Outcome Study [240] iyo pirveli didi masStabis, dasavl eTis hipertenziuli populaciis 8.4 wliani kvleva, romlis drosac gamovlinda awam-is upiratesoba klinikur gazomvebTan SedarebiT 5 wliani kardiovaskul uri sikvdil obis riskis stratificirebis mizniT. aRniSnul ma kvleam daadastura da daakonkreta Ohasama Study-iT miRebuli Sedegebi, kerZod kardiovaskul uri sikvdil obis mniSvnelovani kavSiri 24- saatian sistolur, 24- saatian diastolur, dRis sistolur, dRis diastolur da Ramis diastoluri wnevasTan [204].

1.3.4.4. pul suri wnevis prognozul i mniSvnel oba

Multiple Risk Factor Intervention Trial (MRFIT) iyo kvleva, romelic daiwyo aSS-Si 1975-1977 wlebsi. kvlevis mizans wadmoadgenda pul suri wnevis prognozul i mniSvnel obis gaanalizeba kardiovaskulur sikvdil obaSi 342 815 mamakacis magalitze, romel Tac anamnezSi ar aReniSnebodaT miokardiumis infarqti da Saqriani diabeti. analizisas gamovlinda, rom kardiovaskulur sikvdil obasTan pulsur wnevaze ukeT korel irebda sistoluri da diastoluri aw; amasTan, sistoluri da diastoluri aw-is

erTdrul i mateba kardiovaskul uri sikvdil obis ganviTarebis risks mniSvnel ovnad zrdida.

epidemiol ogiur kvl evebze dayrdnobiT gamoiTqva mosazreba pul suri wnevis damouki debel i risk-faqtorul i mniSvnel obis Sesaxeb kardiovaskul ur sikvdil obasa da avadobaSi [241-244]. Madhavan et al. [245], Benetos et al. [246], Franklin et al. [247], Khattar et al [341] kvl evebma gamoavl ina sistol uri da diastol uri wnevis cifrebisagan damouki debel i kavSiri pul sur wnevasa da kardiovaskul uri garTul ebebis ganviTarebas Soris. kvl eva PIUMA [207] iyo pirveli, romel mac SedarebiT janmrTel hipertenziul popul aciaSi gamoavl ina saSual o dRe-Ramuri pul suri wnevis damouki debel i prediqtorul i mniSvnel oba kardiovaskul uri avadobisa da sikvdil obis mxriv. P. Verdecchia et al. [207] PIUMA-s monacemTa bazis safuZvel ze Seiswavl es arasdroshnamkurnal ebi da garTul ebebis armqone 2010 arteriul i hipertenziis mqone pacienti da daaskvnes pul suri wnevis prediqtorul i mniSvnel oba kardiovaskul ur sikvdil obasa da garTul ebaTa ganviTarebaSi. Benetos et al. [248] normotenziul da hipertenziul mamakacebSi gamoavl ines saSual o aw-isa da pul suri wnevis damouki debel i prediqtorul i mniSvnel oba saerTo kardiovaskul ur, koronarul , yvel a mizeziT ganpirobetul da arakardiovaskul ur sikvdil obaTan mimarTebaSi. Madin et al. [249] avtorTa monacemebiT, axal gazrda individebSi arc ofisis da arc ambul atoriul pul sur wnevas ar eniWeba prediqtorul i mniSvnel oba.

1.4. sisxl is reol ogia

hemoreol ogia rTul i kompl eqsia, romel ic upiratesad ganisazRvreba sisxl is sibl antiT, hematokritiT, eriTrocitebis agregaci iTa da deformaci iT. eriTrocitebis agregacia hemoreol ogiis erT-erTi umniSvnel ovanesi determinantia, romel ic probl emebs upiratesad mikroci r kul atorul doneze qmnis.

kardiovaskul ur garTul ebaTa umetesoba Trombozul ia Tavisi paTogenezis mixedvi T. miuxedavad imisa, rom Trombocitebis agregacia TamaSobs mTavar rols arteriul sistemaSi Trombis formirebis meqanizmSi, eriTrocitebis agregaciis rols ignorireba praqtikul ad

SeuZl ebel ia. dabal i gadanacvl ebis pirobebSi, eriTroci tebis agregaciis pirdapiri zegavl ena Trombis formaciaze dReisaTvis eWvs ar iwvevs [250].

1.4.1. sisxl is reol ogiuri darRvevebi kardi ovaskul ur daavadebaTa dros

De Simone et al. [251], Razavian et al. [252], Yarnell et al. [253] kvl evebma gamoavl ina sisxl is reol ogiur parametrebsa da kardi ovaskul ur risk-faqtorebs Soris Zl ieri kavSiris arseboba. McMillan et al. [254] kvl evaSi dadasturda Saqriani diabetis kavSiri pl azmisa da sisxl is sibl antis zrdasTan, eriTroci tebis agregadobis matebasTan da deformatobis Semci rebasTan.

sisxl is gazrdil i sibl ante, eriTroci tebis deformatiis unaris gauareseba da gazrdil i agregadoba aRweril ia zogierTi kardi ovaskul uri daavadebis dros Kesmarky et al. [255], Demiroglu et al. [256], Koenig et al. [257], Lowe et al. [258]. kerZod, periferiul sisxl ZarRvTa daavadebebis, gul is iSemi uri daavadebis da a.S. dros [255,259].

kardi ovaskul ur daavadebaTa dros arsebul i hemoreol ogiuri darRvevebi ganixil eba, rogorc darRveul i cirkul aciis indikatori, rac savaraudod zegavl enas axdens qsovil ovan perfuziaze da Sesabamisad, xel s uwyobs cirkul atorul i darRvevebis manifestacias [260].

eqsperimentul da kl inikur kvl evebze dayrdnobiT, mkvl evarTa erTi j gufi hemoreol ogiur darRvevebs kardi ovaskul uri daavadebebis ganviTarebis mniSvnel ovan risk-faqtora d moiazrebs [261-264].

1.4.2. hemoreol ogiuri cvl il ebebi arteriul i hipertenziis mqone paci entebSi

mraval i epidemiol ogiuri da kohortul i kvl evebiT dadasturebul ia ah-is kavSiri hemoreol ogiur darRvevebTan [265-269]. amasTan, gaurkvevel ia reol ogiuri darRvevebis ganviTarebis pirvel adi xasiaTi ah-is dros.

hipertenzia aris kl inikuri mdgomareoba, romel ic asoci rebul ia vaskul ur dazianebasTan. avtorTa erTi j gufi sisxl ZarRvovan dazianebas ganixil avs hemoreol ogiur darRvevaTa ganviTarebis mizezad. amasTan, dazianebul i reol ogia Tavistavad SesaZl oa gaxdes aw-is matebis mizezi

periferiul i rezistentobis matebis safuZvel ze [270,271]. dadebiTi kavSiri sisxl is wnevasa da sisxl is viskozurobas an mis komponentebs Soris gamovl enil ia rogorc esenciuri, ise reno-vaskul uri hipertenziis dros [262,263,264,272].

1.4.2.1. eriTroci tebis agregaciul i aqtivoba da deformadoba

Gamzu et al. [273], Meisekman et al. [343] monacemebiT, eriTroci tebis agregacia aris hemoreol ogiis erT-erTi umniSvnel ovanesi determinanti da mis Seswavl as ah dros Sesazl oa hqondes Rrma paTofiziol ogiuri mniSvnel oba, ramdenadac agregirebul i eriTroci tebi monawil eobas iReben kapil arul doneze sisxl is dinebis Senel ebas da periferiul i winaaRmdegobis zrdaSi, rac Sesazl oa gaxdes qsovil Ta SefardebiTi iSemi mi zezi.

eriTroci tebis samganzomil ebiani agregatebis warmoqmna damokidebul ia eriTroci tebis formasa da koncentraciaze, pl azmis proteinebze, eriTroci tebis membranis muxtsa da deformaciis unarianobaze [273,274,275]. stazis pirobebSi mimdinareobs didi zomis agregatebis formireba, rac zrdis sisxl is viskozurobas mikroci kul atorul doneze da Sesabamisad amZimebs sxvadasxva daavadebis mimdinareobas [274]. De Simone et al. [251] monacemebiT, eriTroci tebis agregadoba damokidebul ia hematokritsa da pl azmaSi proteinebis koncentraciaze. Ciuffetti et al. [276] mtkicebiT, ah dros eriTroci tebis agregadobisa da deformadobis darRvevebi Sesazl oa ganpi robebul i iyos uj reddebSi natriumis transportis defeqtiT.

eriTroci tebis deformacia mniSvnel ovani fiziol ogiuri parametria, romelic aucil ebel ia qsovil ebamde Jangbadis misatanad da cirkul atorul sistemaSi uj redTa gadasaadgil ebl ad [274,277]. aRniSnul i maxasiaTebel i mxol od ZuZumwovarTa eriTroci tebSi gv xvdeba da pasuxismgebel ia sisxl is nakadurobis maRal maCvenebel ze rogorc mikro, ise makrocirkul aciaSi [274].

turbulenturi nakadis dros, iseve rogorc retikul oendoTel ial uri sistemis sinusebSi gavli sas, aRiniSneba adenozin difosfatis (adf) gamonTavisuflebis unaris mqone rigidul i

eritrocitebis dazianeba, Sesabamisad savaraudoa maTi monawil eoba Trombocitebisa da leukocitebis aqtivaciasa da hiperkoagulaciis ganvitarებაSi [274,276]. Jer ki dev 1910 wel s Duke werda, rom eritrocitebis deficiTi asocierebuli iyo prolongirebul sisxl denis drostan. Semdgomma kvl ebebma aCvena, rom Trombocitebis adheziis aqtivacia xdeba gaSiSvl ebul endoteliumze eritrocitebis zemoqmedebiT.

Gamzu et al. [273] hipertenziul da normotenziul orsul Ta kvl evis magal iTze aCvena eritrocitebis agregaciul i aqtivobis statistikurad sarwmuno mateba ah mqone pirTa jgufSi. eritrocitebis agregaciul i aqtivobis mateba hipertenziul pacientebSi gamoavl ina sxva kvl ebebmac [278-280]. arsebul kliniku-eqperimentul monacemebze dayrdnobiT gaCnda mosazreba, rom eritrocitebis agregadobis mateba monawil eobs sisxl ZarRvTa rezistiul obisa da Sesabamisad, aw-is matebaSi. eqspertTa azriT, eritrocitebis agregaciis zrda win unda uzRodes hipertenziis gamovlenas da Sesabamisad unda gaacndes prognozuli mniSvel obac [273].

Baskurt et al. [278] gamoavl ines korelacia eritrocitebis agregaciisa da periferiuli winaarmdegobis zrdas Soris. Cicco et al. [279] hipertenziul da sisxl ZarRvovani daavadebis mqone pacientebSi aCvenes eritrocitebis gazrdili agregaciul i aqtivobis kavSiri qsovilovani oqsiqenaciisa da sisxl is nakadis donis SemcirebasTan.

ah-is gavrcelebis albaToba matul obs asakis matebasTan erTad. Sesabamisad, mniSvelovania Jayavanth da Singh kvl eva [274], romelic daigegma eritrocitebis agregadoba/deformadobasa da asakis matebas Soris kavSiris gamosavl enad. kvl evis Sedegebma cxadhyo, rom asakTan erTad aRiniSneba eritrocitebis agregadobis aqtivobis zrda da deformaciis unarianobis Semcireba. amasTan, mkvl evarTa azriT, aRniSnuli cvlilebebi SesaZloa gansazRvavdes kardiovaskulur da cerebrovaskulur risks asakovanpirebSi [274].

1.4.2.2. pl azmisa da sisxl is sibli ante

mecnierTa mier sisxl is sibliantis faqtori wlebis ganmavl obaSi ignorirdeboda. viskozuroba ganixileboda rogorc konstanta da ara rogorc cvladi. miuxedavad zogierTi mecnieris didi mcdel obisa (mag.

Robin Fahraeus), sisxl is sibl antis kvl eva me-20 saukunis 60-ian wl ebamde yuradRebis mi Rma rCeboda [344].

kvl ebebma aCvena, rom zogadad popul aciur doneze sisxl is sibl ante korel irebs aw-Tan [264,276], Tumca sisxl is gazrdil i sibl antis paTofiziol ogiuri mniSvnel oba ah-s dros ucnobia. Teoriul ad, igi monawil eobs gazrdil i periferiul i winaaRmdegobis formirebaSi, rac garkveul wil ad xsnis sistol ur wnevasTan SedarebiT diastol uri wnevisa da sisxl is sibl antes Soris Zl ieri korel aciis arsebobas [276]. hiperviskozuroba SesaZl oa asociirebul i iyos hipertenziul i pacientebis mZime prognozTan, ramdenadac igi korel irebs hipertenziit ganpirobetul organoTa dazianebis simZimesa da garTul ebebTan [276,281,345]. Ciuffetti et al. [276] 50 aranamkurnal eb ah-is mqone mamakacis kvl evis Sedegebze dayrdnobiT daskvnes, rom hiperviskozuroba asociirebul ia momatebul diastol ur wnevasTan da uaryofiT hemoreol ogiur profil Tan. De Simone et al. [251] mier normotenziul individebSi Catarebul ma kvl evam gamoavl ina saerTo sisxl is sibl antis damoukidebel i asociacia diastol ur da/an saSual o wnevasTan, ramac ganapiroba mTl iani sisxl is sibl antis Seswavl is aqTual oba ah-isa da sxva kardiovaskul uri risk-faqtorebis mqone pirebSi.

bol o drois kvl evebs Soris aRsani Snavia Lip et al. [282] kvl eva, sadac avtorebma gamoavl ines pl azmis webovanebis korel acia saSual o dRiur da Ramis sistol ur wnevebTan [223]. amasTan, kavSiri aw-is Ramis dawewis xarisxa da sibl antes Soris daudgenel ia.

De Simone et al. [283] kvl evam gamoavl ina sisxl is sibl antis da hematokritis statistikuri kavSiri sqesTan, simsuqnesTan, cximovani safarvel is distribuciasa da mwevel obasTan. amasTan, kvl evis dros ar gamovl inda aRniSnul parametrTa sxvaoba hipertenziul da normotenziul , aseve diabetian da aradiabetian pacientebis Soris. kvl evam gamoavl ina pul sur wnevasa da sisxl is sibl antes Soris ukuproporciul i damokidebul eba, rac vl indeboda mxol od j anmrTel popul aciaSi, samizne organoTa dazianebis gareSe. ah-is dros aRniSnul i korel acia ar vl indeboda.

kl inikur kvl evaTa umravl esobaSi hipertenzia asociirebul ia fardobiT hiperviskozurobasTan [262,264,284,285], magram ucnobia es aris

maRal i aw-is Sedegi Tu mizezi [286,287], an ra zegavl enas axdens masze mkurnal oba. Tarazi et al. aCvenes, rom momatebul i hematokriti romel ic gazrdil i mTI iani sisxl is sibl antis ZiriTadi mizezia, pirvel adi xasiaTisaa pacientebSi diastol uri wneviT ≥ 105 mm.vvy.sv. [283]. Bogar et al. [288] azriT, ar arsebobs pirdapiri kavSiri ah-sa da mTI iani sisxl is sibl antes Soris.

The Edinburgh Artery Study iyo kvl eva, romel mac gamoavl ina kardiovaskul ur daavadebaTa ganviTarebis sixSiris mkveTri diferenciacia pacientebSi sisxl is maRal i (55%) da dabal i sibl antiT (4%) [253]. msgavsi Sedegebi iqna miRebul i Danesh et al. [289] kvl evaSi, sadac CarTul i iyvnen rogorc j anmrTel i, ise kardiovaskul uri daavadebis mqone pirebi. Lowe et al. [290] kvl evaSi gamovl inda korel acia pl azmisa da sisxl is sibl antesa da kardiovaskul uri garTul ebebis ganviTarebis maRal al baTobas Soris. amasTan, pl azmis sibl antis done korel irebda fibrinogenis donesTan, romel ic Tavis mxriv kardiovaskul uri daavadebebis ganviTarebis damoukidebel prediqtorad moiazreba [290,291]. Danesh et al. [289] sisxl is momatebul sibl antes ganixil aven, rogorc kardiovaskul uri garTul ebebis ganviTarebis Zier risk-faqtors. pl azmis sibl antis mniSvnel obas mniSvnel ovnad ganapirobebs masSi proteinebis, kerZod fibrinogenisa da al buminebis Semcvel oba, rac zemoqedebis mTI iani sisxl is sibl antis mniSvnel obazec [105,292]. zogadad, mTI iani sisxl is sibl anteze momqmedi faqtorebidan mniSvnel ovania eriTrocitebis koncentracia, Tavisufal i fibrinis raodenoba, pl azmis sibl ante, eriTrocitebis drekadoba, sisxl is formiani el ementebis tendencia Seqmnan didi j gufebi, I eikocitebisa da Trombocitebis koncentracia sisxl Si [293]. amasTan, maRal i gadanacvl ebis Zal ebis ararsebobisas, eriTrocitebs, I eikocitebsa da Trombocitebs SeuZiaT stabil uri agregatebis Seqmna erTmaneTTan an endoTel iocitebTan, roml ebic garda sisxl ZarRvis kedl is dazianevisa, adgil obrivad zrdian sisxl is sibl antes da Sesabamisad zrdian garTul ebaTa ganviTarebis al baTobas [294,323].

1.4.2.3. hematokriti

kavSiri hematokritis donesa da kardiovaskul uri daavadebebis ganviTarebas Soris gamovlenilia [289,290]. amastan, momatebuli hematokritis macvenebeli uaryofitad zemoqmedebs cerebralur sisxis nakadze da zrdis insul tisks risks [251]. De Simone et al. [251] kveli evam gamovlina statistikurad sarwmuno kavSiri sisxis wnevasa da hematokritis dones Soris, iseve rogorc pl azmis sibil antesa da sisxis wnevis dones Soris. amastan gamovlinda, rom eritrocitebis agregadoba damokidebulia hematokritis doneze, romelic Tavis mxriv sisxis sibilantis mTavari ganmsazRvrelia. Letcher et al. [264] avtorTa monacemebiT, hipertenziul pacientebis normotenziul individebTan SedarebiT gacniat ufromaRali hematokritis done.

hematokritis done aris dinamikuri parametri da Sesazloa gansxvavebuli iyos cirkul atoruli sistemis sxvadasxva doneze, rac damokidebulia sitxis balansze. sxvadasxva fiziologiur da/an patologiur pirobebsi hematokritma Sesazloa miarwios sakmaod maRalmniSvnelobebs da Sesabamisad gazardos sisxis sibil antec [275].

1.4.2.4. TrombocitTa agregaciuli da adheziuri aqtivoba

jer kidev 150 wli win, virxovma arwera venuri TrombwarmomnisaTvis aucil ebeli triada, romelic moicavda sisxis nakadis, sisxis Semadgenlobisa da sisxi ZarRvis kedl is cvlilebebs [295,296]. virxovis Teoriis Tanamedrove Sexedul eba triadaSi moiazrebs hemoreologiur darRvevebs, turbul entur nakads bifurkaciisa da stenozur ubnebsi da endoteliumis darRvevebs [297].

umniSvnelovanesi fiziologiur paradoqsi, romelic Tan axlavs ahs da cnobilia "hipertenziis Trombozuli paradoqsis" anu "birmingemis paradoqsis" saxel wodebiT, warmoadgens Seusabamobas sisxi ZarRvis kedlebs sisxis maRali wnevit zewolasa da hemoragiis nacvlad Trombozuli gartulebebis ganviTarebas Soris [297].

Minuz et al. [298] acvenes Trombocitebis aqtivaciis maRali macvenebeli ahsis mqone pacientebSi. Sedegad, avtorebma gamoTqves mosazreba, rom rekomendirebulia maRali riskis hipertenziuli pacientebis identifikacia

da droul i antiTrombocitul i mkurnal obis dawyeba garTul ebaTa ganviTarebis prevenciis mizniT.

kl inikur da l aboratoriul monacemebze dayrdnobiT, hipertenzia *per se* asocierebul ia gazrdil proTrombozul an hiperkoagulaciur statusTan, rac gamoixateba koagulaciis, Trombocitebisa da endoTeliumis mxrivicvil ebebiT [296]. kerZod, hipertenziis dros darRveulia fardoba vazokonstriqtorebsa da vazodilatatorebs Soris. procesi vaskuluri dazianebiT iwyeba da mimarTulia aw-is mudmivad maRal doneze SesanarCunebl ad. amasTan, aqtivrebul endoTeliumis didi mniSveloba eniWeba ah-is dros Trombwarmomnis aqtivaciaSi [346].

1.4.2.5. fibrinogeni

fibrinogenis donis mateba pl azmaSi ganixileba, rogorc kardiovaskuluri sikvdilobis prediqtori [299]. amasTan, fibrinogenis gazrdili done korelirebs vaskuluri dazianebl al baTobasTan ah-is dros [300].

The Edinburgh Artery Study-Si [301], sadac CarTuli iyo 55-dan 74 wl amde asakis 1592 randomul ad SerCeuli orive sqesis piri, gamovlinda rom fibrinogenis sabaziso pl azmuri done damoukidebl ad korelirebda cerebrovaskuluri garTul ebebis ganviTarebl al baTobasTan. kvl evis Sedegad fibrinogens mieniWa Zlieri prediqtoruli mniSveloba insul tisa ganviTarebisatvis.

Qiziblash et al. [302] kvl eviT dadginda, rom fibrinogens gaaCnia damoukidebeli risk-faqtoruli mniSveloba tranzitoruli iSemiisa da mcire iSemiuri insul tebis ganviTarebisatvis. amas garda, Resch et al. [303] kvl evis avtorebma aCvenes, rom fibrinogens gaaCnia prediqtoruli mniSveloba ganmeorebiTi kardiovaskuluri garTul ebebis ganviTarebisatvis iSemiuri insul tisa ganviTarebidan 2 wl is ganmavl obaSi.

Svid longitudinalur kohortul kvl evaSi, fibrinogenis el evirebul ma pl azmurma donem Ziritadi kardio-vaskuluri risk-faqtoresagan damoukidebl ad gamoavlina Zlieri prediqtoruli mniSveloba gulis iSemiuri daavadebisa da Tavis tvinis insul tisa ganviTarebisatvis [253,301,304,305].

kvl eva ECAT-Si gamnovl inda, rom pacientebS pl azmuri fibrinogenisa da Sratis qol esterinis maRal i doniT, gaaCniaT kardiovaskul uri garTul ebebis ganviTarebis maRal i riski. Leigh General Practice Study-im aCvena, rom pacientebS fibrinogenisa da qol esterinis maRI i doniT, fibrinogenis dabal i mniSvnel obis mqone popul aciasTan SedarebiT gaaCniaT kardiovaskul uri garTul ebebis ganviTarebis 6-j er ufro maRal i riski; amasTan, hipertenziul pacientebS, romel Tac aReniSnebaT pl azmuri fibrinogenis done >3.5g/l gaaCniaT 12-j er ufro maRal i kardiovaskul uri riski pacientebTan SedarebiT, romel Ta pl azmuri fibrinis done 2.9g/l -ze nakl ebia [296].

1.4.3. hemoreol ogi ur maxasi aTebel Ta sqesobri vi gansxvavebani

Kameneva et al. [306] aCvenes, rom qal ebis sisxl Tan SedarebiT, mamakacis sisxl i xasiaTdeba sibl antisa da eriTroci tebis agregaciis ufro maRal i doniT. amasTan, mamakacebSi qal ebTan SedarebiT statistikurad sarwmunod dabal ia eriTroci tebis deformadoba. aRniSnul i hemoreol ogi uri komponentebi (eriTroci tebis daqveitebul i deformadoba, gazrdil i sisxl is sibl ante da eriTroci tebis agregadoba) SesaZl oa monawil eobdes kardiovaskul uri daavadebebis ganviTarebis mimarT mamakacebis maRal i riskis formirebaSi.

eriTroci tebis fiziol ogi ur daberebasTan erTad imatebs maTi meqanikuri sixiste da agregadul i aqtivoba. amasTan, cnobilia rom mamakacebis sisxl Si qal ebTan SedarebiT sWarbobs daberebul i eriTroci tul i formebi, roml ebic fagocitozs eqvemdebarebian. Sesabamisad, pl azmaSi xdeba Tavisufal i hemogl obinis gamonTavisufleba, romel ic fl obs Zl ier vazokonstriqtorul unars azotis oqsidze zemoqmedebisa da misi inaqtivaciis gziT [306,342]. imdenad, ramdenadac daberebul i eriTroci tebi ufro xistia da drekadobis unardakargul i, maT aReniSnebaT ufro Zl eri mgrZnobel oba e.w. gadanacvl ebis daZabul obis mimarT. Sesabamisad, eriTroci tebis daSl a yvel aze intensiurad cirkul atorul i sistemis im ubnebi viTardeba, sadac ufro maRal ia gadanacvl ebis daZabul oba. igive ubnebi xasiaTdebian azotis oqsidis warmoqmniS maRal i intensivobiT [307-309].

arsebobs hipoteza, rom gansxvaveba mamakacebsa da qal ebs Soris eritrocitebis agregadobas, deformadobasa da sibilantes Soris ganpirobepul ia menstrualuri ciklis arsebobit qal ebSi; arnisnul igarkveulwilad xsnis Turatomaa premenopauzalur qal ebSi kardiovaskuluri daavadebebis ganvitarebis riski ufrodabal igive asakis mamakacebtan sedarebit [310]. Kameneva et al. [306] avtorebma gamoavlines, rom mamakacebis sisxli si premenopauzalur qal ebTan sedarebit arinisneba hematokritis, sisxli sibilantis, eritrocitebis agregadobisa da rigidobis ufrodabali done. premenopauzalur qal ebSi kardiovaskuluri gartulebebis ganvitarebis ufrodabal isixsire sesazloa ganpirobepul iyos mat sisxli si eritrocitebis axial gazrda formebis simravlit, eritrocitebis dasl is dabal i macvenebl ita da sesabamisad Tavisufali hemoglobinis pl azmuri koncentraciis minimaluri macvenebl it. amas adasturebs isic, rom qal ebSi mamakacebtan sedarebit arinisneba azotis oqsidis statistikurad sarwmunod marali pl azmuri done.

Zeltser et al. [311] kvlevis mizans wadmoadgenda eritrocitebis adheziuri da agregaciuli aqtivobis sqesobrivi gansxvavebaTa Seswavl a periferiuli sisxli si. mat gamoavlines eritrocitebis agregadobis mnisvnelovani sqesobrivi diferenciacia. mamakacebsi qal ebTan sedarebit ufrodabali armoCnda hematokritis, pl azmis sibilantis da mTliani sisxli sibilantis donec [251].

Tavi 2. masala da metodebi

2.1. kliniki masala

Ziritadi kvlevis jgufi Seadgina orive sqesis (30 mamakaci da 27 qali), arasdros namkurnal ebma, arteriuli hipertenziis mqone 57 ambulatoriulma pacientma. kvlevis CarTul pacientTa saSualo asakiganisazRvra 35-dan 60 wl amde (saSualo asaki \pm SD, 51.26 \pm 1.94 weli).

kvlevis CarTvis kriteriumberi iyo:

- asaki – 35-60 weli
- sqesi – orive
- pacientebi arteriuli hipertenziit
- mkurnal obis statusi – arasdros namkurnal ebi

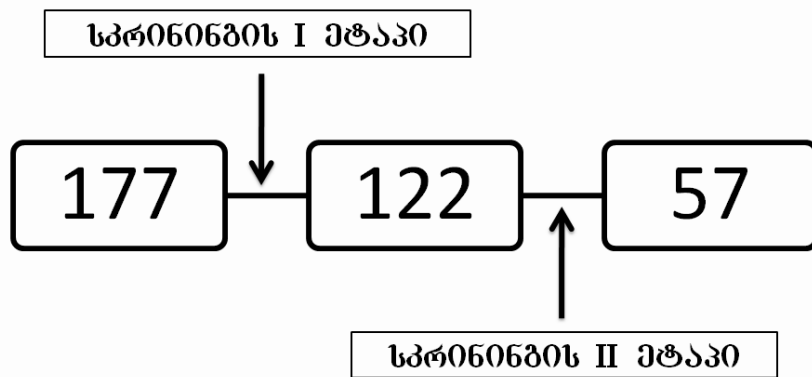
kvlevis dan gamoricxvis kriteriumberi iyo:

- hiperqol esterinemia
- mweveloba
- Saqriani diabeti
- simsuqne
- reinos fenomeni
- manifestirebuli gulis ukmarisoba
- gulis iSemiuri daavadeba
- gulis sarqlovani daavadeba
- cerebrovaskuluri daavadeba
- periferiuli sisxl ZarRvTa daavadebebi
- koagulopatia
- Tirkmlisa da RviZilis daavadebebi
- Zilis apnoes sindromi
- dadgenili meoradi hipertenzia

sakontrol o j gufi Seadgina orive sqesis, 35-dan 60 wl amde asakis, ah-
 is armqone, praqtikul ad janmrTel ma 17 pirma. sakontrol o j gufis
 arcerTi individi ar imyofeboda medikamentur mkurnal obaze. amasTan,
 sakontrol o j ugufis pirebi ZiriTadi j gufis Sesabamisad, SeirCnen igive
 principiT – aramwevel i, normal uri sxedul is masis indeqsiT. kvl evidan
 gamorTvis kriteriუმები srul ad Seesabameboda ah-is mqone pacientTa
 kvl evidan gamorTvis kriteriუმებს.

ah-ad CaiTval a sul mcire sami sxvadasxva SemTxveviTi gazomvisas
 aranmkurnal ebi sistol uri wneva meti vidre 140 mm.vwy.sv. mj domare
 poziciaSi 5 wuTiani dasvenebis Semdeg. kvl evis protokol i mowonebul iqna
 l okal uri eTikuri komitetis mier. informaciul i Tanxmobis furcel i
 kvl evaSi monawil eobaze xel moweril i iqna kvl evaSi CarTul i yvel a piris
 mier.

2.2. kvl evi s di zai ni



177 esenciuri hipertenziis mqone ambul atoriul i pacienti, roml ebi
 identificirdnen ofisis wnevis gazomvebiT, CarTul i iqnen skringis
 procesSi. pacientebi simsuqniT, 60 wel ze meti asakiT da is pirebi, vinc
 imyofebodnen vazoaqtiuri medikamentebiT Terapiaze, gamoiricxnen
 kvl evidan. skringis I etapis dasrul ebi Semdeg, 122 arasdros
 namkurnal ebi ambul atoriul i pacienti, 35-dan 60 wl amde asakis, 64 kaci da

58 qali, dadgenili an diagnoziti CarTuli iqna skringis me-2 etapSi. pacientebi hiperqol esterinemiiT, diabetiT, mwevel ebi, manifestirebuli gulis ukmarisobiT, reinos fenomeniT, stenokardiis klinikuri anamneziT, gadatanili miokardiumis infarqtiT, gulis sarqvl ovani paTol ogiit, periferiul sisxl ZarRvTa daavadebebiT, cerebrovaskuluri daavadebebiT, Tirkml isa da Rvizi is paTol ogiit, iseve rogor pacientebi dadgenili an manifestirebuli meoradi hipertenziit gamoiricxnen kvlevidan.

ramdenadac ah xSir SemTxvevaSi asociirebulia kardiovaskulur da cerebrovaskulur daavadebebtan, skringis me-2 etapis Semdeg, mxolod 57 ah-is mqone ambulatoriuli pacienti, 30 mamakaci da 27 qali iqna CarTuli kvlevasi.

2.3. kvlevis metodebi

yvela patientsa da sakontrolo jgufSi CarTuli individs Cautarda antropometruli gazomvebi, fizikaluri gamokvleva, maTi samedicino istoriis Seswavl a, arteriuli wnevis 24-saatiani ambulatoriuli monitorireba, maRali rezoluciis sisxl ZarRvovani dopler-eqoskopia da sisxlis reol ogiur parametrTa kvleva.

2.3.1. mxris arteriis dupl eqs-skani reba

mxris arteriis ul trasonografiuli kvleva Catarda akad. d. tatisvilis saswavo-kvlevi centriSi.

gamokvleva tardeboda dil iT, 9.00-10.00 saatis periodSi. gamokvlevamde 24 saatit adreyvela patients mieca rekomendacia, rom sisxlis aRebamde 8 saatis ganmavl obaSi ar mieROT sakvebi, kofeini Semcveli produqtebi, al koholi da vazoaqtiuri medikamentebi.

2.3.1.1. nakad-ganpi robebul i vazodil ataciis kvlevis teqnika moqmedi gaidlainis rekomendaciebis mixedvit [37].

1. *gamosakvl ev pirTa momzadeba*

sisxl ZarRvTa reaqtikul obaze da kerZod FMD-ze momqmedi faqtorebis maqsimal uri SezRudvis miznit, kvlevis dawyebamde gaTval iswinebul unda iqnas Semdegi faqtorebi:

- a) Zilis xarixi gasuli Ramis ganmavl obasi [312,313];
- b) menstrual uri ciklis faza [314,333];
- g) gonebrivi gadaZabva Ramis saatebsi [312,314];
- d) dilis varjisi;
- e) Tabaqos moweva (pasiuri da aqturi) [337];
- v) vazoakturi medikamentebis mireba;
- z) kvlevis Catarebamde patients unda mieces rekomendacia, rom Sewyitos medikamentebis mireba aranakeb 4 x medikamentis naxevardasil is periodis xangrZilivobis ganmavl obasi;
- T) patienti unda iyos msieri da ar unda hqondes mirebuli kofeinis Semcveli sasmel ebi gamokvl evamde sul cota 8 saatis ganmavl obasi;
- i) gamokvl eva unda Catardes kontrolirebuli temperaturis Sesazlebi obis mqone wynar otaxsi ($23 \pm 1^{\circ}\text{C}$ otaxis temperaturaze) [321];
- k) mxris arteriis ultrasonografiuli kvleva xorciel deba dilit, uzmoze 9-dan 10 saatamde Sual edsi;
- l) gamokvl eva iwyeba aklimatizaciis 15 wutiani periodis Semdeg;
- m) mxris arteriis diametrisa da sisxlis nakadis siCqaris zomva xorciel deba marjvena xelze [324].

2. *arWurviloba*

ul trabgeriti sistema arWurvili unda iyos sisxl ZarRvis 2-gamzomilebiani gamosaxulebit, feradi da speqtraluri doplerit, Sida ekg monitorit da maral sixsiriani gadamwodit (7-12 mhc) [334,338].

3. *gamosaxul ebis miReba*

gamosakvl evi piri zurgze mwol iare mdgomareobaSia da xel i ganTavsebul i aqvs komfortul poziciaSi. mxris arteriis gamokvl eva xorciel deba antekubital uri fosos zeviT I ongi tudinal uri anu sigrZivi RerZis paral el urad. gamokvl evisaTvis SeirCeva sisxl ZarRvis segmenti mkveTri wina da ukana kedl is gamosaxul ebebiT.

4. *endoTel ium-damokidebul i nakad-ganpirobebul i vazodil atacia*

- sfigmomanometris manJeti Tavseba antekubital iri fosos zeviT an winamxarze [37,335];
- upirvel es yovl isa xdeba gamosaxul ebis mosvenebis mdgomareobaSi miReba;
- izomeba sanaTuris absol uturi diametri;
- pul suri dopl eris gamoyenebiT izomeba sisxl is nakadis siCqare;
- mosvenebis mdgomareobaSi ganxorciel ebul i gazomvebis Semdeg, arteriul i wnevis sazomi manometris manJeti edeba mxarze an winamxarze da xdeba haeris Catumbva, ise rom manJetSida wneva sistol ur wnevas aRematebodes 50 mm.vvy.-iT an metad [318,330,331];
- gaidl ainis mixedviT, arteriis okl uzia unda moicavdes 5 wuTs;
- mxris arteriis gamokvl eva mimdinareobs manJetis moxsnidan 30 wm-is Semdeg da grZel deba moxsnidan 2 wuTis ganmavl obaSi;
- uSual od reaqtul i hiperemiis gamokvl eva xdeba manJetis moxsnidan pirvel i 15 wamis Semdeg.
- arteriaTa kvl eva, romel Ta diametri nakl ebia 2.5 mm-ze an aRemateba 5 mm-s ar aris rekomendirebul i maRal i cdomil ebis gamo [34,315,316,370].

5. *endoTel ium-damoukidebel i vazodil atacia nitrogl iceriniT*

endoTel ium-damokidebul i vazodil ataciis kvl evidan mxol od aranakl eb 10 wuTis Semdeg aris SesaZl ebel i endoTel ium-damoukidebel i vazodil ataciis (nitrogl iceriniT) kvl eva. maqsimal urad misaRebi vazodil atatorul i pasuxis misaRebad, kerZod gl uvkunTovani pasuxis testirebis mizniT gamoiyeneba 0.4 mg nitrogl icerini subl ingval urad an

aerozol is saxiT. vazodil ataciuri piki miRweva nitrogl icerinis miRebidan 3-4 wuTis Semdeg; nitrogl icerinis miReba ikrZal eba pirebSi ni tratebis miRebis ukuCveneBaTa arsebobis SemTxvevaSi [336].

6. *nakad-ganpirobepul i vazodil ataciis Casatarebil i dro*

nakad-ganpirobepul i vazodil atacia asaxavs kunTovani tipis arteriebis dil atacias gazrdil i gd-is sapesuxod. mraVal kvl evaze dayrdnobiT gaidl ainSi miTiTebul ia, rom sisxl ZarRvis maqsimal uri dil atacia vl indeba okl uziuri manJetis moxsnidan 60 wamis Semdeg anu, rac igivea reaqtul i hiperemiis momentidan 45-60 wamis Semdeg [34,317,327].

7. *FMD-s maxasiaTebi*

nakad-ganpirobepul i dil atacia aris cvl il eba sawyis diametrsa da reaqtul i hiperemi iT ganpirobepul sisxl ZarRvis diametrs Soris, rac rogorc wesi procentul ad gamoisaxeba. radgan, nakad-damoki debul i vazodil ataciis procentul i mniSvel oba damoki debul ia sisxl ZarRvis diametris zomaze, kvl evis dros aucil ebel ia sisxl ZarRvis sanaTuris absol uturi cvl il ebis dafiqsireba procentul maCvnebel Tan erTad, radgan aixsnas zogierTi Seusabamobani.

8. *trenireneba da xarisxis gaumj obeseba*

gamokvl evas unda atarebdes maRal kval ificiuri special isti, romel sac daxvewil i aqvs kl inikuri unar-Cvevebi da aqvs didi praqtika (aranakl eb 100 vaskul arul i dopl erografia/wel iwadSi).

2.3.1.2. mxris arteriis ul trasonografiul i kvl evis meTodika

rogorc aRweril i iyo Leeson et al. [98] kvl evaSi, Cvens SemTxvevaSic arteriul i wnevis gazomva xdeboda standartul i sfigmomanometris saSual ebiT. B-mode skanireba marj vena mxris arteriisa xorciel deboda idayvis sigrZivi Wril idan 5-10 sm-is fargl ebSi 7 mhc sixSiris gadamwodiT, idayvis saxsarSi xelis 45⁰-iani kuTxiT moxril poziciaSi, mtevnis ventral uri zedapiriT zeviT. arteriis centrad miCneoda is pozicia, rodesac sisxl ZarRvis wina da ukana kedl is intimis Sreebis yvel aze mkveTri da naTel i gamosaxul eba miReboda. sisxl ZarRvis diametris gazomva tardeboda sisxl ZarRvis mimarT gadamwodis perpendikul arul i

mdebareobis pirobebSi. sisxl is nakadis siCqare mocemul arteriaSi gairzoma gadamwodis 70⁰-iani mdebareobis pirobebSi sisxl ZarRvis sigRZivi RerZis mi marT.

sisxl is nakadis siCqare, da Sesabamisad gadanacvl ebis daZabul oba diastol asTan SedarebiT ufro maRal ia sistol is dros. imdenad, ramdenadac diastol a ikavebs kardiul i cikl is daaxl oebiT 2/3-s, gd-is saSual o donis gamosaTvl el ad swored kardiul i cikl is mocemul i periodi gamoiyeneboda, iseve rogorc Reneman et al. [112] kvl evaSi.

endoTel uri funqcia, Sefasebul i rogorc nakad-ganpirobebul i vazodil atacia, ganisazRvreba rogorc sisxl ZarRvis diametris procentul i zrda sabaziso momentidan hiperemiis Sedegad miRebul maqsimal ur vazodil ataci amde. saerTaSoriso rekomendaciebze dayrdnobiT, nakad-damoki debul i vazodil atacia gamovTval eT rogorc absol utur cifrebSi, ise procentebis saxiT, formul iT:

$$\text{FMD} = \frac{D_1 - D_0}{D_0} \cdot 100\%,$$

sadac FMD - nakad-damoki debul i vazodil ataciaa, D_0 - sisxl ZarRvis sawyisi diametri, D_1 - sisxl ZarRvis diametri reaqtul i hiperemiis Semdeg.

moqmedi gaidl ainis Sesabamisad, endoTel ium-damoki debul i vazodil ataciis paral el urad vatarebdiT endoTel ium-damouki debel i vazodil ataciis kvl evas nitrogl icerinis subl ingval uri miRebis Semdgom.

gazomvebi tardeboda nitratis miRebidan 3-4 wuTis Semdeg, rac Seesabameba nitratis miRebiT gampirobebul vazodil ataciis piks. amasTan, endoTel ium-damoki debul da endoTel ium-damouki debel vazodil ataciis gazomvebs Soris iyo 15 wuTi, rac aseve Seesabameba kvl evis saerTaSoriso standartebs.

2.3.2. arteriul i wnevis gazomvis kl inikuri da ambul atoriul i meTodebi

2.3.2.1. sisxl is wnevis kl inikuri gazomvebi

TviToeul individSi aw-is kl inikuri gazomva xorciel deboda ESH/ESC 2007 wl is gaidl ainis arteriul i wnevis gazomvis Sesaxeb rekomendaciebis srul i dacviT m. winamZRvriSvil is sax. kardiol ogiis

institutSi [347] (*ix. damateba 3*). aw kl inikuri gazomva warmoebda standartul i vercxl iswyl is sfigmomanometris gamoyenebiT [200,351]. aw-is mniSvel obad gamoiyeneboda sami gazomviT miRebul i cifrebi saSual o aritmetikul i.

2.3.2.2. arteriul i wnevis 24 saaTiani ambul atoriul i monitorireba

2.3.2.2.1. arteriul i wnevis 24-saaTiani mini torirebis Catarebis meTodi ka (protokol i)

aw-is 24-saaTiani minitorireba tardeboda kviris dReebis ganmavl obaSi. patients wnevis monitoris manJeti uyendeboda aradominantur xel ze da monitoringis proceduris dawyebamde yvel a individSi orjeradad mowmdeboda awam-is aparatis mier daregistrirebul i wneviTi cifrebi vercxl is wyl is manometriT gazomil wnevis cifrebTan. sxvaoba ori meTodiT gazomil wnevas Soris ar aRemateboda 5 mm.wvy.sv.

awam-is dawyebamde, pacientTa instruqtaJisaTvis Cven viyenebdiT University of Iowa Family Care Center-Si gamoyenebul formas, romelic warmoadgenda gamoqveynebul rekomendaciaTa adaptirebul versias (*ix. damateba 4*).

The Guideline of the Working Party on Blood Pressure Monitoring of the European Society of Hypertension rekomendaciiT, awam-is dros wnevaTa gazomva unda moxdes araumetes 30 wuTiani interval ebisa. Sesabamisad, Cvens mier gamokvl eva tardeboda winaswar kodirebul i periodul obiT: 15 wuTSi erTjer – dRisiT da 30 wuTSi erTjer – Ramis ganmavl obaSi. kvlevis protokol i srul Sesabamisobasi iyo aRniSnul gaidl ainTan.

2.3.2.2.2. arteriul i wnevis 24-saaTiani mini torirebi T miRebul i paramet rebi

Ramis wneva ganisazRvra, rogorc saSual o wneva adamianis l oginSi dasazinebl ad Cawol idan gaRviZebamde [353]. Sesabamisad, 24 saaTis darCeni l i periodi Sefasda rogorc dRis arteriul i wneva.

dilis wneva Sefasda, rogorc saSual o aw gaRviZebidan pirveli 2 saaTis ganmavl obaSi, rac Seesabameboda 8 arteriul i wnevis gazomvis monacemTa saSual o maCvenebel s.

yvel aze dabal (umdabl es) wnevad Ramis saatebSi ganisazRvra aw-is yvel aze dabal i Canaweris, uSual od mis win da mis ukan mdebare (e.i. sul 3 Canaweris) monacemTa saSual o maCvenebl i.

arteriul i wnevis dil is presorul i tal Ris gamosaTvl el ad Cven viyenebdiT Kario et al. [138] SemoTavazebul formul as: dil is sistol ur wnevas minus umdabl esi sistol uri wneva Ramis ganmavl obaSi.

aw-is Ramis daqveiTebis xarixis gamosaTvl el ad viyenebdiT eqspertTa mier [157] mowodebul formul as: wnevis Ramis daqveiTebis xarixi = $(1 - \text{saSual o Ramis wneva} / \text{saSual o dRiuri wneva}) \times 100$.

yvel a aRniSnul i wnevis maCvenebl is kal kul aciisaTvis gamoiyeneboda sistol uri sisxl is wneva, rekomendaciaTa srul i dacviT. awam-is dros, sazano maxasaiTeb ebad CaiTval a parametrebi, romel nic aRweril iqna Madinda Iqbal mier [249] (ix. *damateba 5*).

2.3.2.3. arteriul i wnevis sazomi manJeti

amerikis gul is asociaciis (*American Heart Association*) rekomendaciit, aw-is zusti gazomvisaTvis pnevmaturi buStis sigrZe unda iyos aranakl eb mxris sigrZis 80% da sigane mxris garSemoweril obis aranakl eb 40%-is tol i an aRematebodes kiduris diameters 1.2-j er [126].

rogorc kl inikuri, aseve 24-saatiani awam-is dros, manJetis zomis SerCevis mizniT Cven veyrdnobodiT Perloff et al. [351] mier SemoTavazebul meTodur rekomendaciebs (ix. *damateba 6*).

aw-is gazomvis dawyebamde, Sesabamisi manJetis SerCevis mizniT j er vzomavdiT pacientis mxris garSemoweril obas kiduris Sua wertil ze (mxrisaTvis es wertil i warmoadgens idayvisa da mxris saxsars Soris Sua wertil s). manJets vadebdiT SiSvel kidurze ise, rom kidursa da manJets Soris Tavisufl ad eteoda 2 TiTi. manJetis qveda kide idayvis saxsridan daSorebul i iyo 2 TiTiT.

im SemTxvevaSi, Tu pacientis kiduris garSemoweril oba ori sxvadasxva zomis manJetis mosazRvre iyo, maSin rekomendaciis Tanaxmad viyenebdiT didi zomis manjets, rameTu am SemTxvevaSi mcirdeba mosal odnel i Secdomis al baToba.

2.3.3. hemoreol ogiur parametrTa kvl evi s meTodebi

hemoreol ogiuri gamokvl eva Catarda akad. erisTavis sax. erovnul i qirurgiis centris hemoreol ogiisa da koagul ol ogiis ganyofil ebaSi.

sisxl is aReba xdeboda dil iT, 8.30-9.30 saaTis periodSi. gamokvl evamde 24 saaTiT adre yvel a patients mieca rekomendacia, rom sisxl is aRebamde 8 saaTis ganmavl obaSi ar mieRoT sakvebi, kofeinis Semcveli produqtebi, al kohol i da medikamentebi (aspirini, arasteroidul i anTebis sawinaaRmdego medikamentebi, tricikli uri antidepressantebi, antihistaminuri preparatebi, zogierTi antibiotiki, al kohol i, beta-bl okerebi, heparini, varfarini).

hemoreol ogiuri gamokvl eva moicavda Semdegi parametrebis kvl evas:

- hematokriti
- eriTrocitebis deformadoba
- eriTrocitebis agregaciul i aqtivoba
- pl azmisa da sisxl is sibli ante
- fibrinogenis koncentracia
- Trombocitebis agregaciul i aqtivoba
- Trombocitebis adheziuri aqtivoba

2.3.3.1. hematokriti

hematokritis gansazRvrisaTvis Cven viyenebdiT “Wintrobe”-is meTods, anu sisxl is centrifugirebaze damyarebul makromeTods. aRniSnul i meTodis kl inikuri Rirebul eba da validuroba damtkicebul ia [354]. winaswar antikoagul antebiT damuSavebul erl enmaieris kol baSi vaTavsebdiT 5-8 ml . venur sisxl s. sisxl i gadagvqonda sal is hemometris sinj araSi 100 danayofamde da vacentrifugebdiT 3000 bruni/wuTSi siCqariT 45 wuTis ganmavl obaSi. hematokritis maCvenebel i pirdapir miReboda dal eqil i eriTrocitebis “boZis” simaRl iT.

3.3.2. eriTrocitebis deformadoba

eriTrocitebis deformadoba Sefasda eriTrocitebis suspenziis cel ul ozur membranaze fil traciis meTodiT [274].

venopuncturIT aRebul sisxl s antikoagulaciis mizniT vasxamdiT citratul (deqstrozas fosfatis citratis xsnari (10:1.4)) xsnarSi. 3000 bruni/wuTSi 20 wuTiani centrifugaciis Semdeg, zedapiridan vaSorebdiT pl azmas. aRniSnul i suspenziebis kvl eva mimdinareobda xsnarebis damzadebidan 30 wuTis ganmavl obaSi 25⁰C temperaturis pirobebSi.

mkveTrad vertikal ur mdebareobaSi myofi pipetiT vaxdendiT 0.2 ml 0.85%-iani natriumis ql oridisa da 0.7%-iani adamianis al buminiT damzadebul i xsnaris fil trze gadatanas da vrTavdiT wammzoms. xdeboda drois gansazRvra - T_1 , romelic saWiroa mocemul i xsnaris srul i fil traciisaTvis, anu fil trSi (Filtrak 388, Germany) srul ad gavl isaTvis. xsnaris fil trSi srul i gavl idan 60 wamSi, fil tris nestiani l aqis centrSi daitaneboda 0.02 ml eriTroci tarul i masa, romelic winaswar fiziologiuri xsnariT iyo ganzavebul i, ise rom misi hematokriti 60%-s utol deboda. wammzomiT izomeboda eriTroci tarul i suspenziis fil trSi gavl is dro (T_2). arsebul i monacemebiT xdeboda eriTroci tebis deformadobis indeqsis gamoTvl a, romelic tolia: $DF = T_1 / T_2$. rac ufro maRal ia deformadobis indeqsi, miT ufro Zl ieri deformadobis unari aqvT eriTroci tebs.

2.3.3.3. eriTroci tebis agregaciul i aqti voba

eriTroci tebis agregadobis kvl evisaTvis j er xdeboda venidan aRebul i 4-5 ml sisxl is centrifugireba 1000 bruni/wuTSi siCqariT 7 wuTis ganmavl obaSi. centrifugirebis damTavrebis Semdeg, pl azmas frTxil ad vaSorebdiT eriTroci tarul masas da gadgvqonda sxva sinj araSi. aseve vaSorebdiT l eikocitur firfitasac. pl azmasa da eriTroci tul masas vinaxavdiT oTaxis temperaturaze. eriTroci tul i masis garecxva xdeboda 0.85%-iani natriumis ql oridis xsnariT 9:1 fardobiT, 3-j eradi, 10-10 wuTiani igive siCqaris centrifugirebiT. aRniSnul i meTodis safuZvel s warmoadgens Ashkenazi (1977w.) SemoTavazebul i meTodika. meTodis arsi mdgomareobs imaSi, rom eriTroci tebi ar agregirdebian natriumis ql oridis xsnarSi, isini agregacias ganicdian mxol od sakuTar pl azmaSi,

sadac fibrinogenis gavl eniT isini warmoqmian mcire da didi zomis agregatebs.

yvel a minis sagani gamoyenebamde muSavdeboda l imonmJava natriumiT. pl azma da natriumis ql oridis xsnari gamoiyeneboda eriTrociTul i masis 200-j er gansazavebl ad.

Sesabamisad, 2 standartul SemrevSi (mel anJerSi) viRebdiT centrifugirebul eriTrociTul masas 0.5 danayofamde da vavsebdiT (101 danayofamde) erT SemTxvevaSi natriumis ql oridis xsnariT, xol o meore SemTxvevaSi – sakuTari pl azmiT. SemdgomSi special urad damzadebul i mowyobil obis saSual ebiT Tanabrad vaxdendiT Senj Rrevas 3 wuTis ganmavl obaSi da vasxavdiT goriaevis kameraSi. aRniSnul s 15-20 wuTis ganmavl obaSi vaCerebdiT nestian sakanSi da amis Semdeg vikl evdiT mikroskopis qveS 5 did kvadratSi. eriTrociTebS viTvl idiT did kvadratebSi diagonal urad (okul ari da obieqtivi 20). aseve viTvl idiT pl azmaSi gaxsnil i eriTrociTul i masisgan damzadebul xsnarSi, goriaevis kameris 5 did uj raSi diagonal ze Tavisufl ad mdebare eriTrociTebSa da maT agregatebs (didsa da pataras). daTvl isas yuradRebas vaqcevdit eriTrociTebis agregadebis zomebsa da TviToeul agregatSi eriTricitTa raodenobasac.

eriTrociTebis agregadobis (X) Sesafasebl ad, natriumis ql oridis xsnarSi Tavisufl ad mdebare eriTrociTebis raodenobas (A) akl deba Tavisufl ad mdebare eriTrociTebis raodenoba pl azmaSi (B), iyofa natriumis ql oridis xsnarSi Tavisufl ad mdebare eriTrociTebis raodenobaze (A) da mravl deba 100 procentze.

$$X = \frac{A - B}{A} \times 100$$

2.33.4. pl azmisa da sisxl is sibl antiS gansazRvra

pl azmis sibl antiS gansazRvrisaTvis Cven viyenebdiT Coulter-Harkness-is kapil arul viskozimetrS, romelic moqmedebS distilirebul i wyl is webovanebasTan pl azmis webovanebis Sedarebis principiT.

erTidaigive pirobebSi (37⁰C) graduirebul pipetebSi gaivl is pl azma da distil irebul i wyal i da xdeba maTi moZraobis siCqareTa Sedareba. meTodis saSual o cdomil eba Sesazl oa iyos Skal is ± 2 mcire danayofis tol i. EDTA-sisxl is centrifugireba xdeboda 3000 bruni/wuTsi siCqari T 15 wuTis ganmavl obSi.

saerTo sisxl is sibl antis gamosaTvl el ad Cven gamoviyeneT Weaver et al. mier SemuSavebul i formul a [105].

$$\log WBV = \log \eta_0 + (0.030 - 0.0076 \log \bar{\gamma}) \cdot Hct$$

sadac, WBV - sisxl is saerTo webovanebaa, η_0 - minis kapilarul i viskozimetreb iT gazomil i pl azmis webovaneba (η_0 ; mPa · s), Hct - hematokriti (Hct, %) da $\bar{\gamma}$ - sisxl ZarRvTa kedl is daZabul obis saSual o maCvenebel i (s⁻¹).

2.3.3.5. fibrinogenis gansazRvra

umetes kl inikur l aboratoriebSi fibrinogenis Seswavl is mizni T gamoviyeneba "Von Clauss"-is teqnika (Trombinis droze danyarebul i meTodi). aRniSnul i meTodis gamoyeneba rekomendirebul ia britaneTis hematol ogiis sazogadoebis 2005 wl is gaidl ainiT [355,356]. "Von Clauss"-is teqnika emyareba princips, rom rodesac Trombinis maRal i koncentracia emateba buferSi ganzavebul pl azmas (1:5 an 1:10), koagul aciis inhibitorTa moqmedeba mcirdeba; Sesabamisad, koagul aciis dro koagul irebul i fibrinogenis donis pirdapirporciul ia [357]. maRal i koncentraciis Trombini (100 U/ml) emateba ganzavebul gamosakvl ev pl azmas da izomeba koagul aciis dro (Clauss, 1957). testis Sedegis Sedareba xdeba kalibraciul mrudTan, romelic warmoadgens standartis da Sedegi warmodgenilia g/l ganzomil ebi T.

mocemul i meTodika gamoirCeva maRal i sizustiT, rodesac fibrinogenis koncentracia 50-800mg/dl -is fargl ebSia.

2.3.3.6. Trombocitebis agregacia

Trombocitebis agregaciis testi aris Trombocitebis funqciis Sesafasebel i ZiriTadi testi. Trombocitebis agregaciis kvl eva xdeboda O'Brien-isa [358] da Born-isa [359] meTodis Renaud et al. [360] modifikaci iT.

metodologiuri detal ebi arwerilia sxvagan [361,362]. kerZod, adenozin difosfati emateba TrombocitebiT mdidari pl azmis mosamzadebl ad da xdeba Suqis gatarebis cvl il ebaTa aRricxva. pasuxi iyofa or nawil ad: pirvel adi tal Ra - Trombocitebis Seqcevad agregacias asaxavs, meore tal Ra ki - Seuqcevad agregacias. pirveli tal Ra izomeba, rogorc sinaTl is gatarebis maqsimal uri cvl il ebis procentul i mniSvel oba TrombocitebiT mdidar pl azmasa da TrombocitebiT Rarib pl azmas Soris. meore tal RaSi ganirCeva "maRal i" da "dabal i" meoradi agregaciis ubnebi, rac miuTitebs Seuqcevani agregaciis ganvitarebis mcire da did xarisxe [361,362].

2.3.3.7. Trombocitebis adheziuri aqtivobis gansazRvra

Trombocitebis adheziuri aqtivobis gansazRvris mizniT, Cven viyenebdiT Krizhanovsky V.L. -is mier SemuSavebul mikrometods, roml is mixedvitac 10.05 ml . citratul -furacil inis xsnars vaTavsebdiT sil ikonizirebul sinjaraSi. citratul -furacil inis xsnariT winaswar damuSavebul i mikropipetiT vaxdendiT 0.05 ml sisxl is swraf aRebas da sinjaraSi arsebul citratul -furacil inis xsnarTan Serevas. 6 ml Sereul i xsnaris amoReba xdeboda pipetiT. amoRebul i xsnari weTovnad ifil treboda kvarcis qviSaze da isxmeboda sufTa sil ikonizirebul sinjaraSi. fil traciande da fil traciis proceduris Semdgom arsebul xsnarebSi vaxdendiT Trombocitebis raodenobis daTvl as goriaevis kameris gamoyenebiT. kerZod, 10 did kvadratSi daTvl il Trombocitebis raodenobas emateboda 4 nul i da SemdgomSi iyofoda 2-ze.

adheziuri aqtivobis gamoTvl a xdeba Semdegi formul is gamoyenebiT:

$$AA = \frac{(n_1 - n_2) \times 100}{n_1}$$

sadac, n_1 - Trombocitebis raodenobaa fil traciande, n_2 - ki Trombocitebis raodenoba fil traciis Semdeg. miRebul i ricxvi asaxavs kvarcis qviSaze adheziirebul TrombocitTa procentul mniSvel obas.

2.3.4. pozitiuri prognozuli mniSvneloba, mgrZnobeloba, specifikuroba

mgrZnobeloba – aris pozitiuri Sedegis mqone individTa wili daavadebis mqone saerTo populaciaSi.

specifikuroba – aris pozitiuri Sedegis mqone (anucru-dadebiti) individTa wili j anmrTel (daavadebis ar mqone) pirTa populaciaSi.

pozitiuri prognozuli mniSvnelobis (PPV-Positive Prognostic Value) gamosaTvl el ad, Cven viyenebdiT Bayes' wess [376].

$$PPV = \frac{P(\text{დაავადების}) \times P(\text{პოზიტივ/დაავადება})}{P(\text{დაავადება}) \times P(\text{პოზიტივ/დაავადება}) + [1 - P(\text{დაავადება})] \times P(\text{პოზიტივ/ჯანმრთელობა})}$$

2.3.5. statistikuri analizi

statistikuri damuSaveba da analizi ganxorciel da SPSS 15.0 paketiT (SPSS 15.0 for windows Evaluation Version). monacemebi warmodgenilia, rogorc saSualo ± standartuli gadaxra. kolmogorov-smirnovის ალგორითმი მეTodi gamoyenebul iqna calkeuli maxasiaTebის normaluri ganawilების Seswavis mizniT. bivariაციული კორელაციები დადგინდა პირონის კორელაციური კოეფიციენტის გამოყენებით. $P < 0.05$ მნიშვნელობა მიჩნეულია, როგორც სტატისტიკურად სარწმუნო. ჯგუფთა სორისი სხვაობა დადგინდა Mann-Whitney testით. გარდა Mann-Whitney მეTოდისა, ხემოეოლოგიურ maxasiaTებელთა saSualo მნიშვნელობების Sedareბის მიზნით გამოყენებულ იქნა "Fisher's F Test" და "Student's t Test". კონტროლისა და ჰიპერტენზიის ჯგუფების შესებრები განაწილების Sedareბის მიზნით გამოყენებულ იქნა დამოუკიდებლობის T testი. სისხლის წნევის ცირკადული პროფილისა და ნორმოტენზია/ჰიპერტენზიის სორის დამოუკიდებლობის გამოსავლენად გამოყენებულ იქნა χ^2 დამოუკიდებლობის testი. "zusti testis", e.w. "Exact Test method" მეTodi გამოყენებულ იქნა არტერიული წნევის ცირკადული პროფილის – დიპერი/ნონ-დიპერი გავრცელების სისხლის შესავლად ჰიპერტენზიისა და ნორმოტენზიის დროს.

Tavi 3. kvl evis Sedegebi da maTi ganxil va

cxrili #1-Si warmodgenilia 57 arasdros namkurnal ebi hipertenziuli pacientisa da 17 janmrTel i kontrolis demografiuli da klinikuri maxasiaTebl ebi. rogorc cxrili dan Cans, ZiriTad da sakontrolo jgufes Soris asakobrivi da sqesobrivi sxvaoba ar gamovlinda, rac miuTitebs amori sakvl ebi jgufis homogenurobaze. amastan, rogorc mosal odneli iyo, ZiriTadi jgufis anu hipertenziuli patienteb sakontrolo jgufTan, anu janmrTel kontigentTan SedarebiT gaaCndaT arteriuli wnevis mniSvelovnad maRali maCvenebl ebi. statistikurad sarwmuno gansxvaveba gamovlinda arteriuli wnevis cirkaduli profilis (diperi/non-diperi) arsebobas Soris janmrTel da hipertenziuli individebSi ($P=0.014$). " χ^2 test for independence" statistikuri meTodis gamoyenebiT gamovlinda, rom cirkaduli sisxlis wnevis profili (diperi/non-diperi) damokidebulia sisxlis wnevis doneze, anu normo- da hipertenziaze ($P=0.0298$). "Exact Test" statistikuri meTodis gamoyenebiT dadginda, rom arteriuli wnevis diperi cirkaduli profili ufro xSirad gv xvdeba normotenziuli individebSi hipertenziuli patientebTan SedarebiT ($P=0.0139$).

ZiriTadi (hipertenziuli) da sakontrolo jgufis Sedareba

normotenziuli, praqtikulad janmrTel i pirebisa da ah-is mqone patientebis awam-iT miRebuli maCvenebl ebi mocemulia cxrili #2-Si. maCvenebl TaSorisi gansxvaveba sarwmuno iyo yvela parametrisaTvis, garda gulis cemisis xSirisa dRis, Ramis da 24-saatis ganmavl obaSi.

sisxlis reologiuri maxasiaTebl ebis mxriv, mniSvelovani gansxvaveba dafiqsirda Trombocitebis agregaciisa da adheziis, fibrinogenis koncentraciis, hematokritis, eritrocitebis agregaciisa da deformaciis da pl azmisis blantis mxriv ($P \leq 0.01$) (ix. cxrili #3). amastan, Trombocitebis raodenobam da sisxlis sibilantis donem statistikurad sarwmuno maCvenebl sver miarwia amor jgufs Soris.

mxris arteriis dupl eqs-skani rebis Sedegebi j anmrTel da sakontrol o j gufis individebSi mocemul ia cxril i #4-Si. j anmrTel individebs, hipertenziul pacientebTan SedarebiT aReniSnebodaT nakad-damokidebul i vazodil ataciis (FMD%), reaqtul i hiperemiis testiT ganpirobepul i sisxl ZarRvovani diametris cvl il ebis (ΔD), nitrat-damokidebul i, anu endoTel ium-damokidebul i vazodil ataciis (Ng-MD%), reaqtul i hiperemiis testiT ganpirobepul i sisxl is nakadis siCqaris, gadanacvl ebis daZabul obisa da gadanacvl ebis siCqaris cvl il ebis (ΔV , ΔT da $\Delta \gamma$, Sesabamisad) sarwmunod maRal i maCvenebl ebi ($P \leq 0.01$) (grafiki #1). aRsaniSnavia, rom ara mar to nakad-damokidebul i vazodil ataciis saSual o maCvenebl ebi, aramed medianebic gansxvavebul i aRmoCnda mocemul j gufebs Soris (grafiki #2).

korel acia sisxl is hemoreol ogiur maxasiaTeb l ebsa da mxris arteriis dupl eqs-skani rebiT miRebul parametrebs Soris ZiriTadi j gufis individebSi mocemul ia cxril i #5-Si. FMD%, ΔD , Ng-MD%, ΔV , ΔT da $\Delta \gamma$ avl endnen Zl ier korel acias yvel a hemoreol ogiur parametrTan, garda eriTroci tebis deformaci isa.

sakontrol o j gufis individebSi FMD% korel irebda mxol od Trombocitebis agregaciasTan ($P=0.01$), xol o reaqtul i hiperemiis testiT ganpirobepul i sisxl ZarRvovani diametris cvl il ebam (ΔD) aCvena korel acia Trombocitebis agregacias, adheziurobas, fibrinogenis koncentracias, eriTroci tebis agregacias, pl azmisa da sisxl is sibl antesTan ($P<0.05$). Ng-MD% korel irebda mxol od sisxl is sibl antesTan ($P=0.004$) (ix. cxril i #6).

cxril i #7-Si mocemul ia korel aciuri anal izi hemoreol ogiur maxasiaTeb l ebsa da arteriul i wnevis 24-saaTiani monitorirebis monacemebs Soris sakontrol o j gufis individebSi. Trombocitebis agregaciam da adheziurobam gamoavl ina mniSvnel ovani korel acia dRis saSual o sistol ur, diastol ur da pul sur wnevebTan da Ramis saSual o pul sur wnevasTan ($P \leq 0.02$). eriTroci tebis agregacia, pl azmis sibl ante da sisxl is sibl ante korel irebda Ramis minimal ur saw, Ramis minimal ur daw, Ramis saSual o saw, da Ramis saSual o pul sur wnevasTan. eriTroci tebis

deformaciam gamoavl ina korel acia Ramis saSual o sistol ur da pul sur wnevasTan.

ZiriTadi j gufis individebSi Trombocitebis agregaciam gamoavl ina ZI ieri korel acia dRis maqsimal ur daw, Ramis minimal ur da maqsimal ur sistol ur, Ramis maqsimal ur diastol ur, Ramis saSual o sistol ur da diastol ur, adreul i dil is sistol ur da diastol ur wnevebTan. eriTroci tebis agregaciul i aqtivoba, pl azmisa da sisxl is sibl ante metad ufro ZI ier korel irebda Ramis wnevis maCvenebl ebTan (cxril i #8).

hipertenziul individebSi rogorc nakad-damoki debul ma vazodil ataciam (FMD%), ise reaqtul i hiperemiis sapsuxod ganviTarebul ma sisxl ZarRvis diametris cvl il ebam (ΔD) aCvena sarwmuno korel acia Ramis minimal ur da maqsimal ur saw-Tan, Ramis maqsimal ur daw-Tan, Ramis saSual o sistol ur, diastol ur da pul sur arteriul wnevasTan (ix. cxril i #9). sakontrol o j gufis individebSi, msgavsad ZiriTadi j gufisa nakad-damoki debul ma vazodil ataciam da ΔD -m aCvenes ZI ieri korel acia Ramis saSual o sistol ur da pul sur wnevasTan (ix. cxril i #10). rogorc hipertenziul i, ise normotenziul i individebis gadanacvl ebis daZabul obisa da gadanacvl ebis siCqaris cvl il eba (ΔT da $\Delta \gamma$) korel irebda Ramis wnevis maCvenebl ebTan.

hemoreol ogiur parametrTaSorisi korel aciebi ZiriTadi j gufis individebSi mocemul ia cxril i #11-Si. Trombocitebis raodenoba maRal i sarwmunoobiT korel irebda Trombocitebis adheziurobasTan, fibrinogenis koncentraciasTan, pl azmisa da sisxl is sibl antesTan. Trombocitebis agregacia, hematokriti da eriTroci tebis agregadoba korel irebda yvel a hemoreol ogiur maxasiaTebel Tan, garda Trombocitebis raodenobisa da eriTroci tebis deformaciisa. Trombocitebis adheziuroba, pl azmisa da sisxl is sibl ante avl enda korel acias yvel a parametrTan, garda eriTroci tebis deformaciisa. eriTroci tebis deformacia korel irebda mxol od fibrinogenis koncentraciasTan ($r=-0.327$; $P=0.013$). hemoreol ogiur parametrTaSorisi korel aciebi sxvagar saxes atarebs sakontrol o j gufSi. j anmrTel individebSi ar aRiniSna aranairi korel acia Trombocitebis raodenobasa da sxva hemoreol ogiur parametrebs Soris.

Trombocitebis agregadoba korel irebda Trombocitebis adheziurobasTan, eriTrociitebis agregadobasa da deformadobasTan, pl azmis sibl antesTan da hematokritTan. fibrinogeni korel irebda Trombocitebis adheziurobasTan, hematokritTan, eriTrociitebis deformadobasa da agregadobasTan da pl azmis sibl antesTan. pl azmis sibl antem, iseve rogorc eriTrociitebis deformadobam gamoavl ina korel acia yvel a parametrTan, garda Trombocitebis raodenobisa da adheziurobisa. eriTrociitebis agregadoba korel irebda yvel a hemoreol ogiur maCvenebel Tan. amasTan, sisxl is sibl ante korel irebda mxol od eriTrociitebis agregadoba/deformadobasTan da pl azmis sibl antesTan (ix. cxril i #12).

cxril i #13-Si mocemul ia mxris arteriis dupl eqs-skaniirebiT miRebul monacemTa Sida korel acia ZiriTadi j gufis individebSi. nakad-damoki debul i vazodil atacia (FMD%) avl enda korel acias yvel a sisxl ZarRvovan parametrTan, garda inicial uri gadanacvl ebis daZabul obisa (T_0). msgavsad nakad-damoki debul i vazodil atacisa, mxris arteriis absol uturi cvl il eba (ΔD) korel irebda yvel a sisxl ZarRvovan maxasiaTebL ebTan, garda inicial uri gadanacvl ebis daZabul obisa da gadanacvl ebis siCqarisa (T_0 da γ_0 , Sesabamisad). uaryofiTi korel acia aRiniSna FMD%-sa da sisxl ZarRvis sawyis diametr s (D_0) Soris, iseve rogorc ΔD -sa da D_0 -s Soris. korel acia inicial ur diametr sa da endoTel ium-damouki debel vazodil atacias Soris ar gamovl inda. amas garda, gamovl inda Zl ieri dadebiTi korel acia endoTel ium-damoki debul da endoTel ium-damouki debel vazodil atacias Soris esenciuri hipertenziis mqone individebSi ($P=0.000$).

mxris arteriis dupl eqs-skaniirebiT miRebul monacemTa Sida korel acia sakontrol o j gufis individebSi mocemul ia cxril i #14-Si. FMD% maRal i sarwmunoebiT korel irebda reatriul i hiperemi iT ganpirobepul sisxl ZarRvis dimetris, gadanacvl ebis daZabul obisa da gadanacvl ebis siCqaris cvl il ebasTan (ΔD , ΔT da $\Delta \gamma$, Sesabamisad). inicial uri diametri (D_0) ukuproporciul damoki debul ebaSi iyo sisxl is nakadis sawyis siCqaresTan (V_0), gadanacvl ebis daZabul obasa (T_0) da

gadanacvl ebis siCqaresTan (γ_0). amasTan, gamovl inda maRal i sarwmunoebis ($P=0.000$) dadebiTi korel acia sisxl ZarRvis inicial ur diametrsa (D_0) da sisxl is nakadis siCqaris, gadanacvl ebis daZabul obisa da gadanacvl ebis siCqaris reaqtul i hiperemiIT ganpirobebul cvl il ebas (ΔV , ΔT da $\Delta \gamma$, Sesabamisad) Soris. nitrogl icerin-dmokidebul i vazodil atacia dadebiTad korel irebda sisxl ZarRvTa sawyis diametrTan da uaryofiTad korel irebda inicial ur gadanacvl ebis daZabul obasa da gadanacvl ebis siCqaresTan.

hemoreol ogiur parametrTa al baTobiTi ganawil ebis Seswavl am ori damoukidebel i popul aciis homogenurobis Sesafasebel i kol mogorov-smirnovis testiT aCvena, rom Trombocitebis raodenoba xasiaTdeba msgavsi al baTobiTi ganawil ebiT. aRniSnul is sawinaaRmdogod, Trombocitebis agregadoba ($P=0.0013$), Trombocitebis adheziuroba ($P=0.0010$), fibrinogenis koncentracia ($P=0.0043$), hematokriti ($P=0.0057$) da pl azmis viskozuroba ($P=0.0061$) avl enda gansxvavebul al baTobiT ganawil ebas (grafiki #3).

diperi da nondiperi hipertenziul i pacientebis Sedareba

arteriul i wnevis sxvadasxva cirkadul i profilis mqone 57 hipertenziul i pacientis kl inikuri maxasiaTebi ebi mocemul ia cxril i #15-Si. diperi da nondiperi hipertenziul i pacientebis asaki ar gansxvavdeboda erTmaneTisagan ($P=0.142$). arteriul i wnevis xangrZl ivoba statistikurad sarwmunod maRal i iyo nondiper j gufSi ($P=0.024$). winda raodenobrivi Tval sazrisiT, diper da nondiper hipertenziul j gufebSi l xarisxis hipertenziis gansxvaveba ar gamovl inda; orive j gufSi 12-12 pacienti iyo l xarisxis hipertenziis mqone. rac Seexeba procentul ganawil ebas, diperi pacientebis 60%-s aReniSneboda l xarisxis hipertenzia da 40%-s meore xarisxis. rac Seexeba nondiperi pacientebis, gamokvl eul Ta daaxl oebiT 2/3-s aReniSneboda ll xarisxis hipertenzia. Sesabamisad, me-2 xarisxis hipertenziis mqone patientTa umetesoba xasiaTdeboda nondiperi cirkadul i profil iT ($P<0.05$). Ramis minimal uri da maqsimal uri saw, dRis da Ramis maqsimal uri daw, 24-sT. saSual o daw, dRis da Ramis saSual o daw, Ramis

saSual o saw da pul suri wneva, da adreul i dil is daw statistikurad sarwmunod maRal i iyo nondiper hipertenziul individebSi.

diper da nondiper hipertenziul pacientTa hemoreol ogiuri gamokvl evis Sedegebi mocemul ia cxril i #16-Si. garda eri Trocitatebis deformadobisa, yvel a hemoreol ogiuri maCvenebel i statistikurad sarwmunod maRal i iyo non-diper pacientebSi. amasTan, diper pacientebSi pl azmis sibl ante konstantas warmoadgenda da Seadgenda 1.51 erTeul s (ix. grafiki #4).

Trombocitebis raodenobis al baTobiTi ganawil eba msgavsi iyo diper da nondiper hipertenziul pacientebSi ($P=0.088$). amasTan, Trombocitebis agregacia ($P=0.000008$), Trombocitebis adheziuroba ($P=0.000008$), fibrinogenis koncentracia ($P=0.0128$), hematokriti ($P=0.000008$) da pl azmis viskozuroba ($P=0.000008$) avl enda gansxvavebul al baTobiT ganawil ebas. χ^2 testma gamoavl ina, rom rogorc diperi, ise nondiperi hipertenziul i pacientebis Trombocitebis raodenobas, iseve rogorc Trombocitebis agregacia/adheziurobas da pl azmis sibl antes aqvs log-normal uri ganawil eba (ix. cxril i #17). am mxriv gamonakl iss Seadgens nondiperi pacientebis fibrinogenis koncentracia, romelic xasiaTdeba log-normal uri da degeneraciul i ganawil ebis SenareviT (ix. grafiki 5).

garda Mann-Whitney meTodisa, diperi da nondiperi hipertenziul i individebis hemoreol ogiuri maxasiaTebel Ta saSual o mniSvel obebis Sedarebis mi zni T Cven gamovi yeneT "Fisher's F Test" da "Student's t Test". kvl evis Sedegad gamovl inda, rom nondiper pacientebis diper ebTan Sedarebi T aReniSnebaT hemoreol ogiuri maxasiaTebel ebis saSual o maCvenebel ebis sarwmunod maRal i done (cxril i #18).

mxris arteriis dupl eqs-skani rebis maCvenebel ebi diper da nondiper hipertenziul pacientebSi warmodgenilia me-19 cxril Si. nondiper pacientebSi diper ebTan Sedarebi T maRal i sarwmunoebi T dabal i iyo nakad-damoki debul i vazodil ataciis maCvenebel i (FMD%) (11.94 ± 0.95 da 3.54 ± 1.76 , Sesabamisad; $P=0.000$). garda aRniSnul isa, statistikurad sarwmunod gansxvavdeboda erTmaneTisagan diperi da nondiperi pacientebis nakad-damoki debul i vazodil ataciis maCvenbel Ta medianac (4.16 da 12.31

Sesabamisad; $P=0.000$). msgavsad endoTel ium-damokidebul i vazodil ataciisa, diper pacientebTan SedarebiT ni trat-damokidebul i vazodil ataciis rogorc saSual o maCvenebel i, ise mediana ufro maRali hqondaT (13.01 ± 1.08 da 8.11 ± 1.19 , Sesabamisad; $P=0.000$. saSual o maCvenebel isaTvis da 13.14 da 8.3 , Sesabamisad; $P=0.000$ medi ani saTvis) (ix. grafiki #6).

diperebTan SedarebiT nondiper hipertenziul pacientebTan aReniSnaT ufro didi sisxl ZarRvTa inicial uri diametri (3.76 ± 0.2 da 4.31 ± 0.16 , Sesabamisad; $P=0.000$). amasTan, reaksiuli hiperemiis sapsuxod ganviTarebul i diametris cvl il eba ufro masStaburi diper pacientebTan iyo. rogorc sisxl is nakadis inicial uri, ise reaksiuli hiperemiis sapsuxod ganviTarebul i siCqare sarwmunod maRali iyo diper pacientebTan nondiper individebTan SedarebiT. msgavsad sisxl is nakadis siCqarisa, gadanacvl ebis rogorc inicial uri, ise hiperemiis Semdgomi siCqare sarwmunod maRali diper pacientebTan aReniSnaT. sawyisi gadanacvl ebis daZabul oba praqtikul ad ar gansxvavdeboda am or j gufs Soris (6.3 ± 0.43 da 6.16 ± 0.41 , Sesabamisad; $P=0.394$). amasTan, gadanacvl ebis daZabul obis sxvaoba ganviTarebul i reaksiuli hiperemiis sapsuxod, sarwmunod maRali diper pacientebTan hqondaT (-0.67 ± 0.08 da -0.17 ± 0.1 , Sesabamisad; $P=0.000$) (ix. grafiki #7).

diperi da nondiperi cirkaduli profilis Sedareba saerTo sakvl ev populaciaSi (janmrTel i - kontroli da ZiriTadi - hipertenziuli j gufebi)

aw-is sxvadasxva cirkaduli profilis mqone 74 individi (hipertenziuli da normotenziuli) klinikuri maxasiaTebl ebi mocemulia cxrili #20-Si. diperi da nondiperi gamokvl euli pirebis saSual o asakar gansxvavdeboda erTmaneTisagan ($P=0.086$). rogorc arteriuli wnevis xangrZl ivoba, ise arteriuli wnevis xarisxi sarwmunod maRali hqondaT nondiper individebTan. rogorc mosal odnel iyo, Ramis rogorc maqsimaluri, ise minimaluri da saSual o sistoluri, diastoluri da pulsururi wnevis maCvenebel ebi diperebTan SedarebiT, nondiper pacientebTan ufro maRali aReniSnaT. amas garda, dRis saSual o sistoluri da diastoluri

arteriul i wnevac, iseve rogorc adreul i dil is saSual o sistol uri da diastol uri arteriul i wneva sarwmunod maRal i nondiper pacientebshqondaT. dRe-Ramis sxvadasxva periodSi gul iscemis sixSire praqtikul ad ar gansxvavdeboda am or j gufs Soris.

arteriul i wnevis sxvadasxva cirkadul i profil is mqone 74 gamokvl eul i piris (normotenziul i da hipertenziul i) hemoreol ogiuri maxasiaTeb l ebi mocemul ia cxril i #21-Si.

nondiperi cirkadul i ritmis mqone indivi debs diperebTan SedarebiT aReniSnaT yvel a hemoreol ogiuri parametris statistikurad sarwmunod maRal i maCvenebel i (P=0.000), garda eriTroci tebis deformaci isa da Trombocitebis raodenobisa (ix. grafiki #8). diperebs nondiperebTan SedarebiT ufro gamoxatul i eriTroci tebis deformadobis unari hqondaT, xol o Trombocitebis raodenoba praqtikul ad ar gansxvavdeboda am or sakvl ev j gufSi.

mxis arteriis dupl eqs-skanirebis maCvenebel ebi saerTo gamokvl eul i popul aciis (hipertenziul i, normotenziul i) diper da nondiper indivi debSi mocemul ia cxril i #22-Si. diper pacientebshqondaT nondiper indivi debTan SedarebiT aReniSnaT mxis arteriis endoTel ium-damoki debul i da endoTel ium-damouki debel i vazodil ataciis statistikurad sarwmunod maRal i done (P=0.000) (grafiki #9). inicial uri sisxl ZarRvovani diametri nondiperebs diperebTan SedarebiT ufro maRal i hqondaT (4.29 ± 0.22 da 3.79 ± 0.19 , Sesabamisad; P=0.000). ΔD , ΔV , ΔT da $\Delta \gamma$ –s maCvenebel ebi mniSvnel ovnad maRal i iyo diperebis j gufSi. amasTan, inicial uri gadanacvl ebis daZabul oba am or j gufSi praqtikul ad ar gansxvavdeboda erTmaneTisgan (P=0.243).

hemoreol ogiur parametrTa al baTobiTi ganawil ebis Seswavl am gamoavl ina, rom Trombocitebis raodenobis al baTobiTi ganawil eba msgavsia orive j gufSi (P=0.230). amasTan, Trombocitebis agregacia (P=0.000008), Trombocitebis adheziuroba (P=0.000008), fibrinogenis koncentracia (P=0.0018), hematokriti (P=0.000008) da pl azmis viskozuroba (P=0.000008) gansxvavebul al baTobiT iyo ganawil ebul i.

arteriul i wnevis nondiperi cirkadul i profil is mgrZnobel oba, specifikuroba da pozitiuri prognozul i mniSvnel oba j anmrTel da hipertenziul individebSi mocemul ia cxril i #23-Si.

nondiperi cirkadul i profil is mgrZnobel oba Trombocitebis agregaciul i aqtivobis donis mimarT, ah-is mqone individebSi iyo 0.939, xol o normotenziul popul aciaSi 0.5. amasTan, nondiperi cirkadul i profil is pozitiuri prognozul i mniSvnel oba am or j gufs Soris praqtikul ad ar gansxvavdeboda da Seadgenda 0.833-s j anmrTel ebisaTvis da 0.837-s ah-is mqone individebisaTvis. nondiper cirkadul profil s mxol od hipertenziul pacientebSi gaaCnda maRal i sensitiuroba da pozitiuri prognozul i mniSvnel oba Trombocitebis adheziuri aqtivobis, eriTrocitebis agregaciis, fibrinogenis koncentraciis, pl azmisa da sisxl is sibl antisatvis (ix. grafiki #10). amasTan, nondiperi profil is mgrZnobel oba hipertenziul pacientTa nakad-damoki debul i vazodil ataciis mimarT iyo 1 da orive j gufSi gamoirCeoda maRal i prediqtorul i mniSvnel obi T.

arteriul i hipertenziis sxvadasxva xangrZl ivobis anamnezis mqone pacientTa Sedareba

57 hipertenziul i pacientidan, 28-s ah-is 7 wel ze nakl ebi xangrZl ivobis anamnezi hqonda, xol o 29-s 7 an meti wl is xangrZl ivobis. pacientebS ah-is 7 wel ze nakl ebi anamneziT, aReni SnaT Trombocitebis agregadobis, fibrinogenis koncentraciis, eriTrocitebis agregaciul i aqtivobisa da pl azmis sibl antis sarwmunod dabal i maCvenebl ebi ($P < 0.05$) (cxril i #24).

mxris arteriis dupl eqs-skani rebis monacemebi hipertenziis sxvadasxva xangrZl ivobis anamnezis mqone pacientebSi mocemul ia cxril i #25-Si. statistikurad sarwmuno gansxvaveba mxol od endoTel ium-damouki debel i vazodil ataciis maCvenebl ma gamoavl ina (11.92 ± 1.26 da 7.81 ± 1.33 , Sesabamisad; $P = 0.000$).

hipertenziul pacientTa Sedareba xarisxis mixedviT

gamokvl eul i 57 hipertenziul i pacientidan 24-s aReniSneboda I xarisxis ah, xol o 33-s Il-e xarisxis. hemoreol ogiuri gamokvl eviT gamovl inda, rom Il-e xarisxis hipertenziul pacientebS I xarisxis mqone individebTan SedarebiT gaaCndaT eriTrocitebis agregaciul i aqtivobis, pl azmisa da sisxl is sibl antis sarwmunod maRal i done (cxrili # 26). reaqtiul i hiperemiIT ganpirobebul i gadanacvl ebis daZabul obisa da gadanacvl ebis sicqaris cvl il eba sarwmunod maRal i I xarisxis hipertenziis mqone individebSi aRiniSna ($P < 0.05$). I xarisxis hipertenziul pacientebS Il xarisxis pacientebTan SedarebiT nitroglicerindamokidebul i, anu endotelium-damokidebul i vazodil ataciis sarwmunod maRal i maCvenebel i gamouvl indaT (11.88 ± 1.27 da 4.57 ± 0.23 , Sesabamisad; $P = 0.000$). endotelium-damokidebul i vazodil ataciis jgufTaSorisma gansxvavebam statistikurad sarwmuno maCvenebel s ver miarwia (8.2 ± 2.45 da 5.24 ± 2.08 , Sesabamisad; $P = 0.054$) (cxrili # 27).

svadasxva nakad-damokidebul i vazodil ataciis mqone hipertenziul pacientTa Sedareba

cxrili #28-Si mocemulia svadasxva nkad-damokidebul i vazodil ataciis mqone hipertenziul pacientTa hemoreol ogiuri maxasiaTebIebi. hipertenziul pacientebS 7.5%-ze dabal i endotelium-damokidebul i vazodil ataciis maCvenebel iT aReniSnaT yvel a hemoreol ogiuri parametris sarwmunod maRal i done ($P = 0.000$). am mxriv gamonakl iss warmoadgenda mxol od eriTrocitebis deformacia, romelic praqtikul ad ar gansxvavdeboda am ori jgufis individebS Soris (grafiki #11).

cxrili #29-Si mocemulia mxris arteriis dupl eqs-skani rebis monacemebi endotelium-damokidebul i vazodil ataciis procentul i mniSvel obis mixedviT. hipertenziul pacientebS, romel Ta nakad-damokidebul i vazodil ataciis maCvenebel i aRemateboda 7.5%-s, aReniSnaT sarwmunod maRal i nitrat-damokidebul i vazodil atacia (12.13 ± 1.13 da 7.6 ± 1.34 , Sesabamisad; $P = 0.000$), iseve rogorc gadanacvl ebis daZabul obisa da

gadanacvl ebis siCqaris cvl il ebis indeqsebi (P=0.000). sisxl ZarRvTa sawyisi diametri mniSvnel ovnad maRal i iyo 7.5%-ze dabal i FMD-s mqone pacientebSi (4.36 ± 0.18 da 3.86 ± 0.18 , Sesabami sad; P=0.000).

Tavi 4. Sedegebi s Sej ameba

Cvens mier Catarebul ma kvl evam gamoavl ina, rom aw-is nondiperi cirkadul i profil is arsebobis sixSire ufro maRal ia hipertenziis mqone individebSi normotenziul kontrol Tan SedarebiT. garda aRniSnul isa, Cven gamovavl ineT, rom arteriul i wnevis cirkadul i profil is konkretul i variantis (diperi/nondiperi) arseboba damokidebul ia hipertenziis arsebobaze. Sesabamisad, Cveni azriT esenciuri hipertenziis arseboba gavlenas axdens arteriul i wnevis cirkadul ritmze da iwvev mis darRvevas, anu wnevis nondiperi cirkadul i profil is Camoyal ibebas.

61 prospeqtul i kvl evis metaanal izma, romel Sic CarTul i iyo 1 milionze meti zrdasrul i individi aCvena, rom sistol uri wnevis 10 mm.vvy.sv-iT an diastol uri wnevis 5 mm.vvy.sv-iT mateba asocierebul ia insul tiT ganpirobepul i sikvdil obis 40%-ian da kardiovaskul uri sikvdil obis 30%-ian zrdasTan [238]. mocemul i kvl evis Sedegebs mraval i oponenti hyavs, rac ganapiroba wnevis kl inikuri gazomvis teqnkis da ara arteriul i wnevis ambul atoriul i monitorirebis gamoyenebam. TeTri xal aTis hipertenziis gavrcelebis maRal i maCvenebl isa (zogierT popul aciaSi daaxl oebiT 30%-s utol deba) da mkvl evarTaSorisi da individSida variabel obis gamoricxvis mizniT Cven kvl evaSi arteriul i wnevis 24-saaTiani ambul atoriul i monitorirebis meTodi gamovieneT. garda aRniSnul isa, ambul atoriul i monitorirebis gareSe praqtikul ad SeuZl ebel i iqneboda arteriul i wnevis cirkadul i profil is gansazRvra.

ZiriTad da sakontrol o jgufis individebs Soris hemoreol ogiur parametrTa Sedarebam gamoavl ina, rom arteriul i hipertenzia asocierebul ia hemoreol ogiur darRvevebTan. kerZod, hipertenziul individebSi aRiniSna Trombocitebis agregaciul i da adheziuri aqtivobis, fibrinogenis koncentraciis, hematokritis, eriTrocitebis agregaciisa da pl azmis sibl antis gazrdil i done, rac proTrombozul mdgomareobaze mi aniSnebs. warmodgenil kvl evaSi gamovl inda dadebiTi sarwmuno korel acia eriTrocitebis agregadobasa da sisxl is, iseve rogorc pl azmis sibl antes Soris. igive Sedegi iqna nanaxi Meiselman et al. [343] kvl evaSi. sarwmunod maRal i korel acia gamovl inda aseve eriTrocitebis

agregadobasa da plazmis fibrinogenis koncentracias Soris. amastan, SesaZI oa fibrinogenis gazrdili plazmuri done gansazRvavdes eritrocitebis agregaciis maRal macvnebel s hipertenziul jgufSi. Meiselman et al. [343] monacemebiT, eritrocitebis gazrdil agregadobaSi wamyvan rols garda fibrinogenis donisa TamaSobs eritrocitis garsis maxasiaTebl ebic. maRali sarwmunoebis kavSiri gamovlinda eritrocitebis agregadobasa da sisxliis wnevis macvnebel ebs Soris, kerZod Ramis sistolur, diastolur da pulsur wnevebTan. gansxvavebiT hipertenziul jgufisagan, normotenziul individebs aReniSnebodaT eritrocitebis deformadobis sarwmunod maRali macvnebeli. cnobilia, rom kardiovaskulur daavadebaTa did procentis, gansakuTrebiT gulis iSemieur daavadebasa da periferiul sisxliZarRvTa daavadebebs Tan axlavs hemoreol ogiuri darRvevebi, gamoxatuli plazmis sibilantisa da eritrocitebis agregadobis matebiT [255, 259].

hipertenziul individebSi normotenziul kontrolTan SedarebiT gamovlinda Trombocitebis agregadobisa da adheziurobis sarwmunod maRali done. amastan, orive sakvl ev jgufSi aReniSneboda TrombocitTa agregadobasa da adheziurobas Soris dadebiti korelacia. maRali sarwmunoebis dadebiti korelacia gamovlinda Trombocitebis adheziuroba/agregadobasa da fibrinogenis koncentracias, iseve rogorc sisxliisa da plazmis sibilantes Soris, rac miuTitebs sisxliis reologiis, rogorc mTliani sistemiserTian funqcionirebaze. amastan, Trombwarmomna asociirebulia TrombocitTa hiperaktivacias, plazmisa da sisxliis sibilantis, da fibrinogenis koncentraciis zrdastan.

kardiovaskulur daavadebaTa dros gamovlenili hemoreol ogiuri darRvevebi mkvl evarTa mier ganxil eba, rogorc arasakmarisi cirkul atoruli funqciis Sedegian indikatori. amastan, am kontekstSi arteriuli hipertenzia praqtikul ad Seuswavelia. msgavsad zogadad kardiovaskuluri daavadebebis, arteriuli hipertenziis dros ganvitarebuli hemoreol ogiuri darRvevebi SesaZI oa ganxilul iqnas, rogorc mosalodneli cerebro- da kardiovaskuluri garTulebebis markerebi anu indikatorebi da darRveuli cirkulaciis Sedegi. ramdenadac,

hipertenzia waroadgens paTofiziol ogiuri procesebis rTul kaskads da xasiaTdeba sisxl ZarRvovan dazianeBaTa ganviTarebiT, hemoreol ogiismxri vi darRvevebi SesaZl oa ganxil ul iqnas rogorc sisxl ZarRvTa dazianebis an/da maRal i arteriul i wnevis sisxl is reol ogiaze uSual o zemoqmedebis Sedegi. Bor-Kucukkatay et al. [271], eriTroci tebis agregaciis darRvevas hipertenziis dros ganxil aven rogorc erT-erT umniSvnel ovanes faqtors hipertenziis ganviTarebi saTvis.

Cveni kvl evis msgavsad, Letcher et al. [264] kvl evaSi, j anmrTel sakontrol o j gufTan SedarebiT hematokritis mniSvnel oba ufro maRal i hipertenziul individebSi gamovl inda. amas garda, Danesh et al. [289] gamoavl ines, rom gazrdil i hematokritis done zrdis kardiovaskul ur risks. garda hematokritis, 7 l ongi tudinal ur kogortul kvl evaSi gamovl inda fibrinogenis damouki debel i prediqtorul i mniSvnel oba insul tisa da miokardiumis infarqtis ganviTarebi saTvis [301]. amasTan, praqtikul ad SeuZl ebel ia hemoreol ogiur darRvevaTa pirvel adi bunebis gansazRvra rogorc zogadad kardiovaskul ur daavadebaTa, ise hipertenziis dros, anu "qaTami Tu kvercxis" pirvel adobis probl ema aqac aqtual uri rCeba. kvl evam, msgavsad Natali et al. [394] kvl evis Sedegebisa, gamoavl ina uaryofiTi korel acia endoTel ium-damoki debul vazodil ataci asa da hematokrits Soris.

Cveni kvl evis Sedegebze dayrdnobiT, esenciuri hipertenzia unda ganxil ebodes rogorc gazrdil i proTrombozul i riskis mqone mdgomareoba. msgavs daskvnamde mi vi dnen Lip G. [296] da Minuz et al. [298]. Koenig et al. [257] da Lowe et al. [258] kvl evebma gamoavl ina pl azmis sibl antisa da kardiovaskul uri gamosavl is kavSiri. eqsperimentul i da statistikuri kvl evebis umetesobam tradiciul i risk-faqtorebis (fibrinogenis donis mateba, simsuqne, mwevel oba, hiperlipoproteinemia da a.S.) gverdiT gamoavl ina kardiovaskul ur daavadebaTa axal i mniSvnel ovani risk-faqtorebi, rogoricaa hematokritis, sisxl isa da pl azmis sibl anti s, eriTroci tebis agregadobis donis matebisa da eriTroci tebis deformadobis donis daqvei Tebis maCvenebl ebi.

Cvens mier miRebul i Sedegebi SesaZl oa ganxil ul iqnas, rogorc erTgvari axsna kvl evaTa Sedegebisa, sadac avtorebi adastureben, rom gazrdil i aw kavSirSia kardio- da cerebrovaskul uri avadobisa da sikvdil obis maRal riskTan [75, 77, 320, 372, 373, 374]. metic, Cveni kvl eva daexmareba kl inicistebis im hipertenziul i pacientebis identificirebaSi, romel Tac gaaCniaT gazrdil i kardiovaskul uri da cerebrovaskul uri riski.

mxris arteriis dupl eqs-skani rebam gamoavl ina, rom esenciuri hipertenziis mqone individebs j anmrTel kontrol Tan SedarebiT gaaCndaT gauaresebul i nakad-damokidebul i vazodil ataciis unari, rac endoTel iumis disfunqiaze miuTitebs. reaqtul hiperemias j anmrTel individTa mxris arteria ufro Zl ieri dil ataci iT pasuxobda. dReisaTvis, mecnierta Soris ar arsebobs erTiani azri endoTel ium-damokidebul i vazodil ataciis maCvenebl is normal uri mniSvnel obis Sesaxeb. Fathi et al. [382] monacemebiT, normad unda CaiTval os 7.3%-ze ufro maRal i nakad-damokidebul i vazodil ataciis maCvenebl i. Neunteufel et al. [41] monacemebiT SenarCunebul , normal ur nakad-damokidebul i vazodil ataciis mniSvnel obad 10% da meti vazodil atacia miCneva. zogadad, mecnierta umetesobis azriT j anmrTel popul aciisaTvis normad 7-10%-iani vazodil atacia iTvl eba [35, 69, 315, 383]. ... Cvens kvl evaSi esenciuri hipertenziis mqone individebis nakad-damokidebul i vazodil ataciis saSual o procentul i maCvenebl i 6.49 ± 1.58 iyo, rac udavod endoTel uri disfunqciis arsebobaze miuTitebs. Lauer et al. [87] kvl evaSi, hipertenziul pacientTa nakad-damokidebul i vazodil ataciis saSual o mniSvnel oba $3.6 \pm 0.3\%$ iyo. Cveni kvl evis Sedegsa da maT monacemebs Soris aseTi gansxvaveba SesaZl oa ganpirobepul i iyos Cvens mier kvl evaSi CarTvis kriteriumebis simkacriTa da kvl evis dizainiT, zogadad.

saSual o mxris arteriis diametris cvl il eba reaqtul i hiperemiis dros, TiTqmis 2-jer aRemateboda mis anal ogs hipertenziul j gufSi. aRniSnul i sisxl ZarRvTa endoTel iumis funqciis mkveTr darRvevaze miuTitebs arteriul i hipertenziis dros. endoTel ium-damouki debel i vazodil atacia orive j gufSi aRemateboda 9%-s, amasTan hipertenziul

individus normotenziasTan SedarebiT sarwmunod dabal i maCvenebel i aReniSnaT. Sesabamisi Sedegi miuTitebs sisxl ZarRvTa kunTovani Sris dazi anebaze da mis disfunqciaze arteriul i hipertenziis dros.

kvl evaTa erTi nawil i Cveni Sedegebis msgavsad miuTitebs endoTel uri disfunqciis arsebobaze arteriul i hipertenziis dros [44, 85, 87, 92]. metic, Plavnik et al. [88] normotenziul i da maRal i normul i wnevis mqone individebis gamokvl eviT aCvenes, rom endoTel iumis dazi aneba aRiniSneba sistol uri wnevis matebasTan erTad da SesaZl oa gamovl indes TviT kardiovaskul uri risk-faqtores ar mqone maRal i normul i wnevis individebSi ki. Perticone et al. [44] kvl evis monacemebze dayrdnobiT, endoTel ur disfunqcias ganixil aven rogorc kardiovaskul uri movl enebis ganvitarabis markers hipertenziis mqone pacientebSi. Bonetti et al. [73] ki endoTel iums ganixil aven rogorc kardiovaskul uri sikvdil obisa da avadobis Sesamci reb l ad mimarTul mkurnal obis pirvel ad samiznes. amasTan, arsebovs kvl evaTa sawinaaRmdego Sedegebic, sadac arteriul i hipertenziisa da endoTel uri disfunqciis kavSiri ver dadasturda [84, 384, 385, 386]. miuxedavad kvl evaTa simravl isa, dReisaTvis sakiTxi endoTel uri disfunqciis ganvitarabis Sesaxeb arteriul i hipertenziis dros da misi pirvel adi xasiaTis Sesaxeb j er kidev gadauWrel i rCeba [92].

fiziologiuri I ainarul i gadanacvl ebis daZabul oba umniSvnel ovanes rols TamaSobs sisxl ZarRvTa struqturisa da funqciis normis fargl ebSi SesanarCunebl ad. sisxl is sibl ante gansazRvravs gadanacvl ebis daZabul obis dones da Sesabamisad, sisxl ZarRvismxriv cvl il ebis ganvitarbasac. mniSvnel ovania, rom Cvens kvl evaSi ar gamovl inda gadanacvl ebis daZabul obis statistikurad sarwmunod gansxvavebul i mniSvnel obebi hipertenziul da sakontrol o j gufebs Soris. amasTan hipertenziis j gufis pacientebSi gadanacvl ebis daZabul obis cvl il ebisa da gadanacvl ebis sicqaris cvl il ebis indeqsebis dabal i maCvenebel ebis arseboba miuTitebs sisxl ZarRvTa intimal uri Sris funqciur ukmarisobaze.

gansxvavebiT pl azmis sibl antisagan, Cvens kvl evaSi sisxl is sibl antis mniSvnel oba praqtikul ad ar gansxvavdeboda hipertenziul da

normotenziul individebs Soris. Cveni kvl evis Sedegebis msgavsad, De Simone et al. [283] amerikel indiel ebSi Catarebul ma kvl evam aseve ver aCvena sisxl is sibl antis donis sarwmuno gansxvaveba normo- da hipertenziul individebs Soris. amasTan, sisxl is sibl antis gamosaTvl el ad avtorebi gansxvavebul formul as iyenebdnen, romel Sic gamoiyeneboda pl azmis proteinebis koncentracia (g/l); gamoTvl a tardeboda mudmivi gadanacvl ebis daZabul obis – 208mm^{-1} arsebobis daSvebis pirobobSi. Cveni da De Simone et al. [283] kvl evis Sedegebisagan gansxvavebiT, Razavian et al. [252], Sandhagen et al. [284], Devereux [285] kvl evebma gamoavl ines hipertenziasa da sisxl is sibl antes Soris kavSiris arseboba; amasTan, avtorebma ver axsnes sisxl is sibl antis cvl il eba hipertenziis mizezia Tu Sedegi [287,393]. dReisaTvis yvel aze metad gavrcel ebul i hipotezis mixedviT, hipertenzia da sisxl is sibl ante ar arian urTierTdakavSirebul i parametrebi, maTze zegavl enas axdenen garemosa da genetikuri faqtorebi, iseTi rogoricaa simsuqne, adinamia, mwevel oba da a.S. [288]. aRniSnul i absolutur SesabamisobaSi modis Cvens mier miRebul SedegebTan.

miuxedavad imisa, rom Cvenma kvl evam ar gamoavl ina sisxl is sibl antis sarwmuno gansxvaveba ZiriTadi da sakontrol o jgufis individebs Soris, gamovl inda mniSvnelovani korelacia sisxl is sibl antesa da Ramis sistolur, diastolur da pulsur wnevebs Soris rogorc hipertenziul, ise normotenziul populaciaSi. amasTan, hipertenziul populaciaSi aseve gamovl inda dadebiTi korelacia sisxl is sibl antesa da saSualo sistolur da diastolur, da adreul i dilis diastolur wnevebs Soris. msgavsad Cvens mier miRebul i Sedegisa, De Simone et al. [251] mier janmrTel, hipertenziis armqone individebSi Catarebul ma kvl evam gamoavl ina sisxl is sibl antis damoukidebeli kavSiri diastolur wnevasTan, xolo sistolur wnevasTan korelacia ar gamovl inda.

hipertenziul individebSi gamovl inda ra hemoreol ogiuri da sisxl ZarRvovani darRvevebis maRal done, Cven Seviswavi eT aRniSnul faqtorTa urTierTdamokidebul eba. ZiriTadi jgufis individebSi nakadamokidebul i vazodilataciis, iseve rogorc sisxl ZarRvis absoluturi cvlil ebis maCvenebel i uaryofiTad da sarwmunod korel irebda yvel a

gamokvl eul hemoreol ogiur parametrTan, garda eri Trocitatebis deformadobisa. hipertenziul pacientebSi gamovl inda Trombocitebis agregaciul i da adheziuri aqtivobis sarwmunod maRal i uaryofiTi korel acia endoTel ium-damokidebul vazodil ataciis maCvenebl ebTan, kerZod nakad-damokidebul i vazodil ataciis procentul maCvenebel sa da reaqtul i hiperemiis sapaşuxod ganvitarebul sisxl ZarRvis absolutur cvl il ebasTan. aRniSnul i garkveul wil ad xsnis endoTel uri disfunçiişas Trombwarmomnis procesis aqtivacias. hipertenziul pacientebSi janmrTel i kontrol isagan gansxvavebiT gamovl inda maRal i sarwmunoebis uaryofiTi korel acia ($r=-0.690$; $P=0.000$) sisxl ZarRvis diametris absolutur cvl il ebas da pl azmis sibl antes Soris. xolo sisxl is sibl ante rogorc janmrTel, ise hipertenziul pacientebSi korel irebda sisxl ZarRvis diametris cvl il ebasTan. damokidebul eba sisxl is sibl antesa da sisxl ZarRvis diametris cvl il ebas Soris intaqtur arteriebiŞi nanaxi iqna Fischer et al. [323] mier, rac absolutur SesabamisobaŞi modis Cveni kvlevis SedegebTan. amastan, Cvens SemTxvevaŞi korel acia metad ufro maRal i sarwmunoobiT hipertenziul jgufŞi gamoirCeoda ($r=-0.535$, $P=0.000$; hipertenziul pacientebSi da $r=-0.552$, $P=0.022$). Nagy et al. [389] Catarebul ma kvleam aCvena, rom nakad-damokidebul i vazodil atatorul i pasuxi sisxl is sibl antisagan damoukidebel ia. Cvens kvlevaŞic sakontrol o jgufis individebiŞi, anu janmrTel ebŞi ar gamovl inda damokidebul eba nakad-damokidebul vazodil ataciisa da sisxl is sibl antes Soris. amastan, damokidebul eba nakad-damokidebul vazodil ataciisa da sisxl is sibl antes Soris uaryofiTi korel aciis ($r=-0.600$; $P=0.000$) saxiT gamovl inda mxol od hipertenziul individebiŞi. Sesabamisad, keTdeba daskvna, rom rac ufro metadaa dazianebul i sisxl ZarRvTa endoTel iumi, miT ufro maRalia hemoreol ogiur darRvevaTa gamovl enis masStabi; da meorec, miT ufro maRalia hemoreol ogiur da sisxl ZarRvovan maxasiaTebel ebs Soris korel aciuri kavSiri. garda endoTel ium-damokidebul i vazodil ataciisa, hipertenziul pacientebSi uaryofiTi korel acia yvel a hemoreol ogiur maxasiaTebel Tan gamoavl ina endoTel ium-damoukidebel ma, anu nitrat-damokidebul ma vazodil ataciama.

rac aseve miuTiTebis mZime Trombozul i garTul ebebis ganviTarebis maRal al baTobaze ah-is dros. j anmrTel , sakontrol o j gufSi korel aciis mxriv nakad-damokidebul vazodil ataciis procentul maCvenebel Tan SedarebiT metad ufro efeqturi sisxl ZarRvis absol uturi cvl il eba gamovl inda. es ukanasknel i korel irebda Trombocitebis agregadoba/adheziurobasTan, fibrinogenis koncentracias, eriTrocitebis agregacias da sisxl is sibl antesTan, maSin roca FMD% korel irebda mxol od Trombocitebis agregaciul aqtivobasTan. dReisaTvis ar arsebobs konsensusi mecnierta Soris, Tu ra ufro metad mgrZnobiare parametria FMD% Tu ΔD . moqmed gaidl ainSi upiratesoba FMD%-s eniWebi [37]. Cveni kvl evs Sedegebe dayrdnobiT, sisxl ZarRvis absol uturi cvl il eba metad ufro Rirebul ia endoTel iumis funqciis Sefasebis mizniT procentul sidi desTan SedarebiT, ramdenadac hemoreol ogiur parametrebTan korel acias avl ens rogorc normotenziis, ise hipertenziis dros, gansxvavebiT FMD%-gan, romelic Sedegiania korel aciebis dasadgenad mxol od hipertenziul pacientebSi.

rogorc normotenziul kontrol , ise hipertenziul Ziritad j gufebSi gamovl inda maRali sarwmunoebis uaryofiti korel acia sisxl ZarRvis inicial ur diametrsa da inicial ur gadanacvl ebis daZabul obsas Soris. gansxvavebiT Cveni Sedegebisagan, Verbeke et al. [109] Seiswavl idnen ra bol o stadiis Tirkml is daavadebis mqone da j anmrTel sakontrol o j gufis individebs, pozitiuri korel acia gamoavl ines sakontrol o j gufis individebSi da uaryofiti korel acia - daavadebul Ta Soris. amastan, wminda maTematikuri Tval sazrisiT, gadanacvl ebis siCqarisa da gadanacvl ebis daZabul obis gamosaTvl el i formul ebidan gamomdinare, Cvens mier miRebul i Sedegi metad l ogikuria.

Cvenma kvl evam, msgavsad Girerd et al. [387] kvl evs Sedegebisa, gamoavl ina, rom hipertenziul pacientebis normotenziul individebTan SedarebiT gaaCniat mxris arteriis diametris, iseve rogorc gadanacvl ebis daZabul obis ufro maRali mniSvnel oba. miRebul i Sedegi adasturebs mosazrebas, rom gadanacvl ebis daZabul obis cvl il ebis xanmokle

zemoqmedebisagan gansxvavebiT, sxivis/mxris arteriis diametri izrdeba qronikul ad gazrdil i gadanacvl ebis daZabul obis sapasuxod.

sisxl i aris araniutonuri siTxe, romelic gavlenas axdens gadanacvl ebis daZabul obaze da damokidebul ia gadanacvl ebis siCqareze. Cvenma kvl evam gamoavl ina uaryofiTi korel acia gadanacvl ebis siCqaresa da sisxl is sibl antes Soris rogorc janmrTel, ise hipertenziul individebSi. aRniSnul i faqti miuTitebs, rom sisxl is sibl ante ikl ebs gadanacvl ebis siCqaris zrdis paral el urad. msgavs daskvnamde mividnen Brookshier et al. [377] da Dutta et al. [378], romel Tac aCvenes rom gadanacvl ebis siCqaris cvl il eba upiratesad sisxl is viskozuri maxasiaTebl ebiT gani sazRvreba.

hemoreol ogiur parametrTa Sida korel aciebis Seswavl isas ZiriTad jgufSi gamovl inda sarwmunod maRal i pozitiuri korel acia ($P=0.000$) hematokritis donesa da pl azmisa da sisxl is sibl antes Soris. amasTan, sakontrol o jgufSi pozitiuri korel acia hematokritma mxol od pl azmis sibl antesTan aCvena ($P=0.007$). aRniSnul i fenomenis axsna SesaZl oa Fedde et al. [379] kvl evis SedegebiT. kerZod, hematokritis maRal i done asocierebul ia hemogl obinis maRal donesTan, rac pozitiurad korel irebs pl azmisa da sisxl is sibl antes donesTan. garda hemogl obinisa, pl azmis cil ebidan mniSvel ovania fibrinogenic, romel mac Cvens kvl evaSi gamoavl ina pozitiuri korel acia sisxl isa da pl azmis sibl antesTan. ramdenadac, sisxl is sibl ante gansazRvravs gadanacvl ebis daZabul obas, romelic sisxl ZarRvTa struqturasa da funqciaze momqmedi ZiriTadi faqtoria, Sesabamisad momatebul i sibl antes done sisxl ZarRvovani garTul ebebis ganvitarebis mniSvel ovani maCvenebel ia. rogorc ZiriTadi, ise sakontrol o jgufis individebSi gamovl inda pozitiuri korel acia eriTrocitebis agregadobasa da Trombocitebis agregaciul da adheziur aqtivobas Soris. aRniSnul i SesaZl oa aixsnas Holme et al. [392] kvl evis SedegebiT, sadac gamovl inda eriTrocitebis zegavl ena Trombocitebis aqtivaciaze, maT mier Trombocitarul i agonistis - adf-is gamoyofis safuZvel ze. unda aRiniSnos, rom kvl evis avtorebi Seiswavl idnen momatebul i gadanacvl ebis daZabul obis zegavl enas Trombocitebis

aqtivaciaze mkveTrad stenozi rebul arteriebSi. rogorc eriTroci tebi, ise Trombocitebi Seicavs adf-is uj redSida marags, romel Ta gamonTavisufl eba aRiniSneba maRal i gadanacvl ebis daZabul obis pirobepSi [294]. hipertenziul pacientebS Cvens kvl evaSi aReniSnaT sarwmunod maRal i hematokritis mniSvnel oba normotenziul kontrol Tan SedarebiT, rac nawil obriv xsnis Trombwarmogmnis maRal al baTobas hipertenziul j gufSi, rac viTardeba gadanacvl ebis daZabul obis maRal i maCvenebl is da/an cvl il ebis ganviTarebis sapasuxod didi raodenobiT adf-is sisxl Si gadmosrol iT.

Pries et al. [380], Rachev et al. [381] kvl eviS Sedegebis mixedviT, sisxl is wnevis done zegavl enas axdens gadanacvl ebis daZabul obis maCvenebl ze, kerZod rac ufro maRal ia arteriul i wneva, miT ufro didia gadanacvl ebis daZabul obis mniSvnel oba. Cvens kvl evaSi aRniSnul i mosazreba ar dadasturda. ar gamovl inda sarwmuno korel acia arteriul i wnevis simaRl esa da gadanacvl ebis daZabul obas Soris.

Cvens mier Catarebul ma kvl evam aCvena, rom esenciuri hipertenziis dros aRiniSneba rogorc Trombocitebis, ise endoTel iumis aqtivacia, rasac gadamwyveti mniSvnel oba aqvs Trobozul i tendencis ganviTarebaSi. marTI ac, miuxedavad sisxl ZarRvebze maRal i wnevis zemoqmedebisa, hipertenziis ZiriTadi garTul ebani (rogoricaa miokardiumis infarqti da insul ti) Tavisi bunebiT paradoqsal urad Trombozul ia da ara hemoragiul i. aRniSnul i fenomeni cnobil ia "hipertenziis Trombozul i paradoqsis" anu "birmingemis paradoqsis" saxel wodebiT [375]. kl ini kur- l aboratoriul i monacemebi mowmobs, rom hipertenzia per se ganxil ul unda iqnas rogorc proTrombozul i mdgomareoba, romel ic moicavs hiperkoagul acias, Trombocitebisa da endoTel iumis aqtivacias - anu virxovis Trombogenezul triadas [296].

nakad-damokidebul i vazodil atacia ganisazRvreba gadanacvl ebis daZabul obiT. es ukanasknel i ki Tavisi mxriv gamoiTvl eba sisxl is sibl antisada gadanacvl ebis siCqaris namravl iT. dReisaTvis gamoyenebad sisxl is sibl antis gamosaTvl el formul aSi monawil eobs pl azmis sibl ante, hematokriti da gadanacvl ebis siCqare. ramdenadac, formul a ar

itval iswinebs srul hemoreol ogiur profil s, Cven Seviswavl eT damokidebul eba sisxl is sibl antesa da sxva hemoreol ogiur maxasiaTebel ebs Soris. sakontrol o jgufis individebSi dadebiTi korel acia gamovl inda sisxl is sibl antesa da pl azmis sibl antes, iseve rogorc eriTrocitebis agregadobas Soris da uaryofiTi korel acia eriTrocitebis deformadobas Soris. aRniSnul i Sedegi mosal odnel i iyo, radgan hematokritis maCvenebel i ganisazRvreb a eriTrocitebis raodenobiT. mdgomareoba kritikul ad gansxvavebul i aRmoCnda hipertenziul pacientebSi, sadac sisxl is sibl ante maRal i sarwmunoobiT korel irebda yvel a hemoreol ogiur maxasiaTebel Tan. aRniSnul i kidev erTxel adasturebs hemoreol ogiuri darRvevibisa da Trombozul i riskis arsebobas esenciuri hipertenziis dros. sxva hemoreol ogiur faqtorTa Soris gamovl inda Zl ieri korel acia rogorc j anmrTel , ise hipertenziul individebSi.

literaturaSi arsebobs mcire raodenobis informacia nakad-damokidebul i vazodil ataciis maCvenebel sa da sisxl ZarRvis inicial ur diametrs Soris damokidebul ebis Sesaxeb. Silber et al. [33] avtorebis mtkicebiT, rac ufro mcirea sisxl ZarRvis diametri, miT ufro maRal ia endoTel ium-damokidebul i vazodil ataciis procentul i maCvenebel ic. avtorebma aseve aCvenes, rom gadanacvl ebis daZabul obis maCvenebel ic ufro maRal i mcire kal ibris sisxl ZarRvebs hqondaT. amasTan, aRniSnul i fenomenis mizezebi praqtikul ad gaurkvevel ia. Cvens mier Catarebul kvl evaSi, mxol od hipertenziul pacientebSi gamovl inda statistikurad sarwmuno, uaryofiTi korel acia sisxl ZarRvis diametrsa da nakad-damokidebul vazodil atacias Soris ($r=-0.427$, $P=0.001$). j anmrTel individebSi aRiniSna uaryofiTi korel acia, magram mniSvnel obam sarwmuno zRvars ver miarwia ($r=-0.457$, $P=0.065$). sarwmunod maRal i uaryofiTi korel acia gamovl inda gadanacvl ebis daZabul obis donesa da sisxl ZarRvis inicial ur diametrs Soris rogorc j anmrTel , ise hipertenziul individebSi; rac miuTitebs, rom gadanacvl ebis daZabul obis donis gansazRvrel i sisxl ZarRvis diametria.

Cven Seviswavi eT damokidebul eba, rogorc inicial ur sisxl ZarRvovan diametrsa da FMD%-s, ise sisxl ZarRvis absol utur cvl il ebas Soris janmrTel , anu sakontrol o da hipertenziul i jgufis individebSi. korel acia gamovl inda mxol od hipertenziul jgufSi. amasTan, inicial ur sisxl ZarRvovan diametrsa da FMD%-s Soris aRmoCnda ufro ZI ieri korel acia sisxl ZarRvis absol utur cvl il ebasTan SedarebiT (P=0.001 da P=0.024, Sesabamisad). CvenTvis aseve mniSvnel ovani iyo garkveva, Tu romel i faqtori (inicial uri gadanacvl ebis daZabul oba Tu reaqtul i hiperemiis sapsuxod ganviTarebul i gadanacvl ebis daZabul obis cvl il eba) gansazRvavs FMD%-is mniSvnel obas. kvl evam aCvena ZI ieri uaryofiT i korel acia reaqtul i hiperemiis sapsuxod ganviTarebul gadanacvl ebis daZabul obis cvl il ebas da FMD%-s Soris rogorc sakontrol o, ise hipertenziul individebSi ($r=-0.907$, $P=0.000$ da $r=-0.977$, $P=0.000$; Sesabamisad). korel acia inicial uri gadanacvl ebis daZabul obasa da FMD%-s Soris arasarwmuno aRmoCnda. msgavs Sedegebamde mividnen Niebauer et al. [388]. Sesabamisad, Cven SegviZi ia davaskvnaT, rom endoTel ium-damokidebul i vazodil atacia damokidebul ia gadanacvl ebis daZabul obis absol utur cvl il ebaze.

bol o wl ebSi arteriul i wnevis cirkadul i profil is Seswavi kl inikuri da prevenciul i hipertenziis erT-erT prioritetul mimarTul ebad Camoyal ibda. Dolan et al. [200] saSual od 8.4 wl iani sikvdil is gamosavl is prospeqtul i kvl eviT, romel Sic CarTul i iyo 5292 aranankurnal ebi arteriul i hipertenziis mqone pacienti, daaskvnes rom kardiovaskul uri sikvdil obis prediqciis Tval sazrisiT arteriul i wnevis kl inikur gazomvebTan SedarebiT upiratesoba arteriul i wnevis 24-saaTian ambul atoriul monitorirebas eniWeba, da meorec, Ramis wnevis done gamosavl is ZiriTadi prediqtoria. kvl evis Sedegad avtorebma gamoTqves azri, Ramis wnevis donis - rogorc, damouki debel i risk-faqtoris arsebobis Sesaxeb. Metoki et al. [138], ohasamas 10.4 wl iani prospeqtul i kvl evis fargl ebSi gamoavl ines Ramis wnevis daqveiTebis arasrul fasovnebis zegavl ena insul tis ganviTarebis sixSireze. miuxedavad prospeqtul i kvl evis simravl isa, praqtikul ad Seuswavi el ia arteriul i wnevis

cirkadul i profil is zegavl ena mikro (hemoreol ogia) da makrocirkul aciaze (msxvil i sisxl ZarRvebis endoTel uri funqcia).

Sesabamisad, mocemul i kvlevis fargl ebSi, Cven Sevswavl eT pacientTa hemoreol ogiuri kvleViTa da mxris arteriis dupl eqs-skaniRebiT miRebul i monacemebi aw-is sxvadasxva cirkadul i profil is mqone hipertenziul pacientebSi. unda aRiniSnos, rom arteriul i wnevisa da sisxl is reol ogiis Seswavl a rogorc hipertenziul , ise saerTo popul aciaSi ukiduresad iSviaTia. am mxriv Cveni kvlevis sagani garkveul novacias wamoadgens, gansakuTrebiT arteriul i wnevis cirkadul i profil is hemoreol ogiaze zegavl enis Seswavl is kuTxiT.

nondiper pacientebS diperebTan SedarebiT aReniSnaT ah-is ufro xangrZlivi anamnezi. rogorc 24-saaTiani sistoluri, ise 24-saaTiani diastoluri arteriul i wneva ufro maRal i nondiper pacientebSi gamovlinda. msgavsi Sedegebi miRes Higashi et al. [223] 20 diperi da 20 nondiperi hipertenziul i patientis Seswavl isas. Sedegad Cven vaskvniT, rom nondiperi cirkadul i profil is Camoyal ibebaSi garkveul rols TamaSobs ara mxolod ah-is arseboba, aramed ah-is xangrZlivo anamnezSi da wnevis xarisxi.

diperi da nondiperi hipertenziul i pacientebis hemoreol ogiur parametrTa Sedarebam rogorc Mann-Whitney-s (ganawil ebis Sedareba), ise Student's t Test-iT (saSual oTa Sedareba) aCvena, rom nondiper esenciuri hipertenziis mqone pirebs diper hipertenziul individebTan SedarebiT gaaCniAT hemoreol ogiur parametrTa statistikurad sarwmunod maRal i maCvenebl ebi (P=0.000), rac udavod mianiSnebs rom esenciuri hipertenziis arteriul i wnevis nondiper cirkadul profil Tan Serwymisas, proTrombozul i riski kidev ufro izrdeba da Sesabamisad sisxl ZarRvovani garTul ebebis ganvitarabis al baTobac.

Cvenma kvlevam gamoavl ina, rom diperebs nondiperebTan SedarebiT gaaCniAT fibrinogenis koncentraciis sarwmunod dabal i done (kerZod 3.36 ± 0.23 diperebSi da 3.89 ± 0.18 nondiperebSi, Sesabamisad). amasTan, Leigh General Practice Study-m [296] aCvena, rom hipertenziul pacientebS pl azmuri fibrinogenis doniT $>3,5$ g/l gaaCndaT 12-jer ufro maRal i

kardiovaskuluri riski hipertenziul individebtan Sedarebit, romel Ta fibrinogenis plazmuri koncentracia nakl ebia 2,9g/l -ze. Sesabamisad, nondiper pacientebS diper hipertenziul individebtan Sedarebit gaaCniat kardiovaskuluri gartul ebebis ganvitarebis al batobis sarwmunod maRal idone.

hemoreol ogiur parametrTa al batobiti ganawil ebis Seswavl am diper da nondiper hipertenziul pacientebSi gamoavl ina, rom yvel a hemoreol ogiuri parametri xasiaTdeba l og-normal uri ganawil ebit, garda fibrinogenis koncentraciisa nondiper pacientebSi da plazmis sibil antisa diperebSi, sadac es ukanasknel i konstantaa (1.51 erTeul i). nondiperebSi fibrinogenma acvena l ognormal uri da degeneraciul i ganawil ebis Senarevi. aRniSnul i Cven avxseniT l aborantis mier gazomvata Sedegebis xel ovnuri diskretizaciit.

mxris arteriis dupleqskanirebam gamoavl ina endoteliumis funqciuri mdgomareobis mkvetri diferenciacia arteriul i wnevis cirkadul i profilis mixedvit. msgavsi Sedegi iqna nacvenebi O'Brien et al. [132] mier. nondiper pacientebS aReniSnebodaT gamoxatul ad dabal i nakad-damokidebul i vazodilataciis procentul i macvenebel i, iseve rogorc reaqtiul i hiperemiit ganpirobebul i sisxl ZarRvTa diametris absoluturi cvl il eba. diperi hipertenziul i pacientebis saSual o FMD% macvenebel i normis zrvarSi iyo ganTavsebul i (11.94±0.95), rac miuTitebs nondiperi hipertenziul i pacientebis endoteliumis funqciis sel eqtiur dazianebase. msgavs Sedegebamde mividnen Higashi et al. [223], romel Tac aseve Seiswavl es sisxl is wnevis cirkadul i profilis endoteliumis funqciaze gavl ena invaziuri pl etizmografiis metodis gamoyenebit. am mxriv mniSvel ovania Scholze et al. [221] kvl eva, sadac fotopl etizmografiis gamoyenebit gamovl inda sisxl ZarRvTa tonusis cirkadul i variabel oba, kerZod, hipertenziul individebs kontrolis jgufisagan gansxvavebit aReniSnebodaT sistemuri arteriul i tonusis mniSvel ovani zrda Ramis pirvel naxevarSi. amastan, arteriul i wnevis cirkadul i profilTan mimarTebaSi Sedegebi ar ganxil ula.

Cvens SemTxvevaSi, nondiper pacientTa sisxl ZarRvis inicial uri diametri sarwmunod aRemateboda diperi pacientebis vaskul arul diameters. rac kidev erTxel adasturebs mosazrebas imis Taobaze, rom rac ufro mcirea sisxl ZarRvis diametri, miT ufro maRal ia misi dil ataciis unarianoba reaqtuul i hiperemiis sapsuxod da Sesabamisad, miT ufro SenarCunebul a endoTel iumis funqcia.

diper hipertenziul pacientebSi ganviTarebul i hemoreol ogiuri da sisxl ZarRvovani darRvevebi minimal uria da Seesabameba normotenziur individTa maCvenebl ebs. Cveni kvlevis monacemebze dayrdnobiT, hipertenziul pacientebSi garTul ebaTa ganviTarebisatvis wamyvani mniSvel oba arteriul i wnevis cirkadul i profil is darRvevas, kerZod nondiperi cirkadul i profil is arsebobas eniWeba. amasTan, ramdenadac hipertenziis dros adgili aqvs normal uri cirkadul i profil is paTol ogiuriT Canacvl ebas, aRniSnul i Sesazl oa warmoadgendes erTgvar axsnas hipertenziul individebSi gamovl enil i cvl il ebebisa.

diperi da nondiperi hipertenziul i pacientebis gadanacvl ebis daZabul obis maCvenebel i praqtikul ad ar gansxvavdeboda erTmaneTisagan (P=0.394). amasTan, gamovl inda maRal i sarwmunoebis mqone gansxvaveba reaqtuul i hiperemiis sapsuxod ganviTarebul gadanacvl ebis daZabul obis cvl il ebas Soris sxvadasxva cirkadul i profil is mqone hipertenziul pacientebSi. aRniSnul i, kidev erTxel miuTitebs gadanacvl ebis daZabul obis cvl il ebis mniSvel obis upiratesobaze inicial ur maCvenebel Tan SedarebiT prognozuli Tval sazrisiT. aqve unda aRiniSnos, rom Cvens mier Catarebul i kvleva original uria da msgavsi meTodol ogiita da mimarTul ebit kvleva garkveul novacias warmoadgens.

hemoreol ogiuri da sisxl ZarRvTa endoTel iumismxri vi dazianebebis arseboba esenciuri hipertenziis mqone pacientebSi, miuTitebs proTrombozul mdgomareobasa da sisxl ZarRvovani garTul ebebis ganviTarebis maRal riskze. hipertenziul pacientTa Sesavl am arteriul i wnevis cirkadul i profil is mixedvit dagvanaxa, rom arteriul i hipertenzia gansakutrebil ad "saSiSi" Trombozul i bunebis garTul ebaTa ganviTarebis Tval sazrisiT mxol od misi nondiper cirkadul profil Tan

Serwymias xdeba. amastan, arteriuli hipertenziis dros ganvitarebuli wnevis normaluri cirkaduli profilis patologiuriT canacvl eba xsnis hipertenziis jgufsi gamovlenil hemoreologiur da sisxl ZarRvovani darRvevebis ganvitarebis mizezs.

nondiperi profilis gavl enis Sesaswavi ad hemoreologiasa da sisxl ZarRvTa endoteliumze, 74 gamokvleuli piri davyaviT 2 jgufad – diperebad da nondiperebad cirkaduli profilis mixedvit hipertenziis arsebobisagan damoukidebl ad. kvle evam gamoavli na, rom nondiper individebs diperebTan Sedarebit gacniat ufro metad darRveuli hemoreologia. kerZod, nondiperebs aReniSnaT yvela hemoreologiuri maxasiaTeblis sarwmunod marali done ($P=0.000$), garda eritrocitebis deformadobisa, romelic sarwmunod marali diper pacientebSi iyo. gansakutrebit ARsaniSnavia pl azmis sibil ante, romelic diper individebSi konstanta iyo da Seadgenda 1.51 erTeuls, rac normadaris miCneuli. amastan, unda aRiniSnos rom Tvit normotenziuli individebSic ki, wnevis cirkaduli profilisagan damoukidebl ad, pl azmis sibil antis saSualo macvenebel 1.54±0.04 erTeuls Seadgenda. pl azmis sibil ante gansazRvravs sisxlis sibil antes, romelic Tavix mrxiv gadanacvl ebis daZabulobis ganmsazRvrelia. am ukanasknelis mniSvel obaze ki aris endotelium-damoukidebuli vazodil ataciis macvenebelis sidide damoukidebuli. mocemuli faqti kidev erTxel usvams xazs cirkaduli profilis gansakutrebuli mniSvel obas proTrombozuli mdgomareobis CamoyalibebaSi. nondiper individebs hemoreologiis msgavsad, statistikurad sarwmunod aReniSnaT endoteliumis funqciuri darRveva. nakad-damoukidebuli vazodil ataciis saSualo macvenebeli nondiper jgufsi Seadgenda 5.05±2.58 procentis, gansxvavebit diperebisagan, sadac FMD% 12.45±1.07 iyo. nondiperi pacientebis saSualo FMD% macvenebelis (5.05±2.58), ufro dabal iyo Ziritadi jgufis pacientebis FMD%-Tan (6.49±1.58) Sedarebit. mgavsad Ziritadi jgufis individebisa, am SemTxvevaSic sisxl ZarRvTa inicialuri diametri sarwmunod dabal diper pacientebis aReniSnaT. aseve, gansxvaveba nanaxiqna gadanacvl ebis daZabulobis cvlil ebis indeqsSi, gadanacvl ebis inicialur siCqaresa damis cvlil ebaSi. xolo, inicialuri gadanacvl ebis daZabuloba

am or sakvl ev popul acias Soris ar gansxvavdeboda. aRni Snul i ki dev erTj er adasturebs gadanacvl ebis daZabul obis mniSvnel obis upiratesobas inicial ur mniSvnel obasTan SedarebiT.

diperi da nondiperi pirebis hemoreol ogiurma kvl evam da sisxl ZarRvTa dupl eqs-skani rebam gamoavl ina, rom nondiperi cirkadul i profil i arteriul i wnevisagan damoukidebl ad zrdis proTrombozul risks da kardio-vaskul uri da cerebrovaskul uri garTul ebebis ganviTarebis al baTobas. Sesabamisad, hipertenziul i da zogadad popul acias (hipertenziul i da normotenziul i) Seswavl am gamoavl ina axal i risk-faqtori - arteriul i wnevis darRveul i cirkadul i, anu nondiperi profil i, romelic Tavistavad asociardeba endoTel iumis mZime dazi anebasTan da hemoreol ogiur darRvevTan, rac Trombozis winapi robas warmoadgens.

arteriul i wnevis cirkadul i profil is prognozul i mniSvnel obis Seswavl is mizniT, Cven Seviswavl eT nondiperi cirkadul i profil is mgrZnobel oba (sensi tiuroba), specifikuroba da pozitiuri prognozul i maCvenebel i (PPV – positive prognostic value) hemoreol ogiur da sisxl ZarRvovan darRvevTan mi marTebaSi. ramdenadac hemoreol ogiuri darRvevebi qmnis proTrombozul mdgomareobas da SesaZl oa ganxil ul iqnas rogorc mosal odnel i garTul ebebis prediqtori, CvenTvis mniSvnel ovani iyo cirkadul i profil is prognozul i mniSvnel obisa da mgrZnobel oba-specifikurobis gansazRvra am parametrebis mi marT.

arteriul i wnevis 24-sT monitorirebiT dadgenil i cirkadul i profil is nondiperi varianti CaiTval a, rogorc testis pozitiuri Sedegi, Sesabamisad diperi - rogorc negatiuri. hemoreol ogiur parametrTa diqotomiuri dayofisas (pirobiTad, norma da paTol ogia), gamoiyeneboda mocemul i parametrisaTvis medianis maCvenebel i hipertenziul i da normotenziul i individebisaTvis. nondiperi cirkadul i profil is maRal i pozitiuri prognozul i mniSvnel oba rogorc janmrTel , ise hipertenziul individebSi dafiqsirda Trombocitebis agregaciul i aqtivobisa da FMD% - is mi marT. nondiper cirkadul profil s upiratesad esenciuri hipertenziis mqone pacientebSi gaaCnda maRal i sensi tiuroba da pozitiuri prognozul i

mniSvnel oba Trombocitebis adheziuri aqtivobis, eriTroci tebis agregaciis, fibrinogenis koncentraciis, plazmisa da sisxl is sibl antisatvis. Sesabamisad, hipertenziul individebSi nondiperi cirkaduli profilis gamovlenisas, arsebobs maRali albaToba hemoreol ogiuri da endoteliumis funqciuri darRvevebis arsebobisa. sagulisxmoa is faqtic, rom nondiperi profili xasiaTdeboda maRali pozitiuri prediqtoruli mniSvnelobiT FMD%-sa da Trombocitebis agregaciis mimaTrogorc hipertenziul, ise normotenziul jgufSi.

arteriuli hipertenziis xangrZi ivobis zegavl enis Sesaswavl ad sisxl ZarRvovani garTulebebis ganvitarebis procesze, hipertenziuli pacientebi davayiT or jgufad. gamyof wertil ad gamoviyeneT aw-is xangrZi ivobis mediana, romelic 7 weli iyo. gamokvl evis Sedegebma aCvena, rom arteriuli wnevis xangrZi ivoba dakavSirebulia hemoreol ogiur darRvevebTan, magram xasiaTdeba naklebi masStaburobiT. pacientebS 7 welize meti xangrZi ivobis hipertenziis anamneziT, aRniSnat Trombocitebisa da eriTroci tebis agregaciis, fibrinogenis koncentraciisa da plazmisisbl antisarwmunod maRali done ($P < 0.05$). amastan, sisxl ZarRvTa dupleqs-skani rebam gansxvaveba endoteliumis funqciur mdgomareobastan mimaTebaSi ver gamoavl ina. sawinaaRmdego Sedegi iqna miRebuli Hamasaki et al. [390] kvle vaSi, sadac avtorebma gamoavl ines koronaruli arteriebis endoteluri disfunqciis xarixis damokidebul eba arteriuli wnevis xangrZi ivobaze. aRniSnuli gansxvaveba SesaZloa aixsnas imiT, rom aRniSnuli avtorebi ikvl evdnen pacientebS parkuWta hipertrofiiT, rac Cveni kvle evis sagans ar warmoadgenda. sarwmuno gansxvaveba gamoavl ina mxol od endotelium-damoukidebeli, anu nitratdamokidebuli vazodil ataciis maCvenebel ma. Sesabamisad, Cven SegviZlia davaskvnaT, rom arteriuli hipertenziis xangrZi ivoba upiratesad zemoqmedebS sisxl ZarRvTa medial ur Sreze da iwevS mis disfunqcias, rac Cvens SemTxvevaSi endotelium-damoukidebeli vazodil ataciis gauaresebiT, anu kunTovani Sris disfunqci iT ($7.81 \pm 1.33\%$) gamoi xata.

kvI evIs fargI ebSi Cven aseve Seviswavl eT arteriul i wnevis xarixis zegavl ena sisxl is reol ogiasa da sisxl ZarRvovan parametrebze. gamovl inda, rom aw-is xarixi aranair zegavl enas ar axdens Trombocitul funqciaze. misi zegavl ena hemoreol ogiaze eriTrociTeBis agregaciul i aqtivobisa da sisxl is/pl azmis sibl antiS zrdiT Semoifargl a. am SemTxvevaSic, arteriul i wnevis xangrZl ivobis msgavsad, zegavl ena endoTel iumis funqciaze ar gamovl inda - FMD% da sisxl ZarRvis diametris absol uturi cvl il eba ganviTarebul i reaqtul i hiperemiis sapsuxod ar aRmoCnda mniSvnel ovnad gansxvavebul i am or j gufs Soris. gansxvavebi T Cveni Sedegebisagan, Houghton et al. [391] gamoavl ines endoTel uri disfunqciisa da arteriul i wnevis simZimis kavSiri. aRniSnul i sxvaoba SesaZl oa aixsnas kvI evaSi CarTvis kriteriumTa sxvaobiT, kerZod avtorebi ikvl evdnen gul is areSi tkivil is mqone (anamnezSi stenokardia an misi eqivalenti) patientebs. amas garda, patientTa daj gufebisas wamyvani miokardiumis hipertrofiis arseboba/ararseboba iyo. amasTan, Cveni kol egebis msgavsad [391], Cvens SemTxvevaSic endoTel ium-damouki debel i vazodil ataciis maCvenebel i sarwmunod dabal i me-2 xarixis hipertenziis mqone individebSi gamovl inda; rac mowmobs, rom wnevis xarixic, xangrZl ivobis msgavsad upiratesad sisxl ZarRvTa kunTovan Sres azianebs da iwvevs mis disfunqci as.

hemoreol ogiaze endoTel iumis funqciuri zegavl enis Sesaswavl ad, Cven hipertenziul i patientebi davyaviT 2 j gufad, FMD%-is medianas mixedviT, romel ic 7.5%-s Seadgenda. patientebs endoTel iumis darRveul i funqci iT aReniSnaT sarwmunod maRali done hemoreol ogiuri maCvenebel ebisa, rac gazrdil proTrombozul statusze mi aniSnebs. Cven aseve Seviswavl eT mxris arteriis dupl eqs-skani rebiT miRebul i sisxl ZarRvovani maxasiaTebl ebi hipertenziul patientebSi 7.5%-ze meti da nakl ebi procentul i maCvenebel iT. patientebs dabal i nakad-damoki debul i vazodil ataciis maCvenebel iT aReniSnaT mxris arteriis inicial uri diametris ufro maRali mniSvnel oba. patientebs, endoTel iumis SenarCunebul i funqci iT gaaCndaT endoTel ium-damouki debel i vazodil ataciis sarwmunod maRali done, rac miuTiTebs kunTovani da

endoTel uri Sris paral el uri daziane bis arsebobaze ah-is dros. am SemTxvevaSic, j gufTaSorisi gansxvaveba inicial ur gadanacvl ebis daZabul obas Soris ar gamovl inda, gansxvavebiT reaqtul i hiperemiis sapasuxod ganviTarebul i gadanacvl ebis daZabul obis cvl il ebisagan, romelic sarwmunod maRal i endoTel iumis SenarCunebul i funqciis mqone pacientebSi gamovl inda. aRniSnul i xazs usvavs gadanacvl ebis daZabul obis cvl il ebis wamyvan mniSvnel obas endoTel iumis disfunqciis ganviTarebaSi.

ramdenadac, endoTel iumis funqciuri daziane ba da hemoreol ogiuri cvl il ebebi - Trombocitebisa da eriTrocitebis agregadobis, pl azmisa da sisxl is siblantis, iseve rogorc fibrinogenis koncentraciis, hematokritisa da Trombocitebis adheziurobis mateba - qmnis proTrombozul mdgomareobas da zrdis Trombozul i genezis sisxl ZarRvovani garTul ebebis ganviTarebis al baTobas, gansakuTrebul i yuradReba unda mieqces nondiperi cirkadul i profilis mqone hipertenziul i pacientebis da normotenziul i individebis gamovl enas, meTval yureobas da Sesabamisi prevenciul i RonisZiebebis gatarebas.

daskvnebi

1. esenciuri hipertenziis pacientebSi non-diperi cirkaduli profilis sixSire sarwmunod maRali, maSin rodesac janmrTel individebSi diperi cirkaduli profilis prevalirebs.
2. esenciuri hipertenziis pacientebSi normotenziuli individebisagan gansxvavebit dadginda eritrocitebis agregaciis, Trombocitebis agregaciuli da adheziuri aqtivobis, fibrinogenis plazmuri koncentraciis, hematokritis donisa da plazmis sibilantis sarwmunod maRali done, rac Tavis mxriv Trombogenezis maRali albaTobaze miანი Snebs.
3. garda mikrocircul atoruli donisa, esenciuri hipertenziis mqone pacientebSi gamovlinda darRvevebi makrocircul atoruli – kunTovani tipis arteriebis donezec; kerZod, endotelium-damokidebuli vazodilataciis sasualo macvenebeli sarwmunod Seesabameboda endoteliumis disfunqciur mdgomareobas.
4. dadginda sarwmunod maRali uaryofiti korelacia erTis mxriv hemoreologiur parametrebsa da meores mxriv endotelium-damokidebuli da endotelium-damokidebeli vazodilatacias Soris.
5. dadginda, rom esenciuri hipertenziis mqone pacientebSi xdeba diperi cirkaduli profilis non-diperi cirkaduli profilis Canacvl eba, romel Tac diperisagan gansxvavebit gaaCniaT ufro mkveTrad gamoxatuli hemoreologiuri darRvevebi da endoteliumis disfunqcia.
6. esenciuri hipertenziis mqone non-diperi pacientebi Rma hemoreologiuri darRvevebisa da endoteliumis disfunqciis gamounda ganxil ebodes, rogorc sixli ZarRvovani garTuli ebebis ganvitarebis maRali riskis jgufi e.w. Ramis da dilis kritikuli saatebis periodSi.
7. dadginda, rom arteriuli hipertenziis xangrZlivoba ar korelirebs endoteliumis disfunqciis xarixTan. amave dros gamovlinda daavadebis xangrZlivobisa da xarixis korelacia sixli ZarRvTa kunTovani Sris disfunqciastan..

8. hemoreol ogiur maxasiaTebI ebze arteriul i wnevis xangrZl ivobisa da xarisxis gavl enis Seswavl iT Cven davadgineT, rom pacientebS II xarisxis esenciuri hipertenziiTa da 7 wel ze xangrZl ivi anamneziT aReniSnebaT Trombocitebisa da erITrocitebis agregaciul i aqtivobis, fibrinogenis raodenobisa da pl azmis sibiI antis sarwmunod maRal i done.
9. Cvens kvI evaSi ar gamovI inda sisxI ZarRvTa endoTel iumis funqciuri darRvevis xarisxobriVI gansxvaveba arteriul i hipertenziis xangrZl ivobisa da xarisxis mixedviT. amasTan, kunTovani disfunqcia ufro metad gamoxatul i arteriul i hipertenziis 7 wel ze meti xangrZl ivobis anamnezisa da II xarisxis hipertenziis mqone pirebSi iyo.
10. kvI evam daadgina, rom non-diper pacientebS diperebTan SedarebiT aReniSnebaT arteriul i hipertenziis ufro maral i xarisxi da xangrZl ivi anamnezi. am j gufis pacientebSi reaqtul i hiperemiis sapasuxo vazodil ataciis absol uturi mniSvnel oba 3-j er ufro nakl ebi iyo diper hipertenziul individebSi ganviTarebul vazodil ataciasTan SedarebiT. amdenad, reaqtul i hiperemiIT gamowveul i vazodil ataciis gamokvl eva miCneul unda iqnas sisxI ZarRvTa reaqtul obis stres-testad am j gufis kontingentSi.

Conclusions

1. Non-dipper circadian blood pressure profile is significantly frequent in patients with essential hypertension, while dipper circadian blood pressure profile is prevalent in normotensive individuals.
2. Different from the normotensive individuals, in patients with essential hypertension was established significantly higher levels of erythrocyte aggregability, platelet aggregative and adhesive activity, fibrinogen concentration, hematocrit level and plasma viscosity, which indicates on the high possibility of thrombogenesis.
3. Besides microcirculatory level, in patients with essential hypertension were appeared disturbances on the macrocirculatory – conduit artery – level; namely, mean value of endothelium-dependent vasodilatation was significantly correlated with the state of endothelial function.
4. There was established significantly high negative correlation between haemorheological parameters on the one hand and endothelium-dependent and endothelium-independent vasodilatation on the other hand.
5. There was established, that in patients with essential hypertension dipper circadian blood pressure profile is replaced by non-dipper circadian profile, which in comparison with dippers has more sharply expressed haemorheological disorders and endothelial dysfunction.
6. Because of the deep haemorheological disturbances and endothelial dysfunction, patients with non-dipper essential hypertension have to be considered as the high risk group for development of vascular complications while critical hours period of night and morning.
7. It was established, that duration of arterial hypertension does not correlate with the stage of endothelial dysfunction. At the same time, there were appeared correlations between duration and stage of arterial hypertension and dysfunction of vascular musculature.
8. Via studying an action of the duration and stage of arterial hypertension on haemorheological indices we established, that patients with 2nd stage of essential hypertension and duration more than 7 years have significantly higher platelet and erythrocyte aggregative activity, fibrinogen concentration and plasma viscosity level.
9. In our study there was not appeared difference in the endothelial dysfunction's degree according to the duration and stage of essential hypertension. Therefore, muscular dysfunction was more clearly appeared in hypertensive patients with 2nd stage and duration more that 7 years.

10. Our study confirmed that non-dipper patients compared with dippers have higher stage of arterial hypertension and longer duration of it. In this group of patients absolute level of vasodilatory response on reactive hyperemia test was 3-folds lower than it was in dipper hypertensive patients. Consequently, reactive hyperemia mediated vasodilatation have to be considered as an assessment stress-test of vascular reactivity in the contingent of this group.

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cxril i #1. 57 arasdro s namkurnal ebi hipertenziul i pacientisa
da 17 j anmrTel i kontrol is demografiul i da kl inikuri
maxasiaTeb l ebi.

maCvenebel i/j gufi	ah (n=57)	sakontrol o (n=17)	P
asaki (ww)	51.26±1.94	51±5.41	0.575
sqesi m/q	30m/27q	9m/8q	0.964
gul iscemis sixSire (dar tyma/wT)	75.7±2.09	74.71±2	0.601
24-sT awam			
24-sT saw mm Hg	131.61±3	98.47±1.85	0.000
24-sT daw mm Hg	80.31±2.32	59.18±2.62	0.000
24-sT pw mm Hg	48.95±1.75	41.15±3.99	0.000
dRis saw mm Hg	133.95±2.99	101.12±1.01	0.000
dRis daw mm Hg	84.58±4.36	61.35±2.27	0.000
dRis pw mm Hg	49.79±1.9	39.5±1.63	0.000
Rami s saw mm Hg	123.1±3.16	91.35±4.53	0.000
Rami s daw mm Hg	73.64±2.42	52.24±2.98	0.000
Rami s pw mm Hg	47.05±1.63	39.25±1.99	0.000
adreul i dil is saS. saw	138.63±3.09	98.12±1.83	0.000
adreul i dil is saS. daw	85.83±2.04	58.41±2.77	0.000
diperi/non-diperi profil i	37di p/20ndi p	11di p/6ndi p	0.014

yvel a monacemi mocemul ia, rogorc saSual o±SD. A

ah = arteriul i hipertenzia; saw = sistol uri arteriul i wneva;

awam = arteriul i wnevis ambul atoriul i monitoringi;

daw = diastol uri arteriul i wneva; pw = pul suri wneva.

cxriil i #2. arteriul i wnevis ambul atoriul i monitorirebiT
miRebul i Sedegebi j anmrTel da hipertenziul individebSi.

maCvenebel i/j gufi	ZiriTadi (ah) (n=57)	sakontrol o (n=17)	P
24-sT awam			
dRis minimal uri saw.	109.53±2.93	82.82±2.04	0.000
dRis maqsimal uri saw.	166.49±3.8	131.65±2.77	0.000
dRis minimal uri daw.	61.65±2.57	41.71±1.87	0.000
dRis maqsimal uri daw.	101.12±2.92	77.82±1.86	0.000
Ramis minimal uri saw.	104.26±3.35	76.18±5.23	0.000
Ramis maqsimal uri saw.	148.47±4.7	105.88±4.71	0.000
Ramis minimal uri daw.	62.65±2.75	42.35±2.89	0.000
Ramis maqsimal uri daw.	87.32±3.12	60.59±3.19	0.000
24-sT. saSual o saw.	131.61±3	98.47±1.85	0.000
24-sT. saSual o daw.	80.31±2.32	59.18±2.62	0.000
24-sT. saSual o gcs (dar t yma/wT)	75.7±2.09	74.71±2	0.601
24-sT. pw.	48.95±1.75	41.15±3.99	0.000
dRis saSual o saw.	133.95±2.99	101.12±1.01	0.000
dRis saSual o daw.	84.58±4.36	61.35±2.27	0.000
dRis saSual o pw.	49.79±1.9	39.5±1.63	0.000
dRis saSual o gcs (dar t yma/wT)	79.74±2.46	74.88±2.31	0.056
Ramis saSual o saw.	123.1±3.16	91.35±4.53	0.000
Ramis saSual o daw.	73.64±2.42	52.24±2.98	0.000
Ramis saSual o gcs (dar t yma/wT)	65.86±1.72	64.76±2.39	0.446
Ramis saSual o pw.	47.05±1.63	39.25±1.99	0.000
adreul i dil is saS. saw.	138.63±3.09	98.12±1.83	0.000
adreul i dil is saS. daw.	85.83±2.04	58.41±2.77	0.000
adreul i dil is saS. gcs (dar t yma/wT)	79.26±2.46	71.94±2.37	0.000

yvel a monacemi mocemul ia, rogorc saSual o±SD. A

awam = arteriul i wnevis ambul atoriul i monitoringi;

ah = arteriul i hipertenzia. saw = sistol uri arteriul i wneva;

daw = diastol uri arteriul i wneva; pw = pul suri wneva;

gcs = gul is cemis sixSire.

cxrii i #3. sisxi is reol ogiuri maCvenebl ebi j anmrTel da hipertenziul individebSi.

maCvenebl i/j gufi	ZiriTadi (ah) (n=57)	sakontrol o (n=17)	P
Tr. raodenoba ($?10^3/mm^3$)	191.64±7.02	191.06±13.06	0.892
Tr. agregaciul i aqtivoba (%)	97.68±2.42	87.18±4.67	0.000
Tr. adheziuri aqtivoba (%)	40.8±3.31	28.35±3.89	0.000
fibrinogenis koncentracia (g/l)	3.71±0.15	2.97±0.29	0.000
hematokriti (%)	40.28±0.6	38.24±0.94	0.001
er. agregaciul i aqtivoba (%)	27.2±3.71	14.59±3.78	0.000
er. deformacia	2.66±0.21	3.14±0.12	0.010
pl azmis sibi ante (erTeul ebSi)	1.75±0.07	1.54±0.04	0.002
sisxi is sibi ante	0.76±0.03	0.7±0.03	0.086

Tr. = Trombocitebi; er. = eriTrocitebi.

cxril i #4. mxris arteriis dupl eqs-skanirebis maCvenebel ebi j anmrTel da hipertenziul individebSi.

maCvenebel i/j gufi	ZiriTadi (ah) (n=57)	sakontrol o (n=17)	P
nakad-damokidebul i dil atacia, FMD %	6.49±1.58	13.73±1.21	0.000
sisxl ZarRvis diametri, sm			
sawyisi, D_0	4.12±0.14	3.96±0.28	0.217
RHtest-is Semdeg, D_1	4.37±0.14	4.5±0.31	0.571
RHtest-iT ganpirobebul i cvl il eba, ΔD	0.25±0.06	0.54±0.04	0.000
nitrogl icerinis s/l miRebis Semdgom, NG-D	4.52±0.16	4.51±0.36	0.877
ni trat-damokidebul i dil atacia, NG-MD %	9.83±1.04	13.66±1.39	0.000
sisxl is nakadis siCqare sm/wm			
sawyisi, V_0	86.17±2.75	86.69±3.45	0.753
RHtest-is Semdgom, V_1	81.19±2.98	77.03±1.99	0.059
RHtest-iT ganpirobebul i cvl il eba, ΔV	-4.98±1.63	-9.67±2.28	0.002
gadanacvl ebis daZabul oba, T			
sawyisi, T_0	6.21±0.3	5.86±0.39	0.429
RHtest-is Semdgom, T_1	5.86±0.32	5.15±0.32	0.042
RHtest-iT ganpirobebul i cvl il eba, ΔT	-0.35±0.09	-0.71±0.09	0.000
gadanacvl ebis siCqare, γ			
sawyisi, γ_0	834.04±50.47	846.07±78.27	0.550
RHtest-is Semdgom, γ_1	782.45±44.61	742.97±64.93	0.625
RHtest-iT ganpirobebul i cvl il eba, $\Delta \gamma$	-51.58±14.13	-103.1±15.82	0.001

cxril i #5. korel acia sisxl is hemoreol ogiur maxasiaTebI ebsa da mxris arteriis dupl eqs-skanirebiT miRebul parametrebs Soris ZiriTadi j gufis indivi debSi.

korel acia/p		Tr. raodenoba	Tr. agregac %	Tr. adhezia %	fibrinogeni	hematokriti %	er. agregac. %	er. deformacia	pl azmis sibi ante	sisxl is sibi ante
r	FMD %	-0.390	-0.557	-0.667	-0.348	-0.599	-0.598	0.223	-0.713	-0.600
P		0.003	0.000	0.000	0.008	0.000	0.000	0.096	0.000	0.000
r	D0	-0.036	0.369	0.282	0.234	0.377	0.291	-0.284	0.270	0.518
P		0.790	0.005	0.034	0.079	0.004	0.028	0.032	0.042	0.000
r	D1	-0.219	0.148	0.003	0.101	0.131	0.037	-0.206	-0.032	0.295
P		0.102	0.273	0.981	0.455	0.333	0.784	0.124	0.814	0.026
r	ΔD	-0.401	-0.520	-0.639	-0.314	-0.575	-0.585	0.195	-0.690	-0.535
P		0.002	0.000	0.000	0.017	0.000	0.000	0.146	0.000	0.000
r	NG-D	-0.142	0.240	0.146	0.130	0.295	0.155	-0.261	0.144	0.415
P		0.293	0.072	0.280	0.337	0.026	0.249	0.050	0.287	0.001
r	NG-MD %	-0.389	-0.483	-0.504	-0.400	-0.313	-0.522	0.085	-0.484	-0.384
P		0.003	0.000	0.000	0.002	0.018	0.000	0.530	0.000	0.003
r	V0	-0.065	-0.272	-0.311	-0.314	-0.441	-0.310	0.259	-0.388	-0.637
P		0.628	0.040	0.019	0.017	0.001	0.019	0.052	0.003	0.000
r	V1	0.081	-0.013	-0.087	-0.171	-0.208	0.057	0.151	-0.125	-0.440
P		0.549	0.926	0.521	0.204	0.120	0.675	0.263	0.354	0.001
r	ΔV	0.258	0.437	0.366	0.218	0.364	0.627	-0.161	0.426	0.271
P		0.052	0.001	0.005	0.103	0.005	0.000	0.231	0.001	0.041
r	T0	0.289	0.084	0.145	0.007	-0.086	0.124	0.154	0.400	0.083
P		0.029	0.535	0.283	0.957	0.525	0.358	0.253	0.002	0.541
r	T1	0.376	0.232	0.323	0.095	0.100	0.288	0.084	0.582	0.259
P		0.004	0.083	0.014	0.482	0.460	0.030	0.532	0.000	0.052
r	ΔT	0.356	0.513	0.627	0.294	0.601	0.577	-0.198	0.697	0.607
P		0.007	0.000	0.000	0.026	0.000	0.000	0.141	0.000	0.000
r	γ0	-0.010	-0.291	-0.270	-0.299	-0.400	-0.250	0.286	-0.304	-0.601
P		0.939	0.028	0.042	0.024	0.002	0.061	0.031	0.022	0.000
r	γ1	0.099	-0.154	-0.102	-0.228	-0.259	-0.094	0.252	-0.116	-0.467
P		0.465	0.254	0.450	0.088	0.051	0.485	0.058	0.391	0.000
r	Δγ	0.349	0.555	0.642	0.349	0.612	0.594	-0.226	0.719	0.673
P		0.008	0.000	0.000	0.008	0.000	0.000	0.090	0.000	0.000

pirsonis korel acia (Pearson Correlation) = r
sarwmunoebis macvnebel i = P

cxrili #6. korelacia hemoreol ogiur maxasia Tebl ebsa da mxris arteriis dupl eqs-skani rebi T mi Rebul parametrebs Soris sakontrol o j gufis individebSi.

korelacia/p		Tr. Raodenoba	Tr. agregac. %	Tr. adhezia %	fibrinogeni	hematokriti %	er. agregac. %	er. deformacia	pl azmis sibli ante	sisxl is sibli ante
r	FMD %	0.172	0.603	0.412	0.198	-0.164	0.049	-0.108	-0.059	-0.256
P		0.509	0.010	0.100	0.447	0.528	0.852	0.679	0.821	0.321
r	D0	-0.175	-0.109	0.135	0.425	0.459	0.628	-0.381	0.524	0.864
P		0.500	0.677	0.606	0.089	0.064	0.007	0.132	0.031	0.000
r	D1	-0.160	-0.031	0.202	0.476	0.454	0.673	-0.416	0.548	0.881
P		0.539	0.906	0.436	0.053	0.067	0.003	0.097	0.023	0.000
r	ΔD	0.017	0.488	0.537	0.566	0.199	0.627	-0.435	0.430	0.552
P		0.949	0.047	0.026	0.018	0.444	0.007	0.081	0.085	0.022
r	NG-D	-0.199	-0.082	0.143	0.394	0.439	0.640	-0.361	0.534	0.879
P		0.443	0.755	0.584	0.117	0.078	0.006	0.154	0.027	0.000
r	NG-MD %	-0.247	0.012	0.058	0.058	0.158	0.425	-0.061	0.371	0.660
P		0.339	0.963	0.825	0.826	0.544	0.089	0.816	0.142	0.004
r	V0	0.258	-0.103	-0.144	-0.472	-0.526	-0.610	0.580	-0.558	-0.824
P		0.317	0.694	0.581	0.055	0.030	0.009	0.015	0.020	0.000
r	V1	0.239	0.077	-0.024	-0.348	-0.392	-0.258	0.390	-0.069	-0.385
P		0.356	0.769	0.928	0.172	0.120	0.318	0.121	0.793	0.127
r	ΔV	-0.182	0.223	0.197	0.411	0.454	0.697	-0.537	0.783	0.910
P		0.484	0.391	0.448	0.101	0.067	0.002	0.026	0.000	0.000
r	T0	0.207	0.172	-0.041	-0.402	-0.508	-0.495	0.348	-0.335	-0.695
P		0.424	0.509	0.876	0.110	0.037	0.043	0.172	0.189	0.002
r	T1	0.189	0.074	-0.120	-0.474	-0.525	-0.541	0.397	-0.347	-0.699
P		0.467	0.778	0.646	0.054	0.030	0.025	0.115	0.172	0.002
r	ΔT	-0.225	-0.475	-0.242	0.064	0.339	0.230	-0.102	0.220	0.531
P		0.386	0.054	0.349	0.809	0.183	0.375	0.698	0.396	0.028
r	γ^0	0.196	0.173	-0.057	-0.410	-0.433	-0.539	0.384	-0.464	-0.840
P		0.451	0.507	0.828	0.102	0.083	0.026	0.128	0.060	0.000
r	γ^1	0.184	0.100	-0.115	-0.464	-0.442	-0.576	0.425	-0.481	-0.852
P		0.480	0.702	0.659	0.061	0.075	0.016	0.089	0.051	0.000
r	$\Delta \gamma$	-0.216	-0.443	-0.193	0.124	0.325	0.305	-0.159	0.322	0.659
P		0.406	0.075	0.459	0.635	0.203	0.233	0.542	0.207	0.004

pirsonis korelacia (Pearson Correlation) = r
sarmunobis macvenebel i = P

cxril i #7a. korel acia sisxl is hemoreol ogiur maxasiaTebI ebsa da arteriul i wnevis 24-sT-iani monitorirebis monacemebs Soris sakontrol o j gufis individebSi.

korel acia/P		mi n. saw - dRe	maqs. saw - dRe	mi n. daw - dRe	maqs. daw - dRe	mi n. saw - Rame	maqs. saw - Rame	mi n. daw - Rame	maqs. daw - Rame	24-sT. saS. saw	24-sT. saS. daw	24-sT. saS. gcs	24-sT pw
r	Tr. raodenoba	-0.185	-0.022	-0.221	0.102	-0.374	-0.303	-0.029	0.061	-0.014	0.192	0.315	-0.458
P		0.478	0.933	0.393	0.698	0.139	0.237	0.913	0.817	0.958	0.460	0.219	0.064
r	Tr. agregac %	0.167	-0.410	-0.195	-0.444	0.328	0.313	0.122	-0.035	-0.047	-0.351	-0.197	0.048
P		0.522	0.102	0.453	0.074	0.198	0.221	0.640	0.893	0.859	0.167	0.449	0.856
r	Tr. adhezia %	-0.062	-0.342	0.161	-0.501	0.441	0.246	0.320	-0.125	-0.258	-0.443	-0.507	-0.010
P		0.812	0.180	0.537	0.040	0.077	0.341	0.210	0.634	0.318	0.075	0.038	0.969
r	fibrinogeni	-0.016	-0.257	0.221	-0.093	0.350	0.291	0.266	0.032	0.038	-0.052	-0.496	-0.133
P		0.951	0.320	0.394	0.722	0.168	0.256	0.303	0.904	0.886	0.844	0.043	0.612
r	hematokriti %	0.404	-0.220	0.115	0.120	0.379	0.511	0.242	0.291	0.336	0.197	-0.184	-0.268
P		0.108	0.396	0.660	0.646	0.134	0.036	0.350	0.257	0.188	0.448	0.480	0.299
r	er. aggregac. %	0.203	-0.589	0.297	-0.148	0.839	0.601	0.722	0.348	0.207	-0.003	-0.482	-0.049
P		0.435	0.013	0.247	0.570	0.000	0.011	0.001	0.171	0.426	0.991	0.050	0.851
r	er. deformacia	-0.424	0.533	0.000	-0.006	-0.459	-0.509	-0.409	-0.427	-0.321	-0.194	0.190	-0.095
P		0.090	0.028	0.999	0.983	0.064	0.037	0.103	0.088	0.209	0.457	0.466	0.716
r	pl azmis sibl ante	0.119	-0.508	0.161	-0.084	0.565	0.375	0.506	0.284	0.215	0.061	-0.358	-0.036
P		0.649	0.037	0.536	0.749	0.018	0.138	0.038	0.269	0.408	0.815	0.158	0.892
r	sisxl is sibl ante	0.201	-0.425	0.489	0.235	0.770	0.523	0.762	0.510	0.405	0.352	-0.460	0.231
P		0.439	0.089	0.046	0.365	0.000	0.031	0.000	0.037	0.107	0.166	0.063	0.373

cxrili #7b. korelacia sislis hemoreol ogyur maxasia Tebl ebsa da arteriuli wnevis 24-saati monitorirebis monacemebis Soris sakontrol o j gufis individebSi.

korelacia/P		saS. saw - dRe	saS. daw - dRe	saS. pw - dRe	saS. gcs - dRe	saS. saw - Rame	saS. daw - Rame	saS. gcs - Rame	saS. pw - Rame	adreuli dili saw.	adreuli dili daw.	adreuli dili gcs.
r	Tr. raodenoba	0.134	0.293	-0.496	-0.362	-0.288	-0.048	-0.011	-0.454	-0.561	-0.044	-0.446
P		0.607	0.254	0.043	0.154	0.263	0.854	0.967	0.067	0.019	0.865	0.073
r	Tr. agregac %	-0.558	-0.561	0.557	-0.010	0.272	0.010	0.293	0.583	0.189	-0.330	0.556
P		0.020	0.019	0.020	0.969	0.291	0.970	0.254	0.014	0.467	0.196	0.021
r	Tr. adhezia %	-0.639	-0.600	0.542	0.084	0.259	-0.013	0.195	0.616	0.189	-0.240	0.384
P		0.006	0.011	0.025	0.748	0.316	0.959	0.454	0.008	0.467	0.353	0.128
r	fibrinogeni	-0.386	-0.194	-0.034	-0.087	0.324	0.172	-0.073	0.453	0.186	0.207	-0.060
P		0.126	0.457	0.896	0.741	0.204	0.509	0.780	0.068	0.474	0.425	0.819
r	hematokriti %	-0.026	0.098	-0.033	-0.042	0.485	0.391	0.007	0.458	0.285	0.295	-0.095
P		0.922	0.709	0.898	0.872	0.048	0.120	0.979	0.065	0.267	0.250	0.717
r	er. agregac. %	-0.312	-0.224	0.294	-0.167	0.735	0.512	0.424	0.847	0.229	0.131	0.220
P		0.222	0.386	0.253	0.523	0.001	0.036	0.090	0.000	0.376	0.617	0.395
r	er. deformacia	0.100	0.003	0.073	0.437	-0.564	-0.474	-0.278	-0.532	-0.121	-0.207	0.002
P		0.704	0.990	0.781	0.080	0.018	0.055	0.280	0.028	0.642	0.426	0.993
r	pl azmis sibl ante	-0.278	-0.099	0.009	-0.317	0.552	0.394	0.244	0.621	0.012	0.109	-0.021
P		0.281	0.706	0.974	0.214	0.022	0.117	0.345	0.008	0.964	0.678	0.935
r	sisl is sibl ante	-0.026	0.182	-0.194	-0.324	0.756	0.670	0.295	0.654	0.090	0.468	-0.213
P		0.921	0.485	0.455	0.205	0.000	0.003	0.250	0.004	0.730	0.058	0.411

cxrili #8^a. korelacia sisxl is hemoreol ogiur maxasia Tebl ebsa da arteriuli wnevis 24-sT-iani monitorirebis monacemebs Soris ZiriTadi j gufis individebSi.

korelacia/P		mi n. saw - dRe	maqs. saw - dRe	mi n. daw - dRe	maqs. daw - dRe	mi n. saw - Rame	maqs. saw - Rame	mi n. daw - Rame	maqs. daw - Rame	24-sT. saS. saw	24-sT. saS. daw	24-sT. saS. gcs	24-sT pw
r	Tr. raodenoba	0.001	0.223	-0.027	0.126	0.123	0.099	-0.003	0.080	0.041	0.091	0.108	0.145
P		0.994	0.095	0.841	0.351	0.362	0.464	0.981	0.553	0.762	0.503	0.424	0.281
r	Tr. agregac %	-0.056	0.233	0.003	0.362	0.498	0.431	0.187	0.479	0.195	0.301	-0.340	0.130
P		0.680	0.081	0.985	0.006	0.000	0.001	0.165	0.000	0.145	0.023	0.010	0.335
r	Tr. adhezia %	-0.172	0.177	-0.157	0.168	0.351	0.336	0.073	0.393	0.027	0.144	-0.236	0.195
P		0.201	0.188	0.244	0.213	0.007	0.011	0.588	0.003	0.843	0.285	0.077	0.145
r	fibrinogeni g/l	0.121	0.070	0.155	0.020	0.334	0.373	0.003	0.101	0.091	0.100	-0.124	0.173
P		0.369	0.607	0.249	0.881	0.011	0.004	0.982	0.456	0.500	0.459	0.356	0.198
r	hematokriti %	0.119	0.119	0.190	0.179	0.235	0.120	-0.021	0.362	0.095	0.153	-0.114	0.052
P		0.378	0.379	0.157	0.182	0.078	0.372	0.877	0.006	0.482	0.256	0.399	0.703
r	er. agregac. %	0.195	0.232	0.255	0.207	0.372	0.413	0.006	0.362	0.231	0.222	-0.186	0.231
P		0.145	0.083	0.056	0.121	0.004	0.001	0.964	0.006	0.083	0.097	0.167	0.084
r	er. deformacia	-0.107	-0.038	-0.106	-0.231	-0.159	-0.249	-0.150	-0.203	-0.057	-0.240	-0.317	0.114
P		0.429	0.779	0.431	0.084	0.237	0.062	0.265	0.129	0.674	0.072	0.016	0.399
r	pl azmis sibl ante	0.185	0.263	0.223	0.264	0.447	0.429	0.141	0.486	0.279	0.344	-0.245	0.165
P		0.169	0.048	0.096	0.047	0.000	0.001	0.295	0.000	0.035	0.009	0.066	0.220
r	sisxl is sibl ante	0.222	0.256	0.312	0.326	0.538	0.521	0.249	0.586	0.401	0.488	-0.323	0.110
P		0.097	0.055	0.018	0.013	0.000	0.000	0.062	0.000	0.002	0.000	0.014	0.416

cxril i #8^b. korel acia sisxl is hemoreol ogiur maxasiaTebI ebsa da arteriul i wnevis 24-saaTiani monitorirebis monacemebs Soris ZiriTadi j gufis individebSi.

korel acia/p		saS. saw - dRe	saS. daw - dRe	saS. pw - dRe	saS. gcs - dRe	saS. saw - Rame	saS. daw - Rame	saS. gcs - Rame	saS. pw - Rame	adreal i dil is saw.	adreal i dil is daw.	adreal i dil is gcs.
r	Tr. raodenoba	-0.039	0.257	0.118	0.167	0.130	0.141	0.131	0.253	-0.105	0.003	-0.079
P		0.773	0.053	0.382	0.214	0.334	0.296	0.331	0.058	0.438	0.983	0.559
r	Tr. agregac %	0.186	0.080	0.015	-0.212	0.368	0.359	-0.204	0.243	0.287	0.490	-0.096
P		0.166	0.555	0.911	0.114	0.005	0.006	0.128	0.069	0.031	0.000	0.476
r	Tr. adhezia %	0.054	0.065	0.106	-0.107	0.179	0.188	-0.132	0.200	0.116	0.230	-0.013
P		0.688	0.632	0.431	0.428	0.183	0.161	0.327	0.136	0.389	0.086	0.925
r	fibrinogeni g/l	0.080	0.025	0.076	-0.116	0.300	0.168	-0.048	0.275	0.011	-0.018	-0.072
P		0.553	0.855	0.573	0.390	0.023	0.212	0.723	0.039	0.937	0.894	0.596
r	hematokriti %	0.203	-0.095	-0.057	-0.079	0.138	0.190	-0.113	0.064	0.157	0.317	0.114
P		0.129	0.483	0.674	0.557	0.307	0.156	0.401	0.639	0.243	0.016	0.397
r	er. agregac. %	0.324	0.052	0.096	-0.136	0.399	0.298	-0.044	0.214	0.314	0.292	-0.061
P		0.014	0.702	0.479	0.313	0.002	0.024	0.746	0.110	0.018	0.027	0.652
r	er. deformacia	-0.023	-0.168	0.180	-0.278	-0.183	-0.258	-0.405	-0.070	0.215	-0.023	-0.118
P		0.867	0.212	0.181	0.036	0.174	0.052	0.002	0.607	0.108	0.864	0.383
r	pl azmis sibl ante	0.317	0.082	0.079	-0.159	0.349	0.358	-0.174	0.274	0.219	0.318	-0.151
P		0.016	0.544	0.559	0.238	0.008	0.006	0.194	0.039	0.102	0.016	0.261
r	sisxl is sibl ante	0.419	0.143	0.022	-0.236	0.462	0.467	-0.189	0.276	0.284	0.433	-0.225
P		0.001	0.288	0.869	0.078	0.000	0.000	0.159	0.038	0.032	0.001	0.092

cxril i #9^a. korel acia mxris arteriis ul trasonografiul maxasiaTebI ebsa da arteriul i wnevis ambul atoriul i monitoringi T miRebul parametrebs Soris ZiriTadi j gufis pacientebSi.

korel acia/P		mi n. saw - dRe	maqs. saw - dRe	mi n. daw - dRe	maqs. daw - dRe	mi n. saw - Rame	maqs. saw - Rame	mi n. daw - Rame	maqs. daw - Rame	24-sT. saS. saw	24-sT. saS. daw	24-sT. saS. gcs	24-sT pw
r	FMD %	-0.086	-0.171	-0.138	-0.201	-0.391	-0.320	-0.036	-0.402	-0.132	-0.247	0.224	-0.152
P		0.522	0.203	0.304	0.133	0.003	0.015	0.791	0.002	0.329	0.064	0.094	0.258
r	D0	0.144	0.228	0.301	0.363	0.511	0.345	0.158	0.501	0.383	0.431	-0.306	0.109
P		0.285	0.089	0.023	0.006	0.000	0.009	0.240	0.000	0.003	0.001	0.021	0.420
r	ΔD	-0.103	-0.123	-0.147	-0.162	-0.341	-0.293	-0.050	-0.366	-0.088	-0.209	0.184	-0.135
P		0.446	0.361	0.277	0.228	0.009	0.027	0.710	0.005	0.514	0.118	0.170	0.316
r	NG-MD %	0.016	-0.338	0.070	-0.276	-0.240	-0.421	0.050	-0.213	-0.155	-0.157	0.071	-0.246
P		0.908	0.010	0.603	0.038	0.073	0.001	0.713	0.112	0.250	0.242	0.598	0.065
r	V0	-0.236	-0.065	-0.377	-0.191	-0.348	-0.316	-0.209	-0.475	-0.302	-0.429	0.206	0.165
P		0.077	0.631	0.004	0.155	0.008	0.017	0.119	0.000	0.023	0.001	0.124	0.221
r	ΔV	0.146	0.254	0.133	0.193	0.333	0.253	-0.069	0.215	0.149	0.139	-0.036	0.251
P		0.279	0.057	0.324	0.150	0.011	0.058	0.610	0.109	0.268	0.301	0.788	0.059
r	T0	-0.046	0.098	-0.159	-0.048	-0.046	0.043	-0.044	-0.110	-0.102	-0.135	0.056	0.170
P		0.734	0.467	0.239	0.724	0.736	0.753	0.747	0.416	0.451	0.315	0.680	0.207
r	ΔT	0.111	0.220	0.160	0.199	0.403	0.310	0.010	0.401	0.175	0.263	-0.218	0.147
P		0.412	0.100	0.236	0.138	0.002	0.019	0.939	0.002	0.192	0.048	0.104	0.277
r	γ0	-0.183	-0.112	-0.320	-0.249	-0.402	-0.326	-0.158	-0.464	-0.341	-0.426	0.267	0.061
P		0.172	0.407	0.015	0.062	0.002	0.013	0.242	0.000	0.009	0.001	0.045	0.651
r	Δγ	0.116	0.222	0.173	0.230	0.440	0.357	0.036	0.443	0.211	0.311	-0.252	0.130
P		0.390	0.097	0.199	0.086	0.001	0.006	0.790	0.001	0.114	0.018	0.059	0.333

r = Pirson-IS korel aciiS mačvnebel i; P = statistikuri sarwmunoebis mačvnebel i.

cxrii i #9^b. korel acia sisxl is hemoreol ogjur maxasiaTebI ebsa da arteriul i wnevis 24-sT-iani monitorirebis monacemebs Soris ZiriTadi j gufis individebSi.

korel acia/P		saS. saw - dRe	saS. daw - dRe	saS. pw - dRe	saS. gcs - dRe	saS. saw - Rame	saS. daw - Rame	saS. gcs - Rame	saS. pw - Rame	adreu i dil is saw.	adreu i dil is daw.	adreu i dil is gcs.
r	FMD %	-0.206	-0.044	-0.047	0.173	-0.341	-0.339	0.004	-0.317	-0.201	-0.289	0.060
P		0.124	0.743	0.727	0.198	0.009	0.010	0.976	0.016	0.134	0.029	0.656
r	D0	0.441	0.062	0.003	-0.286	0.469	0.419	-0.128	0.288	0.343	0.518	-0.074
P		0.001	0.649	0.982	0.031	0.000	0.001	0.342	0.030	0.009	0.000	0.584
r	ΔD	-0.147	-0.065	-0.037	0.142	-0.307	-0.307	-0.023	-0.302	-0.174	-0.241	0.034
P		0.275	0.629	0.785	0.292	0.020	0.020	0.865	0.023	0.195	0.071	0.803
r	NG-MD %	-0.219	-0.037	-0.154	0.043	-0.181	-0.128	-0.024	-0.318	-0.110	-0.079	0.058
P		0.102	0.785	0.254	0.749	0.179	0.344	0.861	0.016	0.413	0.560	0.671
r	V0	-0.355	-0.046	0.246	0.178	-0.341	-0.435	-0.008	0.060	-0.177	-0.436	0.080
P		0.007	0.733	0.065	0.186	0.010	0.001	0.952	0.660	0.187	0.001	0.556
r	ΔV	0.237	-0.013	0.162	-0.091	0.327	0.242	0.158	0.359	0.134	0.255	0.025
P		0.075	0.922	0.230	0.503	0.013	0.070	0.242	0.006	0.320	0.056	0.851
r	T0	-0.157	0.073	0.212	0.098	-0.085	-0.117	-0.035	0.123	-0.092	-0.249	-0.104
P		0.242	0.590	0.113	0.470	0.529	0.384	0.796	0.360	0.494	0.062	0.443
r	ΔT	0.273	-0.001	0.041	-0.176	0.342	0.357	0.012	0.284	0.179	0.291	-0.060
P		0.040	0.994	0.764	0.190	0.009	0.006	0.927	0.032	0.182	0.028	0.657
r	γ0	-0.410	-0.012	0.161	0.234	-0.380	-0.419	0.088	-0.081	-0.250	-0.468	0.071
P		0.002	0.929	0.233	0.080	0.004	0.001	0.514	0.549	0.061	0.000	0.601
r	Δγ	0.307	0.010	0.018	-0.197	0.377	0.395	-0.021	0.279	0.212	0.343	-0.080
P		0.020	0.939	0.892	0.142	0.004	0.002	0.876	0.036	0.113	0.009	0.556

r = Pirson-is korel aciiis mačvnebel i; P = statistikuri sarwmnoebis mačvnebel i.

cxril i #10^a. korel acia mxris arteriis ul trasonografiul maxasiaTebI ebsa da arteriul i wnevis ambul atoriul i monitoringi T miRebul parametrebs Soris ZiriTadi j gufis individebSi.

korel acia/P		mi n. saw - dRe	maqs. saw - dRe	mi n. daw - dRe	maqs. daw - dRe	mi n. saw - Rame	maqs. saw - Rame	mi n. daw - Rame	maqs. daw - Rame	24-sT. saS. saw	24-sT. saS. daw	24-sT. saS. gcs	24-sT pw
r	FMD %	-0.157	-0.160	-0.193	-0.464	-0.013	-0.074	-0.069	-0.289	-0.331	-0.471	-0.121	-0.020
P		0.547	0.539	0.458	0.061	0.960	0.778	0.793	0.260	0.194	0.056	0.645	0.939
r	D0	0.326	-0.270	0.587	0.446	0.768	0.644	0.736	0.578	0.530	0.515	-0.428	0.089
P		0.201	0.294	0.013	0.073	0.000	0.005	0.001	0.015	0.029	0.035	0.086	0.735
r	ΔD	0.094	-0.442	0.339	-0.087	0.701	0.483	0.638	0.237	0.131	-0.024	-0.518	0.053
P		0.718	0.076	0.183	0.738	0.002	0.049	0.006	0.360	0.617	0.929	0.033	0.839
r	NG-MD %	0.168	-0.259	0.462	0.085	0.674	0.364	0.601	0.389	0.246	0.173	-0.326	0.332
P		0.519	0.315	0.062	0.746	0.003	0.151	0.011	0.123	0.342	0.506	0.201	0.193
r	V0	-0.560	0.344	-0.478	-0.376	-0.774	-0.734	-0.706	-0.674	-0.581	-0.511	0.343	-0.256
P		0.019	0.177	0.053	0.137	0.000	0.001	0.002	0.003	0.014	0.036	0.178	0.322
r	ΔV	0.244	-0.577	0.395	0.080	0.808	0.526	0.804	0.549	0.365	0.277	-0.412	0.091
P		0.345	0.015	0.117	0.761	0.000	0.030	0.000	0.022	0.150	0.283	0.101	0.729
r	T0	-0.487	0.121	-0.561	-0.555	-0.658	-0.680	-0.598	-0.606	-0.596	-0.597	0.319	-0.125
P		0.047	0.645	0.019	0.021	0.004	0.003	0.011	0.010	0.012	0.011	0.213	0.634
r	ΔT	0.330	0.015	0.403	0.562	0.359	0.385	0.370	0.498	0.509	0.594	-0.086	0.078
P		0.196	0.955	0.109	0.019	0.157	0.127	0.144	0.042	0.037	0.012	0.743	0.767
r	γ0	-0.407	0.196	-0.588	-0.512	-0.709	-0.645	-0.675	-0.608	-0.567	-0.571	0.378	-0.165
P		0.105	0.452	0.013	0.036	0.001	0.005	0.003	0.010	0.018	0.017	0.135	0.526
r	Δγ	0.305	-0.055	0.455	0.545	0.446	0.415	0.466	0.526	0.512	0.590	-0.164	0.103
P		0.233	0.835	0.066	0.024	0.073	0.098	0.059	0.030	0.035	0.013	0.530	0.693

r = Pirson-is korel acii s mačvenebel i; P = statistikuri sarwmunoebis mačvenebel i.

cxril i #10^b. korel acia sisxl is hemoreol ogiur maxasiaTebI ebsa da aw-is 24-saaTiani
 monitorirebis monacemebs Soris sakontrol o j gufis individebSi.

korel acia/p		saS. saw - dRe	saS. daw - dRe	saS. pw - dRe	saS. gcs - dRe	saS. saw - Rame	saS. daw - Rame	saS. gcs - Rame	saS. pw - Rame	adreuI diI is saw	adreuI diI is daw	adreuI diI is gcs
r	FMD %	-0.557	-0.573	0.456	0.087	-0.121	-0.274	0.157	0.185	0.016	-0.434	0.528
P		0.020	0.016	0.066	0.739	0.643	0.287	0.548	0.476	0.952	0.082	0.029
r	D0	0.162	0.383	-0.299	-0.172	0.799	0.764	0.179	0.588	0.228	0.687	-0.355
P		0.534	0.129	0.244	0.510	0.000	0.000	0.493	0.013	0.379	0.002	0.162
r	ΔD	-0.418	-0.244	0.200	-0.109	0.601	0.415	0.354	0.724	0.190	0.153	0.227
P		0.095	0.345	0.442	0.676	0.011	0.098	0.164	0.001	0.466	0.557	0.381
r	NG-MD %	0.088	0.069	0.098	-0.019	0.592	0.512	0.338	0.510	0.237	0.258	0.063
P		0.738	0.793	0.709	0.942	0.012	0.036	0.185	0.037	0.361	0.318	0.810
r	V0	-0.229	-0.332	0.185	0.255	-0.869	-0.818	-0.276	-0.676	-0.366	-0.630	0.173
P		0.377	0.193	0.477	0.323	0.000	0.000	0.284	0.003	0.149	0.007	0.507
r	ΔV	0.007	0.104	-0.078	-0.391	0.782	0.690	0.439	0.711	0.137	0.320	-0.044
P		0.977	0.690	0.765	0.121	0.000	0.002	0.078	0.001	0.601	0.211	0.868
r	T0	-0.333	-0.495	0.330	0.089	-0.758	-0.764	-0.078	-0.486	-0.360	-0.771	0.373
P		0.192	0.043	0.196	0.735	0.000	0.000	0.766	0.048	0.156	0.000	0.140
r	ΔT	0.519	0.605	-0.444	-0.122	0.468	0.565	-0.033	0.137	0.156	0.646	-0.507
P		0.033	0.010	0.074	0.640	0.058	0.018	0.901	0.599	0.549	0.005	0.038
r	γ0	-0.261	-0.456	0.345	0.169	-0.782	-0.773	-0.127	-0.532	-0.281	-0.739	0.379
P		0.312	0.066	0.175	0.518	0.000	0.000	0.628	0.028	0.274	0.001	0.133
r	Δγ	0.456	0.577	-0.447	-0.172	0.537	0.614	0.015	0.223	0.140	0.658	-0.501
P		0.066	0.015	0.072	0.510	0.026	0.009	0.954	0.390	0.591	0.004	0.040

r = Pirson-is korel acii s mačvenebel i; P = statistikuri sarwmunoebis mačvenebel i.

cxriil i @11. hemoreol ogiur parametrTaSorisi korel aciebi ZiriTadi j gufis individebSi.

korel acia/p	hemoreol ogia	Tr. raodenoba	Tr. agregacia %	Tr. adheziuroba %	fibrinogeni	hematokriti %	er. agregadoba %	er. deformacia	pl azmis sibl ante	sisxl is sibl ante
r	Trombocitebis raodenoba		0.215	0.411	0.354	0.092	0.122	-0.214	0.384	0.325
P			0.108	0.001	0.007	0.497	0.367	0.110	0.003	0.014
r	Trombocitebis agregacia %	0.215		0.688	0.391	0.581	0.626	-0.070	0.568	0.492
P		0.108		0.000	0.003	0.000	0.000	0.607	0.000	0.000
r	Trombocitebis adheziuroba %	0.411	0.688		0.454	0.581	0.577	-0.133	0.644	0.563
P		0.001	0.000		0.000	0.000	0.000	0.324	0.000	0.000
r	fibrinogeni g/l	0.354	0.391	0.454		0.278	0.534	-0.327	0.400	0.431
P		0.007	0.003	0.000		0.037	0.000	0.013	0.002	0.001
r	hematokriti %	0.092	0.581	0.581	0.278		0.544	-0.059	0.625	0.469
P		0.497	0.000	0.000	0.037		0.000	0.661	0.000	0.000
r	eritrocitebis agregadoba %	0.122	0.626	0.577	0.534	0.544		-0.136	0.538	0.426
P		0.367	0.000	0.000	0.000	0.000		0.313	0.000	0.001
r	eritrocitebis deformacia	-0.214	-0.070	-0.133	-0.327	-0.059	-0.136		-0.137	-0.240
P		0.110	0.607	0.324	0.013	0.661	0.313		0.308	0.072
r	pl azmis sibl ante	0.384	0.568	0.644	0.400	0.625	0.538	-0.137		0.900
P		0.003	0.000	0.000	0.002	0.000	0.000	0.308		0.000
r	sisxl is sibl ante	0.325	0.492	0.563	0.431	0.469	0.426	-0.240	0.900	
P		0.014	0.000	0.000	0.001	0.000	0.001	0.072	0.000	

r = Pirson-is korel acis mačvenebel i; P = statistikuri sarwmunoebis mačvenebel i.

cxrili 12. hemoreol ogiur parametrTaSorisi korel aciebi sakontrol o j gufis individebSi.

	hemoreol ogia	Tr. raodenoba	Tr. agregacia %	Tr. adheziuroba %	fibrinogeni	hematokriti %	er. agregadoba %	er. deformacia	pl azmis sibil ante	sisxl is sibil ante
r	Trombocitebis raodenoba		-0.222	-0.216	-0.136	-0.192	-0.401	0.193	-0.202	-0.182
P			0.391	0.405	0.602	0.460	0.111	0.458	0.437	0.485
r	Trombocitebis agregacia %	-0.222		0.621	0.416	0.518	0.524	-0.528	0.526	0.049
P		0.391		0.008	0.097	0.033	0.031	0.029	0.030	0.853
r	Trombocitebis adheziuroba %	-0.216	0.621		0.501	0.402	0.736	-0.427	0.429	0.187
P		0.405	0.008		0.040	0.109	0.001	0.087	0.086	0.472
r	fibrinogeni g/l	-0.136	0.416	0.501		0.547	0.532	-0.610	0.488	0.404
P		0.602	0.097	0.040		0.023	0.028	0.009	0.047	0.108
r	hematokriti %	-0.192	0.518	0.402	0.547		0.638	-0.519	0.629	0.287
P		0.460	0.033	0.109	0.023		0.006	0.033	0.007	0.264
r	eritrocitebis agregadoba %	-0.401	0.524	0.736	0.532	0.638		-0.561	0.746	0.642
P		0.111	0.031	0.001	0.028	0.006		0.019	0.001	0.005
r	eritrocitebis deformacia	0.193	-0.528	-0.427	-0.610	-0.519	-0.561		-0.622	-0.495
P		0.458	0.029	0.087	0.009	0.033	0.019		0.008	0.043
r	pl azmis sibil ante	-0.202	0.526	0.429	0.488	0.629	0.746	-0.622		0.742
P		0.437	0.030	0.086	0.047	0.007	0.001	0.008		0.001
r	sisxl is sibil ante	-0.182	0.049	0.187	0.404	0.287	0.642	-0.495	0.742	
P		0.485	0.853	0.472	0.108	0.264	0.005	0.043	0.001	

r = Pirson-is korel aciis maCvenebel i; P = statistikuri sarwmunoebis maCvenebel i.

cxril i #13. mxris arteriis dupl eqs-skani rebi T mi Rebul monacemTa Si da korel acia Ziri Tadi j gufis individebSi.

		FMD %	D0	ΔD	NG-D	NG-MD %	V0	ΔV	T0	ΔT	γ0	Δγ
r	FMD %		-0.427	0.982	-0.273	0.581	0.367	-0.736	-0.152	-0.977	0.342	-0.960
P			0.001	0.000	0.040	0.000	0.005	0.000	0.259	0.000	0.009	0.000
r	D0	-0.427		-0.300	0.965	-0.120	-0.631	0.276	-0.640	0.488	-0.872	0.560
P		0.001		0.024	0.000	0.373	0.000	0.037	0.000	0.000	0.000	0.000
r	ΔD	0.982	-0.300		-0.152	0.554	0.282	-0.734	-0.248	-0.934	0.211	-0.899
P		0.000	0.024		0.260	0.000	0.034	0.000	0.062	0.000	0.116	0.000
r	NG-D	-0.273	0.965	-0.152		0.144	-0.575	0.137	-0.696	0.336	-0.831	0.406
P		0.040	0.000	0.260		0.285	0.000	0.310	0.000	0.011	0.000	0.002
r	NG-MD %	0.581	-0.120	0.554	0.144		0.215	-0.537	-0.219	-0.582	0.154	-0.590
P		0.000	0.373	0.000	0.285		0.109	0.000	0.102	0.000	0.254	0.000
r	V0	0.367	-0.631	0.282	-0.575	0.215		-0.152	0.582	-0.436	0.898	-0.522
P		0.005	0.000	0.034	0.000	0.109		0.260	0.000	0.001	0.000	0.000
r	ΔV	-0.736	0.276	-0.734	0.137	-0.537	-0.152		0.203	0.749	-0.110	0.702
P		0.000	0.037	0.000	0.310	0.000	0.260		0.131	0.000	0.417	0.000
r	T0	-0.152	-0.640	-0.248	-0.696	-0.219	0.582	0.203		0.072	0.727	0.000
P		0.259	0.000	0.062	0.000	0.102	0.000	0.131		0.595	0.000	0.998
r	ΔT	-0.977	0.488	-0.934	0.336	-0.582	-0.436	0.749	0.072		-0.428	0.988
P		0.000	0.000	0.000	0.011	0.000	0.001	0.000	0.595		0.001	0.000
r	γ0	0.342	-0.872	0.211	-0.831	0.154	0.898	-0.110	0.727	-0.428		-0.531
P		0.009	0.000	0.116	0.000	0.254	0.000	0.417	0.000	0.001		0.000
r	Δγ	-0.960	0.560	-0.899	0.406	-0.590	-0.522	0.702	0.000	0.988	-0.531	
P		0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.998	0.000	0.000	

pirsonis korel acia (Pearson Correlation) = r
 sarwmunoebis mačvenebel i = P

cxril i #14. mxris arteriis dupl eqs-skani rebi T mi Rebul monacemTa Sida korel acia sakontrol o j gufis individebSi.

		FMD %	D0	ΔD	NG-D	NG-MD %	V0	ΔV	T0	ΔT	γ0	Δγ
r	FMD %		-0.457	0.588	-0.431	-0.204	0.297	-0.249	0.522	-0.907	0.502	-0.857
P			0.065	0.013	0.084	0.433	0.247	0.336	0.032	0.000	0.040	0.000
r	D0	-0.457		0.444	0.993	0.627	-0.881	0.818	-0.938	0.767	-0.977	0.837
P		0.065		0.074	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000
r	ΔD	0.588	0.444		0.466	0.376	-0.484	0.513	-0.303	-0.220	-0.375	-0.097
P		0.013	0.074		0.060	0.137	0.049	0.035	0.238	0.397	0.138	0.712
r	NG-D	-0.431	0.993	0.466		0.714	-0.897	0.844	-0.928	0.748	-0.973	0.822
P		0.084	0.000	0.060		0.001	0.000	0.000	0.000	0.001	0.000	0.000
r	NG-MD %	-0.204	0.627	0.376	0.714		-0.692	0.691	-0.588	0.439	-0.650	0.509
P		0.433	0.007	0.137	0.001		0.002	0.002	0.013	0.078	0.005	0.037
r	V0	0.297	-0.881	-0.484	-0.897	-0.692		-0.836	0.898	-0.638	0.922	-0.706
P		0.247	0.000	0.049	0.000	0.002		0.000	0.000	0.006	0.000	0.002
r	ΔV	-0.249	0.818	0.513	0.844	0.691	-0.836		-0.673	0.517	-0.779	0.620
P		0.336	0.000	0.035	0.000	0.002	0.000		0.003	0.034	0.000	0.008
r	T0	0.522	-0.938	-0.303	-0.928	-0.588	0.898	-0.673		-0.828	0.970	-0.856
P		0.032	0.000	0.238	0.000	0.013	0.000	0.003		0.000	0.000	0.000
r	ΔT	-0.907	0.767	-0.220	0.748	0.439	-0.638	0.517	-0.828		-0.809	0.986
P		0.000	0.000	0.397	0.001	0.078	0.006	0.034	0.000		0.000	0.000
r	γ0	0.502	-0.977	-0.375	-0.973	-0.650	0.922	-0.779	0.970	-0.809		-0.872
P		0.040	0.000	0.138	0.000	0.005	0.000	0.000	0.000	0.000		0.000
r	Δγ	-0.857	0.837	-0.097	0.822	0.509	-0.706	0.620	-0.856	0.986	-0.872	
P		0.000	0.000	0.712	0.000	0.037	0.002	0.008	0.000	0.000	0.000	

pi rsoni s korel acia (Pearson Correlation) = r
sarwmunoebis maCvenebel i = P

cxril i #15. arteriul i wnevis sxvadasxva cirkadul i profil is mqone 57 hiperteziul i pacientis kl inikuri maxasiaTebI ebi

maCvenebel i/j gufi	arteriul i hipertenziis j gufi		
	di peri (n=20)	nondi peri (n=37)	P
asaki (ww)	49.4±3.57	52.27±2.34	0.142
aw xangrZl ivoba	6.55±2.29	10.16±1.77	0.024
aw xarisxi	12-Ix/8-IIx	12-Ix/25-IIx	0.046
24-sT awam			
dRis minimal uri saw. mm.Hg.	109.45±6.78	109.57±2.97	0.706
dRis maqsimal uri saw. mm.Hg.	162.6±7.5	168.59±4.35	0.072
dRis minimal uri daw. mm.Hg.	61.2±3.41	61.89±3.62	0.920
dRis maqsimal uri daw. mm.Hg.	95.8±4.79	104±3.47	0.005
Ramis minimal uri saw. mm.Hg.	95.6±4.09	108.95±4	0.000
Ramis maqsimal uri saw. mm.Hg.	135.95±5.35	155.24±5.62	0.000
Ramis minimal uri daw. mm.Hg.	60.6±4.27	63.76±3.64	0.357
Ramis maqsimal uri daw. mm.Hg.	78.5±3.35	92.08±3.67	0.000
24-sT. saSual o saw. mm.Hg.	127.93±5.57	133.61±3.53	0.136
24-sT. saSual o daw. mm.Hg.	75.98±3.75	82.65±2.76	0.005
24-sT. saSual o gcs (dar tyma/wT)	78.6±3.68	74.14±2.51	0.050
24-sT. pw.	47.78±2.5	49.58±2.39	0.509
dRis saSual o saw. mm.Hg.	129.35±5.55	136.43±3.42	0.053
dRis saSual o daw. mm.Hg.	83.3±12.05	85.27±2.77	0.012
dRis saSual o pw. mm.Hg.	49.89±2.92	49.74±2.57	0.531
dRis saSual o gcs (dar tyma/wT)	81.8±4.8	78.62±2.88	0.461
Ramis saSual o saw. mm.Hg.	116.65±4.1	126.58±4.01	0.003
Ramis saSual o daw. mm.Hg.	68.75±3.02	76.28±3.11	0.002
Ramis saSual o gcs (dar tyma/wT)	66.9±2.45	65.3±2.37	0.435
Ramis saSual o pw. mm.Hg.	44.9±2.73	48.21±2.03	0.040
adreul i dil is saS. saw. mm.Hg.	134.8±2.89	140.7±4.46	0.110
adreul i dil is saS. daw. mm.Hg.	81.07±2.68	88.4±2.47	0.001
adreul i dil is saS. gcs (dar tyma/wT)	80.3±2.15	78.7±3.69	0.700

cxril i #16. aw-is sxvadasxva cirkadul i profil is mqone 57
hiperteziul i pacientis hemoreol ogiuri maxasiaTebl ebi.

maCvenebel i/j gufi	arteriul i hipertenziis j gufi		
	diperi (n=20)	nondiperi (n=37)	P
Tr. raodenoba (*10 ³ /mm ³)	183.35±9.08	196.13±9.62	0.045
Tr. agregaciul i aqtivoba (%)	87.35±2.73	103.27±1.5	0.000
Tr. adheziuri aqtivoba (%)	27.85±3.82	47.79±2.67	0.000
fibrinogenis concentracia (g/l)	3.36±0.23	3.89±0.18	0.001
hematokriti (%)	38.25±0.5	41.38±0.64	0.000
er. agregaciul i aqtivoba (%)	14.1±1.54	34.28±4.11	0.000
er. deformacia	2.83±0.35	2.58±0.27	0.127
pl azmis sibl ante (erTeul ebSi)	1.51±0	1.88±0.09	0.000
sisxl is sibl ante	0.66±0.02	0.81±0.04	0.000

cxril i #17. hemoreol ogiur parametrTa al baTobiTi ganawil eba diper da nondiper ah pacientebSi.

hemoreol ogiuri maxasiaTebI ebi	parametrTa ganawil ebis tipi			
	hipertenziul i diperebi (n = 20)	χ^2 (2) testi P	hipertenziul i nondiperebi (n = 37)	χ^2 (3) testi P
Tr. agregacia %	I og-normal uri ganawil eba (4.468; 0.076)	0.149	I og-normal uri ganawil eba (4.639; 0.042)	0.309
Tr. adhezia %	I og-normal uri ganawil eba (3.860; 0.180)	0.657	I og-normal uri ganawil eba (3.276; 0.389)	0.244
fibrinogeni mg/dl	I og-normal uri ganawil eba (1.186; 0.171)	0.644	I og-normal uri da degeneraciul i ganawil ebis Senarevi (1.229; 0.168)	0.515
hematocriti %	I og-normal uri ganawil eba (3.645; 0.028)	0.121	I og-normal uri ganawil eba (3.718; 0.055)	0.079
pl azmis sibil ante (erTeul i)	konstanta 1.51	—	I og-normal uri ganawil eba (0.600; 0.164)	0.341

cxril i #18. aw-is sxvadasxva cirkadul i profil is mqone 57 hipertenziul i pacientis hemoreol ogiuri maxasiaTebl ebi.

maCvenebel i/j gufi	arteriul i hipertenziis j gufi			
	diperi (n=20)	nondiperi (n=37)	Fisher's F Test P	Student's t Test P
Tr. raodenoba (*10 ³ /mm ³)	183.35±9.08	196.13±9.62	0.039	0.028
Tr. agregaciul i aqtivoba (%)	87.35±2.73	103.27±1.5	0.018	0.000
Tr. adheziuri aqtivoba (%)	27.85±3.82	47.79±2.67	0.000	0.000
fibrinogenis koncentracia (g/l)	3.36±0.23	3.89±0.18	0.395	0.000
hematokriti (%)	38.25±0.5	41.38±0.64	0.01	0.000
er. agregaciul i aqtivoba (%)	14.1±1.54	34.28±4.11	0.000	0.000
er. deformacia	2.83±0.35	2.58±0.27	0.000	0.000
pl azmis sibl ante (erTeul ebSi)	1.51±0	1.88±0.09	"One sample Z Test"	P=0.000
mTl iani sisxl is sibl ante	0.66±0.02	0.81±0.04	0.000	0.000

cxriil i #19. mxris arteriis dupl eqs-skani rebis maCvenebl ebi di per da nondi per hipertenziul individebSi.

maCvenebl i/j gufi	arteriul i hipertenziis j gufi		
	di per i (n=20)	nondi per i (n=37)	P
nakad-damoki debul i dil atacia, FMD %	11.94±0.95	3.54±1.76	0.000
sisxl ZarRvis diametri, sm sawysi, D_0	3.76±0.2	4.31±0.16	0.000
RHtest-iT ganpi robebul i cvl il eba, ΔD	0.45±0.03	0.15±0.07	0.000
ni trat-damoki debul i dil atacia, NG-MD %	13.01±1.08	8.11±1.19	0.000
sisxl is nakadis siCqare sm/wm sawysi, V_0	93.45±4.32	82.24±2.93	0.000
RHtest-iT ganpi robebul i cvl il eba, ΔV	-9.19±1.63	-2.7±2.03	0.000
gadanacvl ebis daZabul oba, T sawysi, T_0	6.3±0.43	6.16±0.41	0.394
RHtest-iT ganpi robebul i cvl il eba, ΔT	-0.67±0.08	-0.17±0.1	0.000
gadanacvl ebis siCqare, γ sawysi, γ_0	963.17±90.5	764.24±49.75	0.000
Rhtest-iT ganpi robebul i cvl il eba, $\Delta \gamma$	-103.41±13.85	-23.57±13.54	0.000

cxrili #20.A aw-is sxvadasxva cirkadul i profil is mqone 74 (hipertenziul i da normotenziul i) individis kl inikuri maxasiaTebli ebi.

maCvenebel i/j gufi	saerTo popul acia (n=74)		
	diperi (n=31)	nondiperi (n=43)	P
asaki (ww)	49.13±4.5	52.7±2.86	0.086
aw xangrZl ivoba	4.23±2.49	8.74±2.5	0.009
aw xarisxi	12-Ix/8-IIx	12-Ix/25-IIx	0.001
24-sT awam			
dRis minimal uri saw. mm.Hg.	99.55±8.88	106.16±4.9	0.037
dRis maqsimal uri saw. mm.Hg	152.06±9.6	163.12±7.59	0.009
dRis minimal uri daw. mm.Hg	54.16±5.67	59.16±5.03	0.108
dRis maqsimal uri daw. mm.Hg	89.55±5.9	100.26±5.58	0.001
Ramis minimal uri saw. mm.Hg	87.26±6.69	105.42±6.18	0.000
Ramis maqsimal uri saw. mm.Hg	123.81±9.6	149.42±8.86	0.000
Ramis minimal uri daw. mm.Hg	53.58±5.98	61.16±5.11	0.026
Ramis maqsimal uri daw. mm.Hg	71.74±5.62	87.98±6.04	0.000
24-sT. saSual o saw. mm.Hg	117.31±8.63	128.83±6.41	0.008
24-sT. saSual o daw. mm.Hg	70.05±5.26	79.35±4.74	0.001
24-sT. saSual o gcs (dar tyma/wT)	77.48±3.42	74.02±2.9	0.060
24-sT. pw. mm.Hg	45.42±3.79	48.41±3.02	0.103
dRis saSual o saw. mm.Hg	119.45±8.18	131.42±6.5	0.006
dRis saSual o daw. mm.Hg	75.77±11.37	81.74±4.9	0.002
dRis saSual o pw. mm.Hg	45.89±3.71	48.54±3.25	0.173
dRis saSual o gcs (dar tyma/wT)	79.29±4.61	78.14±3.37	0.943
Ramis saSual o saw. mm.Hg	106.42±7.87	122.57±6.37	0.000
Ramis saSual o daw. mm.Hg	62.35±5.15	73.31±4.82	0.000
Ramis saSual o gcs (dar tyma/wT)	65.81±2.47	65.47±2.82	0.974
Ramis saSual o pw. mm.Hg	42.2±2.99	47.46±2.51	0.000
adreul i dil is saS. saw. mm.Hg	121.42±9.44	135.02±7.78	0.005
adreul i dil is saS. daw. mm.Hg	72.88±6.08	84.32±5.2	0.000
adreul i dil is saS. gcs (dar tyma/wT)	76.97±3.03	78.02±4.37	0.564

cxril i #21. arteriul i wnevis sxvadasxva cirkadul i profil is
mqone 74 individis hemoreol ogiuri maxasiaTebl ebi.

maCvenebel i/j gufi	saerTo popul acia (n=74)		
	diperi (n=31)	nondiperi (n=43)	P
Tr. raodenoba (*10 ³ /mm ³)	188.21±11.71	193.89±11.38	0.227
Tr. agregaciul i aqtivoba (%)	85.87±3.01	102.05±2.54	0.000
Tr. adheziuri aqtivoba (%)	26.61±3.61	46.1±3.61	0.000
fibrinogenis koncentracia (g/l)	3.15±0.29	3.81±0.23	0.000
hematokriti (%)	37.9±0.53	41.19±0.81	0.000
er. agregaciul i aqtivoba (%)	12.84±1.7	32.57±5.14	0.000
er. deformacia	2.96±0.31	2.64±0.32	0.010
pl azmis sibl ante (erTeul ebSi)	1.51±0	1.84±0.11	0.000
sisxl is sibl ante	0.67±0.02	0.8±0.05	0.000

cxrili #22. mxris arteriis dupl eqs-skani rebis maCvenebl ebi diper da nondiper individebSi.

maCvenebl i/j gufi	saerTo popul acia (n=74)		
	diperi (n=31)	nondiperi (n=43)	P
nakad-damokidebul i dil atacia, FMD %	12.45±1.07	5.05±2.58	0.000
sisxl ZarRvis diametri, sm			
sawyisi, D_0	3.79±0.19	4.29±0.22	0.000
RHtest-iT ganpirobepul i cvl il eba, ΔD	0.47±0.04	0.21±0.11	0.000
nitrat-damokidebul i dil atacia, NG-MD %	13.1±1.12	8.98±1.7	0.000
sisxl is nakadis siCqare sm/wm			
sawyisi, V_0	91.86±4.01	82.28±3.55	0.000
RHtest-iT ganpirobepul i cvl il eba, ΔV	-9.71±1.51	-3.43±2.64	0.000
gadanacvl ebis daZabul oba, T			
sawyisi, T_0	6.21±0.38	6.06±0.5	0.243
RHtest-iT ganpirobepul i cvl il eba, ΔT	-0.69±0.08	-0.25±0.14	0.000
gadanacvl ebis siCqare, γ			
sawyisi, γ_0	933.41±82.79	767.16±65.29	0.000
RHtest-iT ganpirobepul i cvl il eba, $\Delta \gamma$	-103.62±13.38	-34.44±20.12	0.000

cxrili #23. nondiperi cirkaduli profilis mgrZnobel oba, specifikuoba da pozitiuri prognozuli mniSvnel oba.

maxasiaTebeli	janmrTel i	ah-is mqone
Tr. agregacia%		
mgrZnobel oba	0.5	0.939
specifikuoba	0.142	0.25
ppm	0.833	0.837
Tr. Adheziuroba %		
mgrZnobel oba	0	1
specifikuoba	0.5	0.285
ppm	0	0.783
fibrinogeni g/l		
mgrZnobel oba	0.166	0.8
specifikuoba	0.454	0.481
ppm	0.166	0.648
hematokriti %		
mgrZnobel oba	0.45	0.89
specifikuoba	1	0.2
ppm	0.45	0.891
erit. Agregacia %		
mgrZnobel oba	0.4	1
specifikuoba	1	0.25
ppm	0.363	0.81
erit. Deformacia		
mgrZnobel oba	0.687	0.64
specifikuoba	0	0.66
ppm	1	0.675
plazmisiblantep		
mgrZnobel oba	0.5	1
specifikuoba	0.307	0.259
ppm	0.333	0.810
sixl is siblantep		
mgrZnobel oba	0.5	0.965
specifikuoba	0.272	0.32
ppm	0.5	0.756
FMD %		
mgrZnobel oba	0.5	1
specifikuoba	0.142	0.31
ppm	0.833	0.756

cxril i #24. hemoreol ogiuri maxasia Tebl ebi ah-is sxvadasxva xangrZI ivobis mqone pacientebSi.

maCvenebel i/j gufi	arteriul i hipertenziis j gufi		
	< 7w. (n=28)	≥ 7w. (n=29)	P
Tr. raodenoba (*10 ³ /mm ³)	184.59±7.77	198.46±11.51	0.145
Tr. agregaciul i aqtivoba (%)	94.57±3.4	100.69±3.26	0.008
Tr. adheziuri aqtivoba (%)	38.04±4.86	43.46±4.59	0.069
fibrinogenis koncentracia (g/l)	3.52±0.23	3.89±0.2	0.021
hematokriti (%)	40.21±0.99	40.34±0.74	0.585
er. agregaciul i aqtivoba (%)	22.91±5.02	31.34±5.29	0.015
er. deformacia	2.85±0.2	2.48±0.37	0.100
pl azmis sibl ante (erTeul ebSi)	1.68±0.1	1.81±0.1	0.031
mTI iani sisxl is sibl ante	0.74±0.05	0.78±0.04	0.100

cxriil i #25. mxris arteriis dupl eqs-skanirebis maCvenebl ebi hipertenziis sxvadasxva xangrZl ivobis anamnezis mqone individebSi.

maCvenebl i/j gufi	arteriul i hipertenziis j gufi			
	< 7w. (n=28)	≥ 7w. (n=29)	P	
nakad-damokidebul i dil atacia, FMD %	7.89±2.07	5.13±2.41	0.112	
sisxl ZarRvis diametri, sm	sawysi, D_0	4.12±0.21	4.11±0.19	0.682
	RHtest-is Semdeg, D_1	4.43±0.2	4.31±0.19	0.255
	RHtest-iT ganpirobebul i cvl il eba, ΔD	0.31±0.08	0.2±0.09	0.079
nitrogl icerinis s/l miRebis Semdgom, NG-D	4.61±0.23	4.43±0.23	0.123	
nitrat-damokidebul i dil atacia, NG-MD %	11.92±1.26	7.81±1.33	0.000	
gadanacvl ebis daZabul oba, T	sawysi, T_0	5.93±0.39	6.47±0.44	0.071
	RHtest-is Semdgom, T_1	5.51±0.38	6.19±0.49	0.029
	RHtest-iT ganpirobebul i cvl il eba, ΔT	-0.42±0.12	-0.28±0.15	0.177
gadanacvl ebis siCqare, γ	sawysi, γ_0	825.42±81.52	842.36±65.43	0.492
	RHtest-is Semdgom, γ_1	762.52±68.98	801.7±60.42	0.213
	RHtest-iT ganpirobebul i cvl il eba, $\Delta \gamma$	-62.9±19.54	-40.66±20.73	0.140

cxril i #26. hemoreol ogiuri maxasiaTebl ebi ah-is sxvadasxva xarixsis mqone pacientebSi.

maCvenebel i/j gufi	arteriul i hipertenziis j gufi		
	I x. (n=24)	II x. (n=33)	P
Tr. raodenoba (*10 ³ /mm ³)	186.50±9.21	195.39±10.34	0.299
Tr. agregaciul i aqtivoba (%)	94.96±3.77	99.67±3.15	0.057
Tr. adheziuri aqtivoba (%)	38.54±5.01	42.44±4.56	0.152
fibrinogenis koncentracia (g/l)	3.57±0.21	3.8±0.22	0.118
hematokriti (%)	39.83±1.12	40.61±0.67	0.086
er. agregaciul i aqtivoba (%)	21.5±3.86	31.35±5.5	0.017
er. deformacia	2.84±0.22	2.54±0.33	0.254
pl azmis sibl ante (erTeul ebSi)	1.67±0.11	1.8±0.1	0.034
sisxl is sibl ante	0.73±0.05	0.79±0.04	0.032

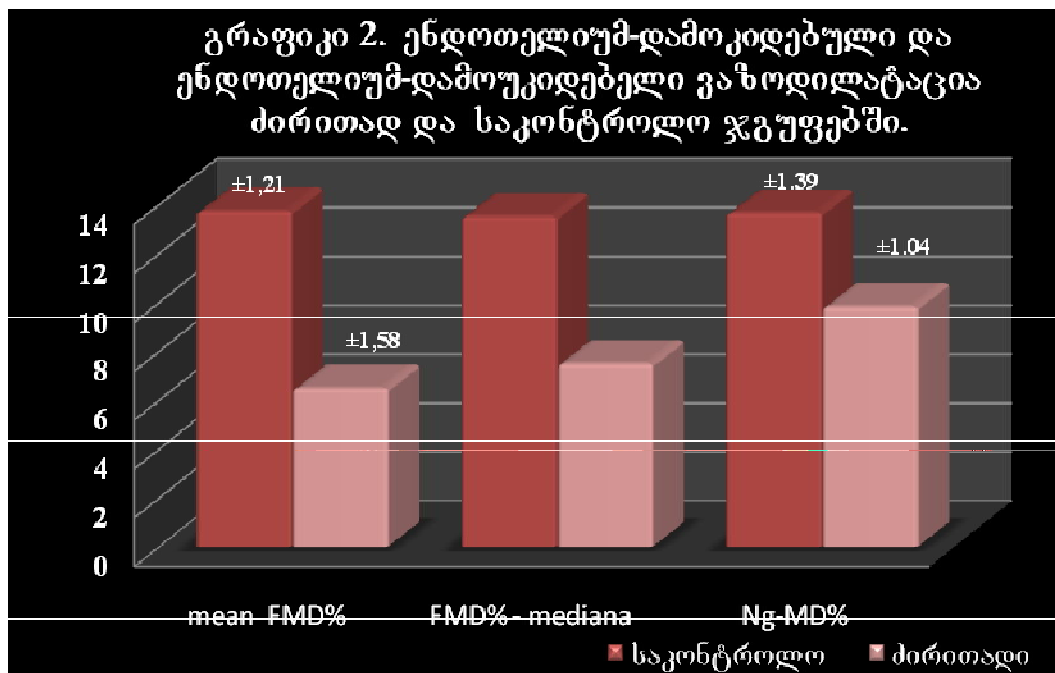
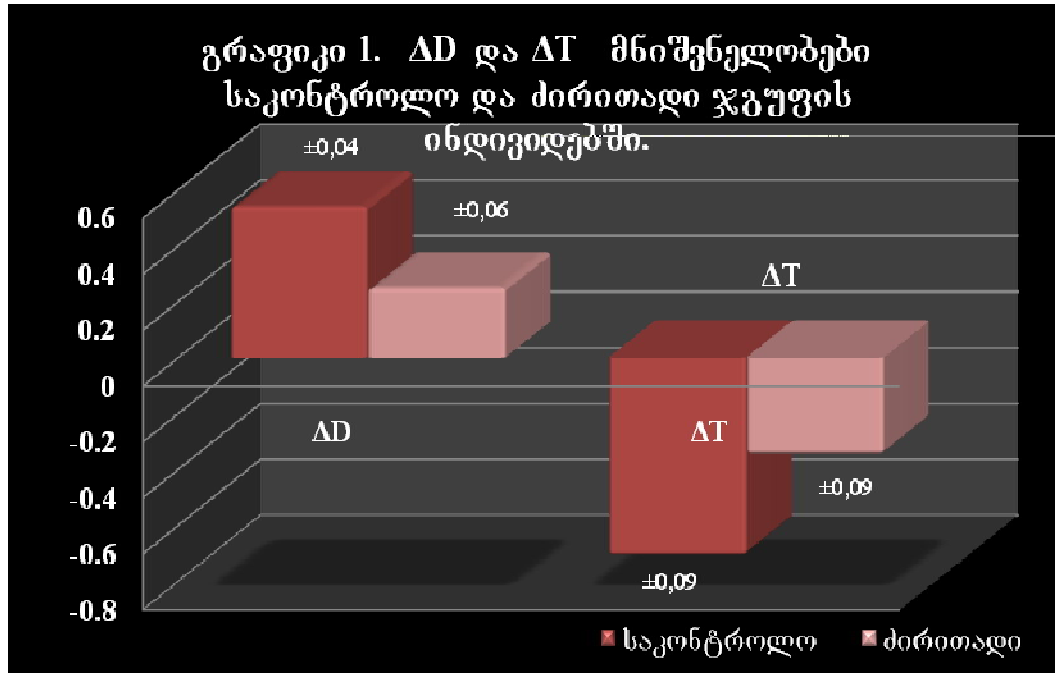
cxril i #28. hemoreol ogia sxvadasxva nakad-damoki debul i vazodil ataciis mqone hipertenziul pacientebSi.

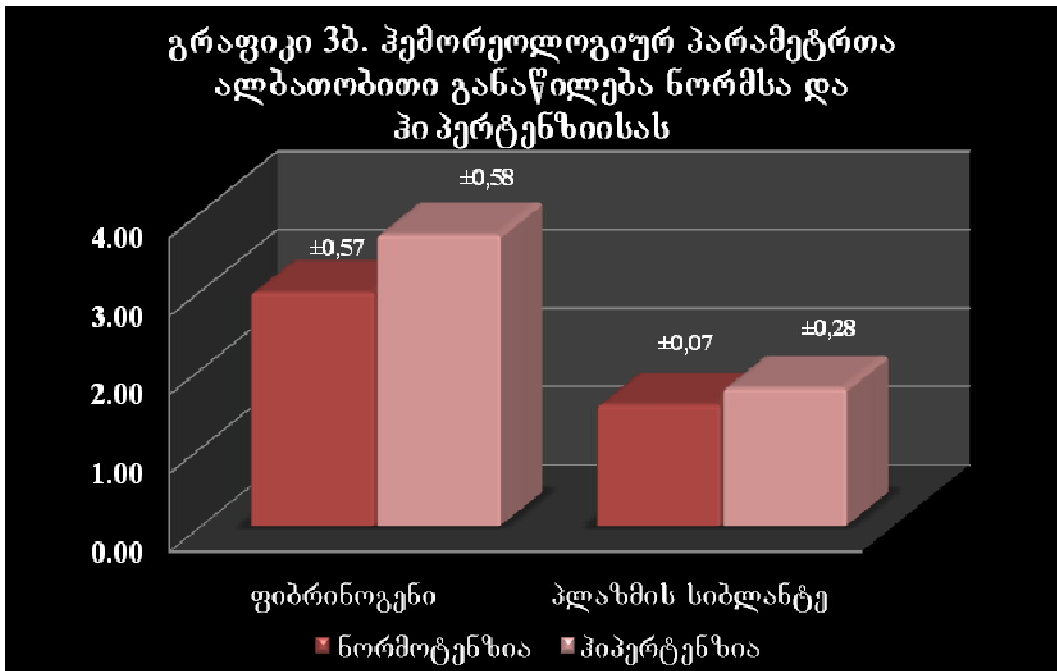
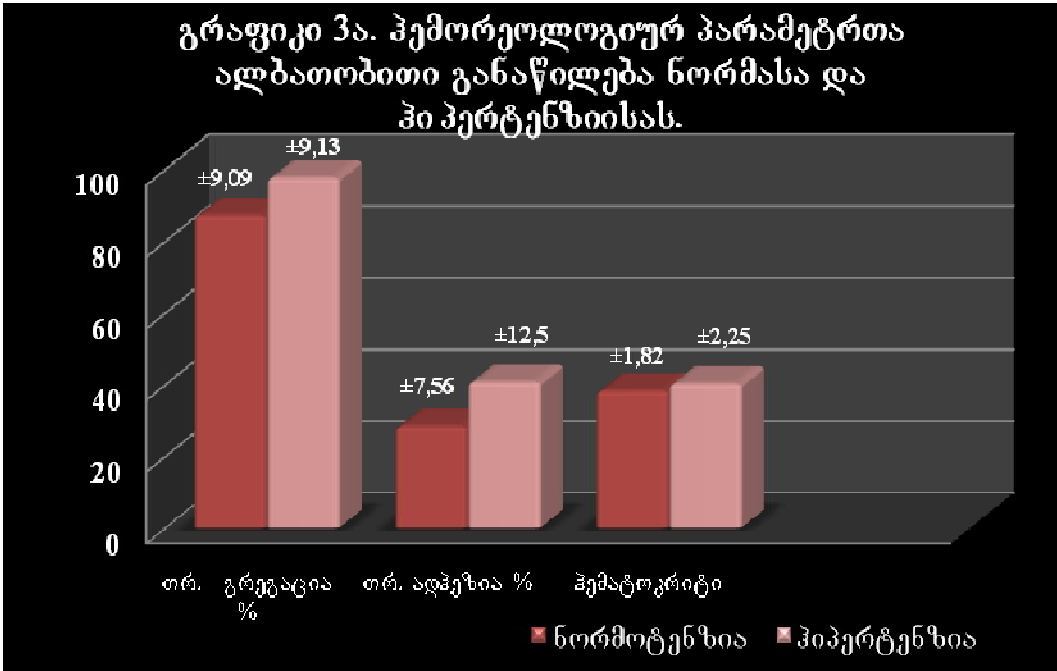
maCvenebel i/j gufi	arteriul i hipertenziis j gufi		
	< 7.5%. (n=29)	≥ 7.5% (n=28)	P
Tr. raodenoba (*10 ³ /mm ³)	201.86±10.89	181.07±7.51	0.000
Tr. agregaciul i aqtivoba (%)	102.76±2.04	92.43±3.61	0.000
Tr. adheziuri aqtivoba (%)	48.66±2.99	32.65±4.32	0.000
fibrinogenis koncentracia (g/l)	3.88±0.2	3.53±0.23	0.025
hematokriti (%)	41.59±0.76	38.93±0.62	0.000
er. agregaciul i aqtivoba (%)	33.7±4.8	20.47±4.73	0.000
er. deformacia	2.53±0.34	2.8±0.26	0.202
pl azmis sibil ante (erTeul ebSi)	1.93±0.1	1.56±0.04	0.000
sisxl is sibil ante	0.84±0.04	0.68±0.02	0.000

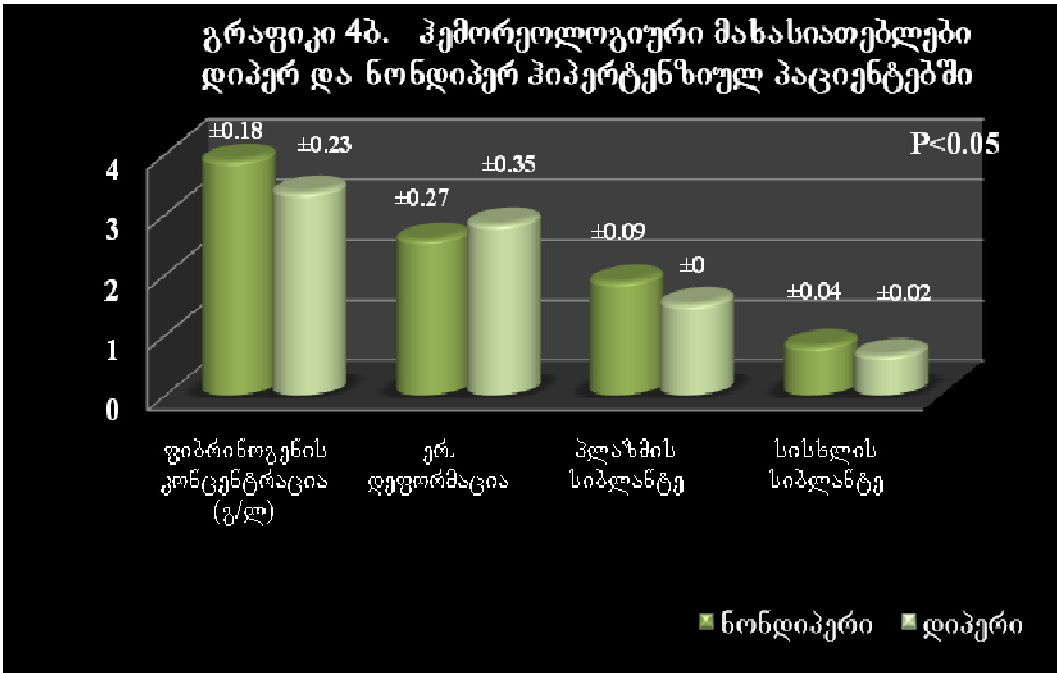
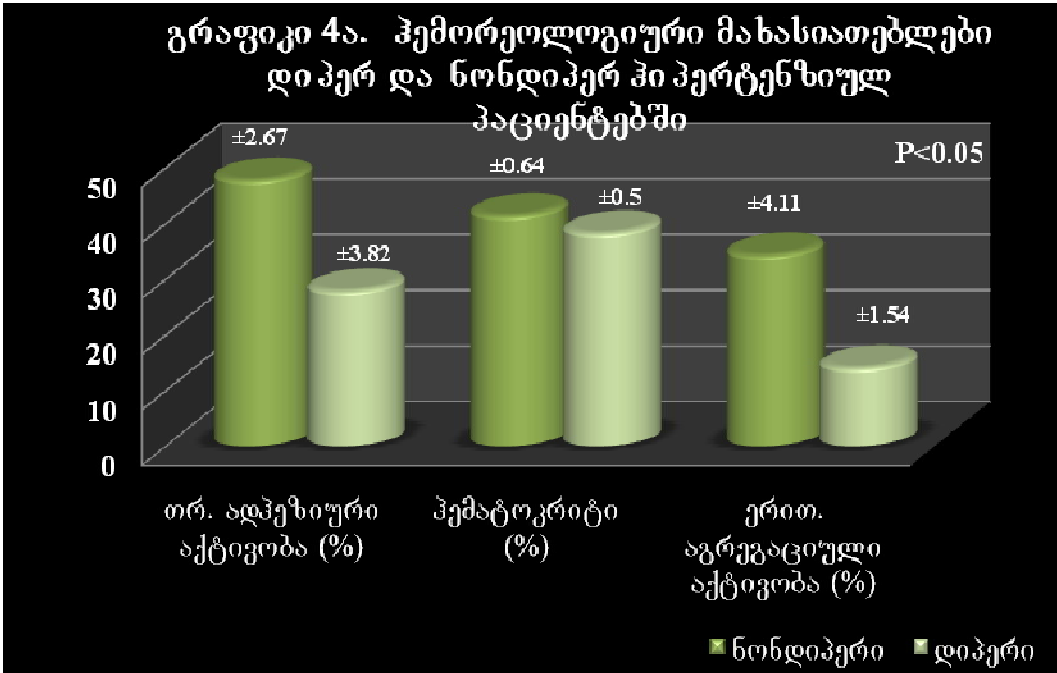
cxril i #29. mxris arteriis dupl eqs-skanirebis maCvenebel ebi sxvadasxva nakad-damokidebul i vazodil ataciis mqone hipertenziul pacientebSi.

maCvenebel i/j gufi	arteriul i hipertenziis j gufi		
	< 7.5% (n=29)	\geq 7.5% (n=28)	P
sisxl ZarRvis diametri, sm sawyisi, D_0	4.36 \pm 0.18	3.86 \pm 0.18	0.000
RHtest-is Semdeg, D_1	4.43 \pm 0.2	4.3 \pm 0.19	0.491
RHtest-iT ganpirobebul i cvl il eba, ΔD	0.07 \pm 0.07	0.44 \pm 0.03	0.000
nitrogl icerinis s/l miRebis Semdgom, NG-D	4.7 \pm 0.23	4.33 \pm 0.2	0.030
ni trat-damokidebul i dil atacia, NG-MD %	7.6 \pm 1.34	12.13 \pm 1.13	0.000
gadanacvl ebis daZabul oba, T sawyisi, T_0	6.25 \pm 0.49	6.17 \pm 0.35	0.786
RHtest-is Semdgom, T_1	6.18 \pm 0.54	5.52 \pm 0.3	0.125
RHtest-iT ganpirobebul i cvl il eba, ΔT	-0.07 \pm 0.09	-0.64 \pm 0.06	0.000
gadanacvl ebis siCqare, γ sawyisi, γ_0	753.54 \pm 57.24	917.41 \pm 74.96	0.002
RHtest-is Semdgom, γ_1	745.17 \pm 61.95	821.08 \pm 64.97	0.088
RHtest-iT ganpirobebul i cvl il eba, $\Delta\gamma$	-8.37 \pm 11.13	-96.34 \pm 11.7	0.000

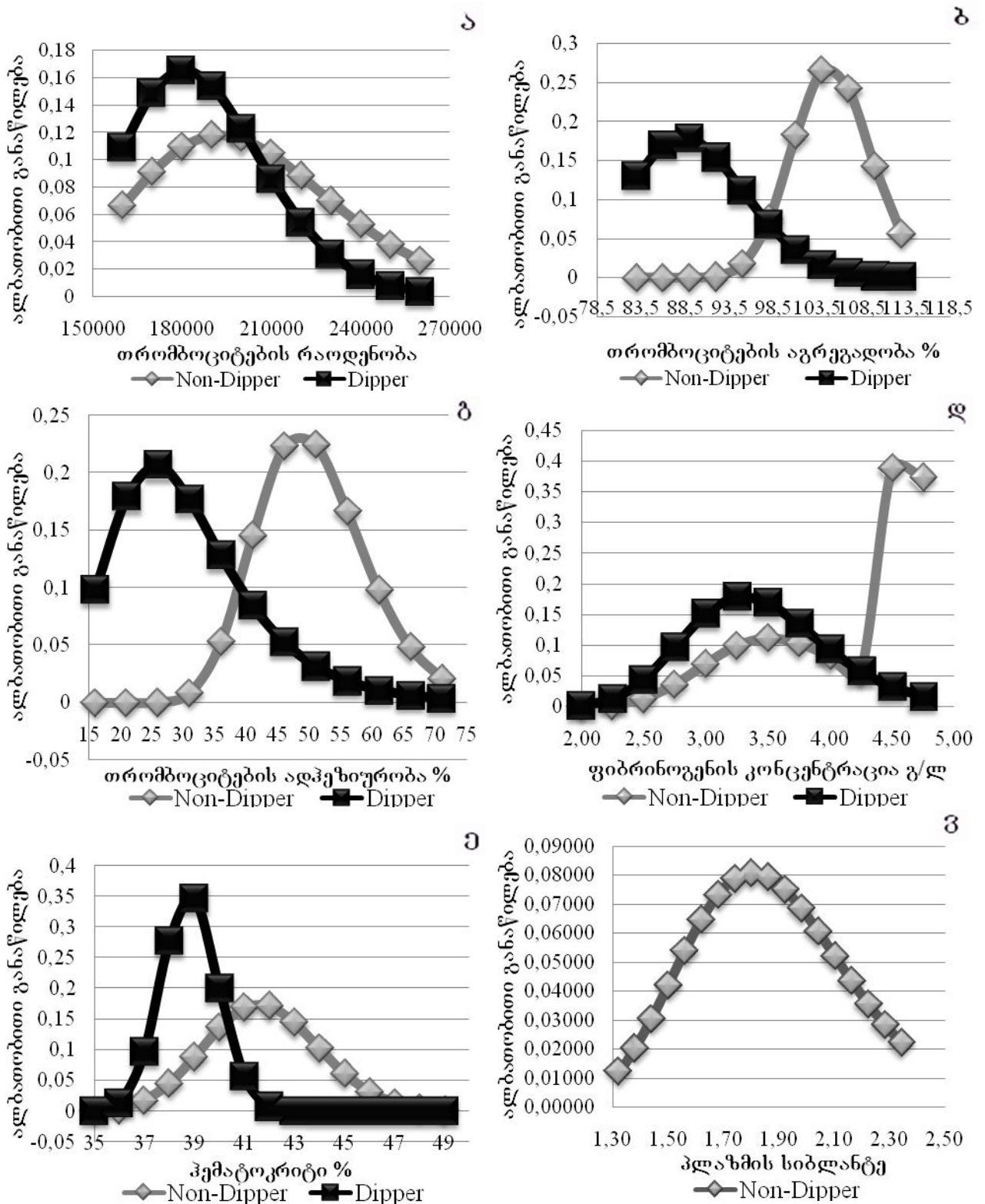
grafi kebi

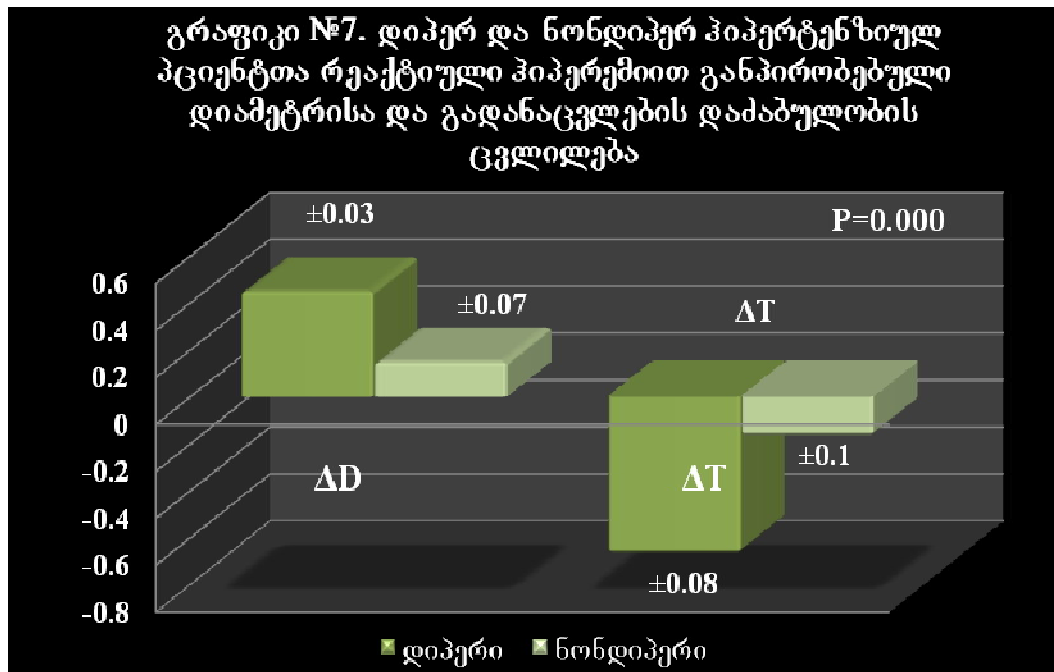
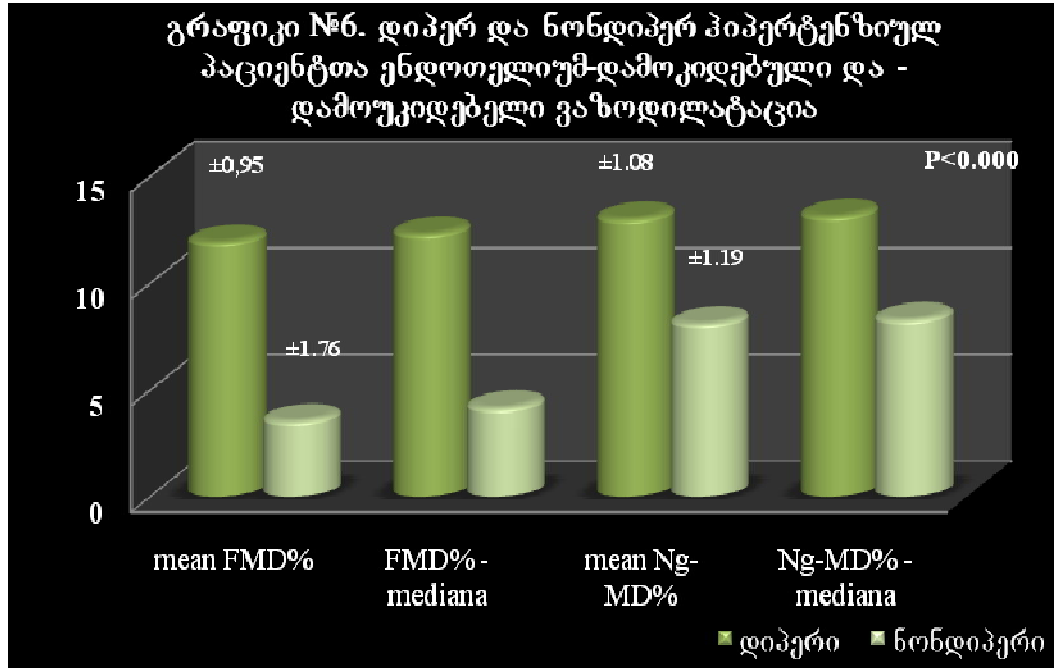


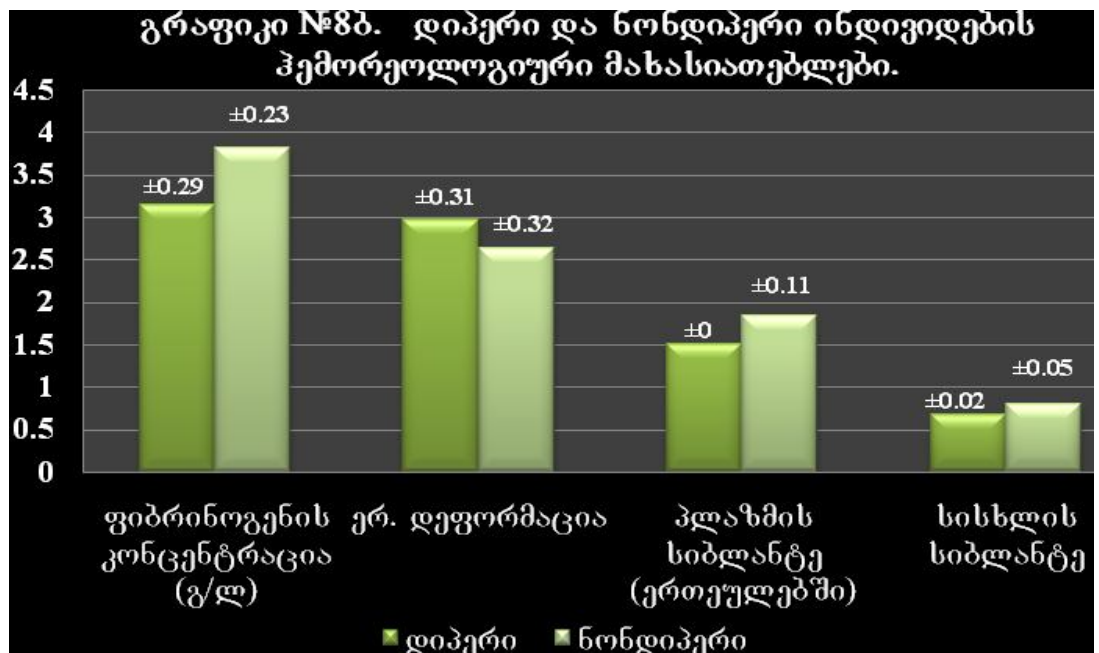
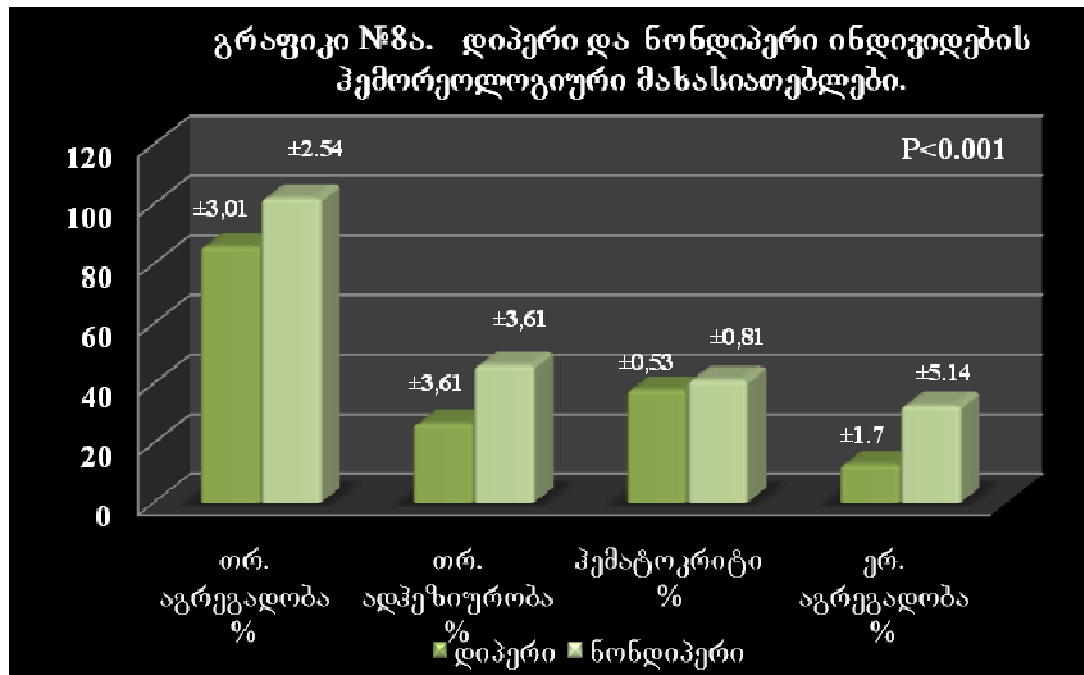




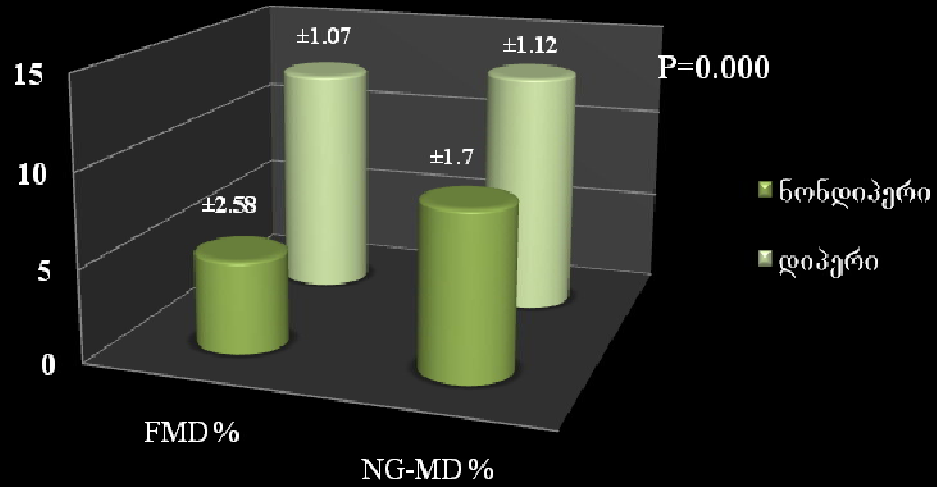
გრაფიკი 5. ჰემორეოლოგიური პარამეტრების განაწილება დიპერ და ნონდიპერ პაციენტებში.



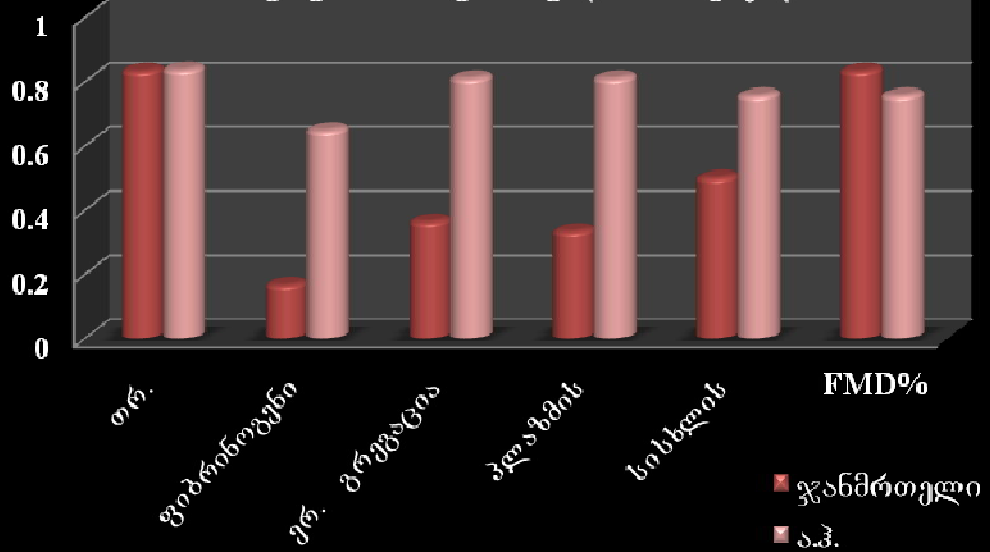




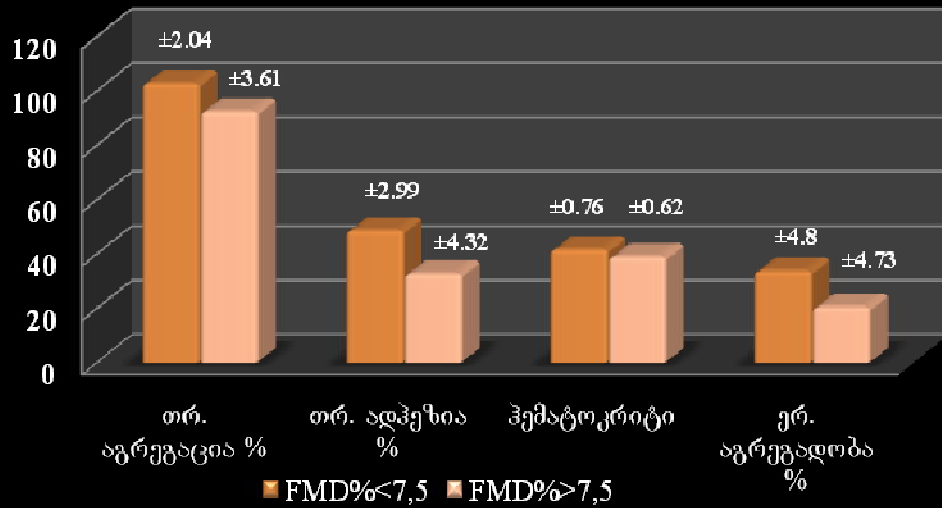
გრაფიკი №9. ენდოთელიუმ-დამოკიდებული და ენდოთელიუმ-დამოუკიდებელი დილატაცია დიპერ და ნონდიპერ ინდივიდებში.



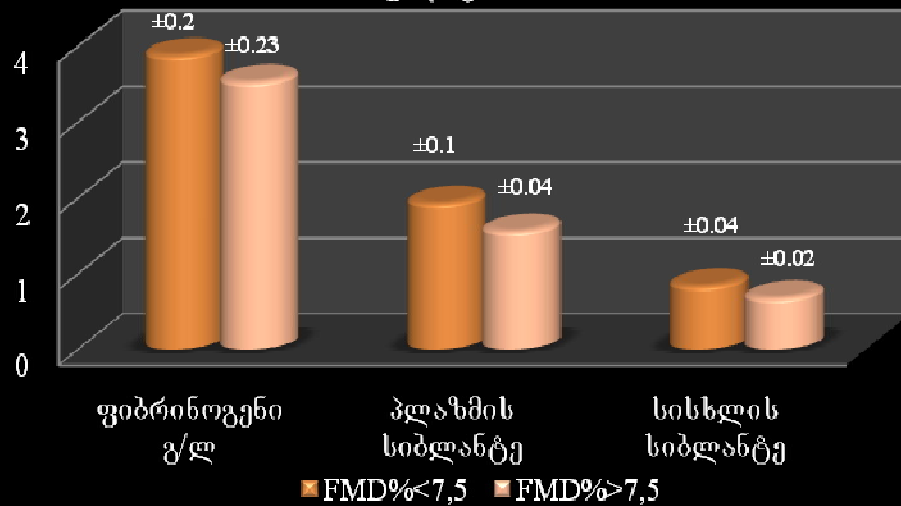
გრაფიკი №10. ნონდიპერი პროფილის პოზიტიური პროგნოზული მნიშვნელობა.



გრაფიკი №11ა. სისხლის ჰემორეოლოგიური მახასიათებლები სხვადასხვა FMD%-ის მქონე პოპულაციაში.



გრაფიკი №11ბ. სისხლის ჰემორეოლოგიური მახასიათებლები სხვადასხვა FMD%-ის მქონე პოპულაციაში.



damateba 1.

kl inikuri mdgomareobani, romel Ta dros rekomendirebul ia sisxi s wnevis ambul atoriul i monitoringis Catareba - JNC 7-is mixedvi T

- TeTri xal aTis" hipertenziis gamosaricxad pacientebSi, axl ad diagnostirebul i hipertenziiTa da samizne organoebis dazianebis ar arsebobiT;
- medikamentebis mimarT rezistentobis dros (e.w. ofisis rezistentoba);
- antihipertenziul i mkurnal obisas hipotenziis simptomebis gamovl enisas;
- epizoduri hipertenzia;
- autonomiuri disfunqcia.

ambul atoriul i sisxi s wnevis monitoringis Catarebis Cvnebebi ESH/ESC 2007-is mixedvi T

- erTidaigive an sxvadasxva vizitis dros ofisis wnevis mniSvnel ovani variabel oba;
- maRal i ofisis wneva pcientebSi, romel Tac ar gaaCniaT dabal i saerTo kardiovaskul uri riski;
- didi Seusabamobis arsebobisas ofisisa da saxl is wnevis gazomvaTa monacemebs Soris;
- aRiniSneba/mosal odnel ia medikamentebis mimarT rezistentoba, gansakuTrebiT moxuc da diabetian pacientebSi;
- momatebul i ofisis wnevis mqone orsul qal ebSi, mosal odnel i pre-ekl amfsiis ganviTarebis al baTobis gamo;
- namkurnal eb da aranamkurnal eb pacientebSi kardiovaskul uri riskis prediqciis gasaumj obesebl ad.

damateba 2. eqspertTa rekomendaciebi arteriuli wnevis
ambulatoriuli monitoringis Catarebis Sesaxeb

(ESH/ESC 2007 wli is gaidlinis mixedvit)

- awam-is miznit gamoyenebul unda iqnas mxolod is aparatebi, romlebic srulad Seesabameba saertasoris standartizaciis protokolis;
- gazomvisas gamoyenebul unda iqnas Sesabamisi zomis manjeti. amastan monitoringis procesis dawyebamde unda moxdes aw-is monitorit gazomili cifrebis gadamowmeba vercxli swylis manometri gazomil monacemebtan. sxvaoba ori metodit gazomil wnevas Soris ar unda aRematebodes 5 mm.vwy.sv.-s.
- avtomaturi gzmvebis sixsiris programirebisas, gazomvatasorisi interval ebis xangrzi ivoba ar unda aRematebodes 30 wuts;
- manjetidan haeris avtomaturi gamotumbvis sicqare ar unda aRematebodes 2 mm.vwy.sv.-s wamsi;
- patients unda mieces instrucia, rom monitorirebis periodsi icxovros Cveuli rejimit dasualod gazomvis procesi xeli gaaceros gasil umozrao mdgomareobasi. patients unda metitos, rom gamokvl evis periodsi aucil ebelia driuris warmoeba, sadac Cainisnavs driur aqtivobas, zil is xangrzi ivobasa da xarixs, ucveul o simptomtikas das.
- im semtxvevasi, tu gazomvata dasesabamisad canawertaraodenoba naklebia 70%-ze, patienti sawiroebs ganmeorebiti gamokvl evis Catarebas; amastan, yuradreba unda mieqces artefaqtebis raodenobas drisa da Ramis ganmavl obasi, val idurobisatvis isini Tanabrad unda iyos gadanawil ebuli drisa da Ramis periodze;
- ambulatoriuli sisli is wneva Cveulebriv ramdenime milimetri vwy.sv. ufro dabal ia ofisis anu klinikuri gazomvit mirebul SedegTan Sedarebit;
- klinikuri Sefaseba metwil ad damokidebul ia 24-saatian dasual o wnevasa da wnevis dRe-Ramur variabel obaze.

damateba 3.

rekomendaciebi arteriuli wnevis gazomvis Sesaxeb ESH/ESC 2007 wl is gaidl ainis mixedvit.

- wnevis gazomvamde pacienti unda ijdes wynar oTaxSi ramdenime wuTis ganmavl obaSi;
- wneva unda gaizomos sul mcire orjer 1-2 wuTiani Sual edebiT. im SemTxvevaSi Tu monacemTa Soris didi sxvaobaa, aucil ebel ia mesame gazomvis ganxorciel ebac;
- gazomvebi unda ganxorciel des standartul i manJetiT (12-13 sm. sigrZisa da 35 sm. siganis); saWiroebis SemTxvevaSi didi an mcire zomis manJetebiT;
- manJeti unda Seesabamebodes gulis dones Tavisi lokalizaciIT, miuxedavad pacientis poziciisa;
- sistoluri da diastoluri wnevis gansazRvrisaTvis gamoyenebul unda iqnas korotkovis pirveli da mexuTe toni, Sesabamisad;
- pirveli vizitis dros wneva gazomil unda iqnas orive xelze, SesaZlo periferiuli vaskuli daavadebis gamosaricxad. gansxvavebis SemTxvevaSi mniSvnelobaeniWebaim xel s, romel zec ufro maRali cifrebi dafiqsirda;
- wnevis gazomva moxucebSi, diabetian pacientebSi, da posturuli hipotenziis mqone pirebSi unda gaizomos arteriuli wneva fexze dgomidan 1 da 5 wuTis Semdeg;
- guliscemis sixSire pulsis pal paciIT daTvlili unda iqnas minimum 30 wamis ganmavl obaSi arteriuli wnevis meore gazomvis Semdeg.

damateba 4.

awam-is rekomendaciaTa kerbul i, SemuSavebul i University of Iowa Family Care Center-is mier [129]:

- awam-is dayeneba wynar oTaxSi 15 wuTiani rel aqsaciis Semdeg;
- mowyobil obis gadaprogrameba saWiro gazomvaTa sixSiris misaRebad;
- tradiciul i vercxl iswyl is sfigmo-manometriT patientis orive xel ze arteriul i wnevis gazomva. Tu wnevaTa Soris sxvaoba ar aRemateba 10 mm.vwy.sv., ambul atoriul i arteriul i wnevis monitoris manJeti Tavsdeba aradominantur xel ze; xol o im SemTxvevaSi, roca xel Ta Sorisi wnevis sxvaoba aRemateba 10 mm.vwy.sv., manJeti Tavsdeba im xel ze, romel zec ufro maRal ia sixl is wneva;
- kvl evisas gamoyenebul unda iqnas Sesabamisi zomis manJeti;
- patients sityvierad unda miwodos informacia da gadaeces weril obiTi instruqcia Tu rogor unda moiqces gazomvis periodSi (kerZod, gaaCeros xel i umoZraod gul is simaRl eze), Zil is dros (datovos CarTul i aparati), aparatis moxsnisa da gamorTvis Sesaxeb;
- sacdel i gazomva Catarides patientis TandaswrebiT, raTa Semowmdes aparatis muSaobis sizuste;
- patientis momzadeba;
- patients miwodos zepiri informacia imis Sesaxeb, Tu ramdenad xSirad moxdeba arteriul i wnevis gazomva, saWiroebis SemTxvevaSi rogor Caataros damatebiTi gazomva da a.S.;
- patients unda gaaCndes sakontaqto piris koordinatebi, raTa saWiroebis SemTxvevaSi advil ad SeZl os masTan kontaqti;
- patients unda mieces rekomendacia, rom 24 saaTis, anu gamokvl evis periodSi awarmoos dRiuri, sadac maqsimal uri sizustiT Caweril i iqneba gaRviZebis, daZinebis, fizikuri aqtivobis, medikamentis miRebis, kvebis, raime saxis simptomis da a.S. gamovl enis dro;
- monacemTa anal izi, daskvna da kardiol ogis konsul tacia.

damateba 5.

awam-is dros dafiqsi rebul i sazi ano maCvenebl ebi [249]:

- dRis systol uri wneva >135 mm.vwy.sv.
- dRis diastol uri wneva >85 mm.vwy.sv.
- Ramis systol uri wneva >120 mm.vwy.sv.
- Ramis diastol uri wneva >75 mm.vwy.sv.
- Ramis wnevis daqvei Tebis ararseboba (systol uri wnevis daqvei Teba <10%)
- dil is hipertenzia >140/90 mm.vwy.sv.
- maRal i pul suri wneva >50 mm.vwy.sv.

damateba 6.

manJeti s zomebi mxris garSemoweril obis mixedvi T*

manJeti	mxris garSemoweril oba central ur wertil ze (santimetrebSi)
"zrdasrul i"	27-34 sm
"zrdasrul is didi"	35-44 sm
"zrdasrul is barZayis"	45-52 sm

warmodgenil i gaidl aini SemuSavebul ia Dorothee Perloff et colleagues mier (Circulation 1993;88:2460-2467).

damateba 7.

kvl evis ZiriTadi rekomendaciebi

- *yvel a hipertenziul patients Cautardes sisxl is reol ogiuri gamokvl eva, ramdenadac "birmingemis paradoqsis" pirvel adi niSnebi reol ogiaSi Cndeba;*
- *dadges sakiTxi arteriul i wnevis 24-saaTiani ambul atoriul i monitoringis Catarebis CvenebaTa gafarTovebis Sesaxeb, rameTu droul ad iqnas gamovl enil i arteriul i wnevis non-diperi cirkadul i profil i da Sefasdes prognozi;*
- *hipertenziul individebs non-diperi cirkadul i profil iT CautardeT sisxl ZarRvTa endoTel iumis funqciuri gamokvl eva, raTa ganisazRvros garTul ebaTa ganviTarebis riski da gatardes swori, mizanmimarTul i prevenciul i strategia.*