**z.xelaZe, zv.xelaZe,**

,**avadmyofTa inteleqtualuri SesaZleblobebisa da mexsierebis Seswavla kritikul mdgomareobaTa dros. kritikuli medicinis instituti,Tbilisi,saqarTvelo.**

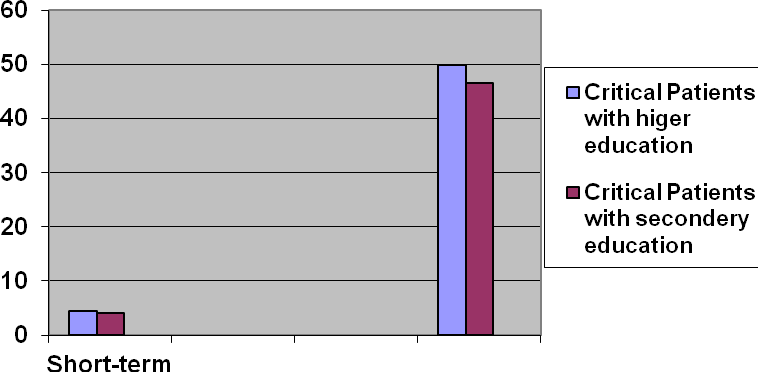
kritikuli mdgomareoba sicocxlis arsebobis iseTi formaa,rodesac es sicocxle safrTxeSia da dauyonebliv dawyebuli specialuri mkurnalobis gareSe uaxloes droSi damTavrdeba sikvdiliT. kritikul avadmyofTa umravlesoba ugono mdgomareobaSia da isini maT Tavze datexil ubedurebas ver aRiqvamen, Tumca arsebobs avadmyofTa garkveuli jgufi,romlebsac azrovneba SenarCunebuli aqvT da isini im ubedurebasac naTlad xedaven, Tu ra mdgomareobaSi imyofebian. amas gansakuTrebiT xels uwyobs maTTvis SeuCvevel garemoSi yofna,permanentuli kardiominitoruli meTvalyureoba da sxva msgavsi fsiqologiuri saxis datvirTvebi. Tumca **am fsiqologiuri problemebis** garda maT inteleqtsa da kognitur SesaZleblobebs is paTologiuri cvlilebebic azianeben,romlebic asocirdebian kritikul mdgomareobaTa dros. maT Soris upirvelesad **es aris hipoqsia, sisxlismimoqcevis ukmarisoba,endogenuri toqsemia da is sxva paTologiuri cvlilebebi**,romlebic organizmSi aRmocendebian am dros. sagulisxmoa,rom am TvalsazrisiT aseve mniSvnelovani im **medikamentebisa da sadiagnozo saSualebaTa wvlilic**,romlebic amgvari mdgomareobebis samkurnalod gamoiyeneba kritikuli medicinis klinikebSi. aqedan gamomdinare aqtualuri xdeba sicocxlisaTvis saSiS mdgomareobaTa dros adamianis inteleqtualuri SesaZleblobebis dacva amgvari zemoqmedebebisagan,Tumca manamde Tavad im faqtis dadgenaa saWiroa,Tu ra saxiT arian warmodgenilni pirovnebis inteleqtualuri SesaZleblobebis es darRvevebi kritikul mdgomareobaTa dros. amasTan xazgasmiT aris aRsaniSnavi,rom es **am mimarTulebiT warmoebuli pirveli Sromebia** da isini momavalSic saWiroeben Semdom gagrZelebas

.aqedan gamomdinare cnobiereba SenarCunebul zrdasruli asakis orive sqesis 80 kritikul avadmyofs Soris gamowvleuli iyo **xanmokle da xangrZlivi mexsiereba da inteleqtualuri SesaZleblobis** mdgomareoba.am avadmyofebSi kritikuli mdgomareoba gamowveuli iyo sunTqvis ukmarisobiT,sisxlismimoqcevis ukmarisobiT,travmebiT, sisxldenebiT da sxva imgvari paTologiuri mdgomareobebiT,romlebic uSualod Tavis tvinze emoqmedebiT ar iyvnen gamowveulni.avadmyofTa umetesoba SeZlebisdagvarad gamokvleuli iyo **klinikaSi Semosvlis pirvel saaTebSi**,maSin,rodesac standartuli samkurnalo RonisZiebebi, gansakuTrebiT servizuli momsaxurebis is saxeebi,romlebic maT kognitur SesaZleblobebze gavlenas moaxdenda jer kidev sruli moculobiT ar iyo dawyebuli.amasTan ganmeorebiT **igive avadmyofebi gamokvleluli iyvnen kritikuli mdgomreobis likvidaciis Semdeg pirvel dReebSi da momdevno eqvsi Tvis ganmavlobaSi.** sakontrolo jgufis saxiT igive kvlevebi imavdroulad utardeboda klikis TanamSromlebs-eqimebs,eqTnebs,avadmyofis momvlelebs,inJinrebsa da sxvebs. Yvela aRniSnul SemTxvevaSi responderis CarTva xdeboda maTi Tanxmobis SemTxvevaSi,maT Soris avadmyofTa Seswavlis dros savaldebulo iyo maTi patronebis Tanxmobac.

**xanmokle** mexsierebis Sesamowmeblad **responders erTi wuTis hanmavlobaSi miewodeboda oci sityva,romlebic mas unda gaexsenebia 30,0 wamis Semdeg.** Sefaseba xdeboda 20,0 quliani sistemiT da TiToeuli sityvis gaxseneba fasdeboda erTi quliT. sabolodd ki 0-4 sityvis gaxseneba iTvleboda cud Sedegad, 5-9 sityvi -damakmayofilebel,10-14 sityvis karg da 15-20 sityvis SesaniSnav Sedegad.

**xangrZlivi** mexsierebis Sesaswavlad responders erTi wuTis ganmavlobaSi aseve miewodeboda ucnobi Sinaarsis specialurad am mizniT Sedgenili teqsti,romelic **mas unda gaexsenebina naxevari saaTis Semdeg**. Sefasebisas cud Sedegad iTvleboda Tu ki responderi ver aRadgenda teqstis Sinaarsis 25%-mde monakveTs,damakmayofileblad Tu ki is aRadgenda teqstis Sinaarsis 50%-mde monakveTs, kargad,rodesac is aRadgenda teqstis sinaarsis 75%-mde monakveTs da SesaniSnavad teqstis Sinaarsis 100%-mde monakveTis aRdgenis dros.

**inteleqtis** Sefasebis mizniT responders aseve waredgineboda popularuli donis kiTxvebi samecniero sferodan.,romelTa Sesaxebac arsebuli codna maT unda warmoedginaT **momdevno 10,0 wuTis** ganmavlobaSi. Sefasebis dros 0-4 qulawarmodgenda cud Sedegs,5-9 qula damakmayofilebls,10-14 karg da 15-20 qula SesaniSnav Sedegs.



**xanmokle da xangrZlivi mexsiesrebis kvlevis Sedegebi kritikul avadmyofebSi**

kvlevis Sedegebma uCvenes,rom kritikul avadmyofebs darRveuli aqvs rogorc xangrZlivi, ise xanmokle mexsiereba,rac gansakuTrebiT mkveTrad aris gamoxatuli xanmokle mexsierebis mimarT.am TvalsazrisiTasevemniSvnelovanis is faqyi,rom gamokiTxvisdros pacientebi Tavisdauneburad xSirad ixsenebdneb soreul bavSvobaSi gadxdenil faqtebs an sakuTar cxovrebaSi momxdar im faqtebs,romlebic maTTvis sasiamovno SegrZnebebis aRmocenebasTan asocirdebodnen. samwuxarod am avadmyofebs aseve daTrgunuli aqvT inteleqtualuri SesaZleblobebic. sagulisxmoa, rom mexsierebisa da inteleqtis es deficiti amJRavnebs erTgvari gamosworebis tendencias kritikuli mdgomareobis likvidaciis Semdgom periodSi,Tumca apirveli eqvsi Tvis ganmavlobaSi kvlav sakmaod daTrgunuli moCans.

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aRniSnul SromaSi ganxilulia kritikul avadmyofebSi ,,DeJa vus” fenomenis gamovlenis Taviseburebani.. miRebulma Sedegebma SesaZloa garkveuli mniSvneloba iqonios kritikul avadmyofTa mkurnalobis procesis da reabilitaciis kursis optimaluri formiT warmarTvis procesSi.

**Materials and Methods:**Seswavlilia kritikul mdgomareobaSi myofi 40 avadmyofi. qali iyo 18, mamakaci - 22, avadmyofTa asaki meryeobda 50 –dan 90 wlamde. maT Soris 50 wlamde iyo 9 avadmyofi, 70 wlamde -25, xolo 70 wlis zeviT 5 pacienti. kritikuli mdomareobebi am avadmyofebSi asocirebuli iyo pnevmoniiT gamowveul sunTqvis mwvave ukmarisobasTan,gulis qronikul ukmarisobis gamwvavebasTan, hipovolemiur SokTan, da sxva paTologiur procesebTan. kvlevaSi specialurad ar yofila CarTuli iSemiuri insultiT,hemoragiuli insultiT,qala-tvinis mZime tramviT,meningoencefalitiT da tvinis sxva dazianebebis mqone kritikuli avadmyofebi. yvela avdmyofs SenarCunebuli hqonda cnobiereba da adeqvaturad azrovnebda.avadmyofTa umravlesobas aReniSneboda hipertonuli daavadeba,filtvebis qronikuli obstruqciuli daavadeba,Saqriani diabeti da sxva Tanmxlebi daavadebebi. am avadmyofTas mkurnaloba moicavda wylisa da eleqtrolitebis cvlis koreqcias, parenteralur da enteralur kvebas,antibaqteriul Terapias da sxva standartul RonisZiebebs.

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**Results and Discussion**:aRsaniSnavia, rom sakontrolo jgufSi gamokvleuli 10 pirovnebidan cru mogonebis Seqmna moxerxda da “DeJa vus” fenomeni Semdgarad CaiTvala 4 responderSi,rac gamokvleulTa 40% Seesabameba.a kritikul mdgomareobaSi myof pacientTa Soris ki responderTa 39%-i ver moserxda cru mogonebis Seqmna da “DeJa vus” fenomenis gamovlineba. kritikul pacientTa danarCenma 61%-ma ki saerTod ver daimaxsovra micemuli sityvebis CamonaTvali da verc gaacnobiera Tu ra davaleba mieca mas.

**Conclusion:**kritikuli mdgomareobisas pacientebs ar rCebodaT cru mogoneba da arc “DeJa vus” fenomeni aReniSnebodaT.

**z.xelaZe, zv.xelaZe,**

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**Key Words::**kritikuli avadmyofi, ,,DeJa vus”, **,Jame vus”**, cru mogoneba.

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**References:**

1.[Z.Kheladze, Zv.Kheladze, N.Kajaia, Ts.Kharaishvili Critical patients have better clairvoyance ability than their care personnel](http://www.cccmj.ge/pdfs/fulls/f_1465322827.pdf)“,“Critical Care & Catastrophe Medicine”, Tbilisi,Georgia, 2012,N15-16.

2.Z. Kheladze; G.Chkhartishvili,E. Bibiluri; Zv.Kheladze,T.Kurtsicidze “Study of Memory and intellectual assessment of critical patients.”- “Critical Care & Catastrophe Medicine”,Tbilisi,Georgia,2015,N21-22

3.Z kheladze, E. Bibiluri, G.Chkhartishvilli, Zv.Kheladze Evaluation of memory in critical patients and critical medicine personnel Critical Care Medicine Institute”, “Critical Care & Catastrophe Medicine”, Tbilisi,Georgia,2016,N25-26

4. H. I. Aizenki- “Personality and Individual Differences”.

**5. G.Chkhartishvili, E.Bibiluri, Z.Kheladze,Zv.Kheladze, T.Kurtsikidze Ability of saving new and old information during critical care conditions “Critical Care & Catastrophe Medicine”, Tbilisi,Georgia,2016.,N29-30**

**z.xelaZe, zv.xelaZe, g.CxartiSvili,e.bibiluri,**

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**Critical Care &Catastrophe Medicine,Tbilisi,Georgia,2017,31-32**

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**kritikuli medicinis instituti,Tbilisi,saqarTvelo.**

**Critical Care &Catastrophe Medicine,Tbilisi,Georgia,2017,31-32**

Seswavlilia kritikul mdgomareobaSi myofi 40 avadmyofi. qali iyo 18, mamakaci-22, avadmyofTa asaki meryeobda 50 –dan 90 wlamde. maT Soris 50 wlamde iyo 9 avadmyofi, 70 wlamde -25, xolo 70 wlis zeviT 5 pacienti. kritikuli mdomareobebi am avadmyofebSi asocirebuli iyo pnevmoniiT gamowveul sunTqvis mwvave ukmarisobasTan, gulis qronikul ukmarisobis gamwvavebasTan, hipovolemiur SokTan, da sxva paTologiur procesebTan. kvlevaSi specialurad ar yofila CarTuli iSemiuri insultiT,hemoragiuli insultiT,qala-tvinis mZime tramviT,meningoencefalitiT da uSualod Tavis tvinis tvinis dazianebebis mqone kritikuli avadmyofebi. yvela avdmyofs SenarCunebuli hqonda cnobiereba da adeqvaturad azrovnebda.avadmyofTa umravlesobas aReniSneboda hipertonuli daavadeba,filtvebis qronikuli obstruqciuli daavadeba,Saqriani diabeti da sxva Tanmxlebi daavadebebi.am avadmyofTa mkurnaloba moicavda wylisa da eleqtrolitebis cvlis koreqcias, parenteralur da enteralur kvebas,antibaqteriul Terapias da sxva standartul RonisZiebebs.

kvlevis dasawyisSi responderebs miewodebodaT Sinaarsobrivad erTmaneTTan axlo myofi 20 xvadasxva sityva, romlebTanac responders Tavisi cxovrebis ganmavlobaSi xSirad unda hqonoda Sexvedra.amasTan 24 saaTis Semdeg, responders xelaxla axsenebdnen am 20 sityvas,im pirobiT,rom am CamonaTvalSi ori nacnobi sityvis nacvlad damatebiT SehyavdaT aseve Sinaarsobrivad axlo myofi ssva orisityva,romlebTanac responders Tavisi cxovrebis ganmavlobaSi yvela sxva dasaxelebul sityvasTan SedarebiT ufro xSirad unda hqonoda Sexvedra. amis Semdeg ki responders winadadeba eZleoda ukve Tavad daesaxelebina sityvaTa am CamonaTvalisgan is sityvebi,romlebTaganac mas adre hqonda Sexvedra.,,Jame vus” fenomeni Semdgarad iTvleboda im SemTxvevaSi Tuki responderi misTvis cnobil sxva sityvebTan erTad im ori sityvisgan arcerTs ar daasaxelebda,romelsac is Tavisi cxovrebis manZilze yvelaze xSirad xvdeboda.

kvlevis Sedegebma uCvena,rom kritikuli mdgomareobisas pacientebSi ,,Jame vus” damadasturebeli testi uaryofiTia.

**Key Words::**kritikuli avadmyofi, ,,DeJa vus”, **,Jame vus”**, cru mogoneba.

**Introduction:** es kvleva SromaTa im ciklis fragmentia, romelic kritikul mdgomareobaTa fsiqologias moicavs. am problemis Seswavla pirvelad saqarTvelos kritikuli medicinis institutSi iyo dawyebuli. wina kvlevebisas, dadasturebuli iyo kritikul avadmyofTa Soris mexsierebisa da inteleqtualuri SesaZleblobebis cvlilebis sakiTxi. saxeldobr dadgenili iqna, rom kritikul avadmyofebs mkveTrad eTrgunebaT rogorc operatiuli, ise stabiluri mexsierebis sfero. (Z.Kheladze and other.2015).aseve Semcirebulia inteleqtualuri SesaZleblobebis diapazoni (Z.Kheladze and other.2016). am fonze yuradRebas ipyrobs is faqti, rom am avadmyofebs dakninebuli aqvT TavianTi mdgomareobis kritikulad aRqmis unari da gaZlierebuli aqvT momavlis winaswarmetyvelebis unari ((Z.Kheladze and other.2012). aseve dadgenili iqna, rom kritikuli mdgomareobebisas axal informaciasTan SedarebiT ufro maRalia Zveli informaciis aRdgenis xarisxi.am,asTan pozitiur informaciasTan SedarebiT. ufro maRali aRmoCnda uaryofiTi informaciis gaxsenebis albaToba (Z.Kheladze and other.2016).

aRniSnul SromaSi ganxilulia kritikul avadmyofebSi,,Jame vus” fenomenis gamovlenis Taviseburebani.. miRebulma Sedegebma SesaZloa garkveuli mniSvneloba iqonios kritikul avadmyofTa mkurnalobis procesis da reabilitaciis kursis optimaluri formiT warmarTvis procesSi.

**Materials and Methods:**Seswavlilia kritikul mdgomareobaSi myofi 40 avadmyofi. qali iyo 18, mamakaci - 22, avadmyofTa asaki meryeobda 50 –dan 90 wlamde. maT Soris 50 wlamde iyo 9 avadmyofi, 70 wlamde -25, xolo 70 wlis zeviT 5 pacienti. kritikuli mdomareobebi am avadmyofebSi asocirebuli iyo pnevmoniiT gamowveul sunTqvis mwvave ukmarisobasTan,gulis qronikul ukmarisobis gamwvavebasTan, hipovolemiur SokTan, da sxva paTologiur procesebTan. kvlevaSi specialurad ar yofila CarTuli iSemiuri insultiT,hemoragiuli insultiT,qala-tvinis mZime tramviT,meningoencefalitiT da tvinis sxva dazianebebis mqone kritikuli avadmyofebi. yvela avdmyofs SenarCunebuli hqonda cnobiereba da adeqvaturad azrovnebda.avadmyofTa umravlesobas aReniSneboda hipertonuli daavadeba,filtvebis qronikuli obstruqciuli daavadeba,Saqriani diabeti da sxva Tanmxlebi daavadebebi. am avadmyofTas mkurnaloba moicavda wylisa da eleqtrolitebis cvlis koreqcias, parenteralur da enteralur kvebas,antibaqteriul Terapias da sxva standartul RonisZiebebs.

სakontrolo jgufis saxiT Seswavlili iyo 10 zrdasruli asakis janmrTeli piri,romelTa umravlesobas kritikuli medicinis institutis TanamSromlebi Seadgendnen.

kvlevis dasawyisSi responderebs miewodebodaT Sinaarsobrivad erTmaneTTan axlo myofi 20 xvadasxva sityva, romlebTanac responders Tavisi cxovrebis ganmavlobaSi xSirad unda hqonoda Sexvedra.amasTan 24 saaTis Semdeg, responders xelaxla axsenebdnen am 20 sityvas,im pirobiT,rom am CamonaTvalSi ori nacnobi sityvis nacvlad damatebiT SehyavdaT aseve Sinaarsobrivad axlo myofi ssva orisityva,romlebTanac responders Tavisi cxovrebis ganmavlobaSi yvela sxva dasaxelebul sityvasTan SedarebiT ufro xSirad unda hqonoda Sexvedra. amis Semdeg ki responders winadadeba eZleoda ukve Tavad daesaxelebina sityvaTa am CamonaTvalisgan is sityvebi,romlebTaganac mas adre hqonda Sexvedra.,,Jame vus” fenomeni Semdgarad iTvleboda im SemTxvevaSi Tuki responderi misTvis cnobil sxva sityvebTan erTad im sityvas ar daasaxelebda,romelsac is Tavisi cxovrebis manZilze yvelaze xSirad xvdeboda.

,,Jame vus” fenomeni Semdgarad iTvleboda im SemTxvevaSi Tu ki responderi misTvis cnobil sxva sityvebTan erTad im or sityvisgan arcerTs ar daasaxelebda,romelsac is Tavisi cxovrebis manZilze yvelaze xSirad xvdeboda.

**Results and Discussion**:aRsaniSnavia, rom sakontrolo jgufSi gamokvleuli 10 pirovnebidan “ ,,Jame vus ” fenomeni Semdgarad CaiTvala 2 responderSi,rac gamokvleulTa 20% Seesabameba. kritikul mdgomareobaSi myof responderTa Soris ki , ,,Jame vus” fenomenis gamovlenis arcerTi SemTxveva ar dafiqsirebula

Conclusion:kritikuli mdgomareobisas pacientebSi,,Jame vus” fenomenis gamosavleni testi uaryofiTi aRmoCnda**.**

**References:**

1.[Z.Kheladze, Zv.Kheladze, N.Kajaia, Ts.Kharaishvili Critical patients have better clairvoyance ability than their care personnel](http://www.cccmj.ge/pdfs/fulls/f_1465322827.pdf)“,“Critical Care & Catastrophe Medicine”, Tbilisi,Georgia, 2012,N15-16.

2.Z. Kheladze; G.Chkhartishvili,E. Bibiluri; Zv.Kheladze,T.Kurtsicidze “Study of Memory and intellectual assessment of critical patients.”- “Critical Care & Catastrophe Medicine”,Tbilisi,Georgia,2015,N21-22

3.Z kheladze, E. Bibiluri, G.Chkhartishvilli, Zv.Kheladze Evaluation of memory in critical patients and critical medicine personnel Critical Care Medicine Institute”, “Critical Care & Catastrophe Medicine”, Tbilisi,Georgia,2016,N25-26

4. H. I. Aizenki- “Personality and Individual Differences”.

**5. G.Chkhartishvili, E.Bibiluri, Z.Kheladze,Zv.Kheladze, T.Kurtsikidze Ability of saving new and old information during critical care conditions “Critical Care & Catastrophe Medicine”, Tbilisi,Georgia,2016.,N29-30**

**z.xelaZe, zv.xelaZe, g.CxartiSvili,e.bibiluri,**

,,,Jame vus” **fenomenis gamovlinebis Taviseburebani kritikul mdgomareobaTa dros**

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**Correlation between transmitral early and late diastolic velocities ratio and ratio of medial mitral annulus early and late tissue doppler velocities.**

**David Maisuradze\*, A.Kistauri\*\***

**Aversi Clinic\*, Tbilsi State Medical University\*\***

**Introduction:** Echocardiography is now the most commonly used non invasive tool for the assessment of cardiac anatomy and function. In addition to commonly established roles such as confirming diagnosis, etiologic work-up, complication screening, and disease monitoring, echocardiography plays an important clinical role in prognostic assessment. Conventional echocardiographic predictors of poor outcome, such as left ventricular (LV) ejection fraction (EF) and restrictive filling pattern have recently been supplemented by tissue Doppler imaging (TDI). Tissue Doppler imaging is a robust and reproducible echocardiographic tool which has permitted a quantitative assessment of both global and regional function and timing of myocardial events (1,2,3).

Tissue Doppler echocardiography (TDE) is used in the assessment of diastolic function, however, it is unclear whether the medial (E# med) or lateral (E# lat) annulus should be used.

There have been limited studies on the use of TDE in subjects with normal systolic function.(4).Systolic Tissue Doppler Imaging (TDI) parameters are complementary tools in the

 evaluation of left ventricular (LV) systolic function, especially in patients with subtle systolic dysfunction despite preserved

LV ejection fraction(5)

Doppler tissue imaging (DTI) echocardiography is already a part of the standardized diastolic evaluation.(3) Its ability to detect early signs of cardiac disease before it is detectable by conventional echocardiography(4-9) and its strong predictive power6,(7,10-13) are encouraging.(6)

Tissue Doppler imaging (TDI) echocardiography is an advanced echocardiographic modality, which is already part of the standardized diastolic evaluation.(5) The late diastolic velocity, a′ , reflects the ventricles passive motion, which is dependent on the viscoelastic properties(8)

Echocardiographic assessment of left ventricular (LV) diastolic function is an integral part of the routine evaluation of patients presenting with symptoms of dyspnea or heart failure.

Differentiation between normal and abnormal diastolic function is complicated by overlap between Doppler indices values in healthy individuals and those with diastolic dysfunction.

The four recommended variables and their abnormal cutoff values are annular e'velocity (septal e'< 7 cm/sec, lateral e' < 10 cm/sec), average E/e' ratio > 14, LA maximum volume index > 34 mL/m2 , and peak TR velocity > 2.8 m/sec.

LV diastolic dysfunction is present if more than half of the available parameters meet these cutoff values. The study is inconclusive if half of the parameters do not meet the cutoff values .(9)Diastolic dysfunction(DDF) is a significant predictor of maior adverse cardiac events(MACE) in the general population.A number of echocardiographic parameters have been shown to reflect DDF.How to interpret these parameters has been widely discussed and numerous classification algorithms have been proposed.However ,these algorithms often leave a substantial amount of patiemts as indeterminate due to incongruent echocardiographic parameter.(10)

**Background:** Diastolic dysfunction is an early sign of the heart disease.Detecting diastolic disturbances ispredicted to be the way for early recognizing underlying heart disease.Tissue Doppler imaging(TDI) parameters has shown to be a sensitive marker to detect progressive deterioration of cardiac function in various cardiac conditions. The aim of this research was to calculate e’/a’ of medial annulus in patients with mild diastolic dysfunction and determine their diagnostic value

**Methods:** We prospectively studied (Igroup-control group) 50 adult outpatients with normal diastolic function and (II group)50 adult outpatients with grade I left ventricular (LV) diastolic dysfunction (2016 ASE/EACVI guidelines) and normal LV ejection fraction . We determined diastolic function as a I grade,using four criteria (1.Average E/e’>14,2-Septal e’velocity<7sm/sec or lateral e’velocity,10sm/sec.3-TR velocity .2.8m/s,4-LA volume or index>34ml/m2)or E/A≤0.8+E ≤50sm/secUnderwent 2D echo,including septal-lateral tissue Doppler e’/a’ ratio .Standard TTE examinations performed on a commercially available system Epiq7.To assess LV diastolic function the transmitral early (E) and late (A) wave velocities were measured by pulsed Doppler ultrasound at the mitral leaflet tips. Peak systolic (s’), and early(e’) and late(a’) diastolic velocities of the medial mitral annulus were measured by pulsed tissue Doppler imaging from the apical four-chamber view. The ratio e’/a’ was calculated. Data were expressed as mean±standard deviation. A p<0.05 was considered statistically significant. **Results:**

**I group;**The values of septal e’/a’ ratio among the studies varied from 0.9 to 2.4 (mean 1.33±o.31).p<0.00001(**image#1)**The values of lateral e’/a’ ratio among the studies varied from 1to 2.0 (mean 1.75±0.53).p<0.00001

The values of E/A ratio varied from 1 to 2.1 (mean E/A- 1.38 ±0.26).p<0.00001

Age of patients varied from 17 to 51 ,(mean age-31), n=50%,25 were male,n=50%,25 were female.(**image#2)**

**II group:** The values of septal e’/a’ ratio among the studies varied from 0.4 to 0.9 (mean 0.61±0.12),p<0.00001(**image#3**)

Mean LVEF was 56±3% (range 50%- 61%).p-0.008

The values of E/A ratio varied 0.4 to 0.9 (mean 0.61±0.12) **(image#4)**

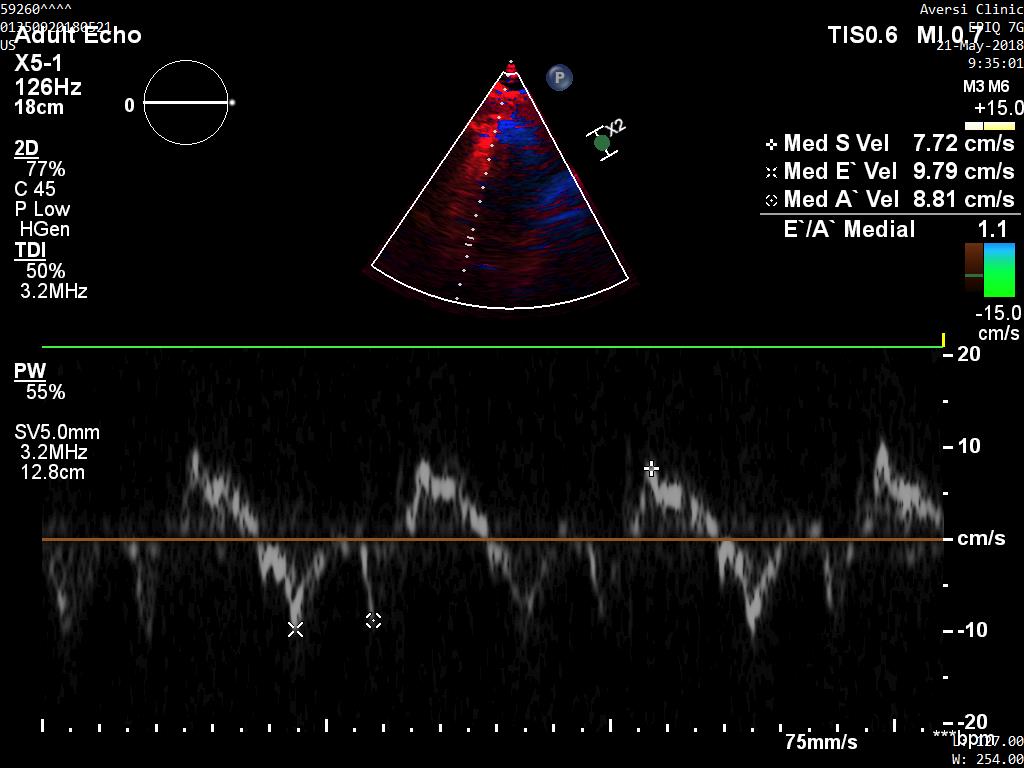
Age of patients varied from 25 to 91 ,(mean age-59.6±14),

**Conclusion:**,

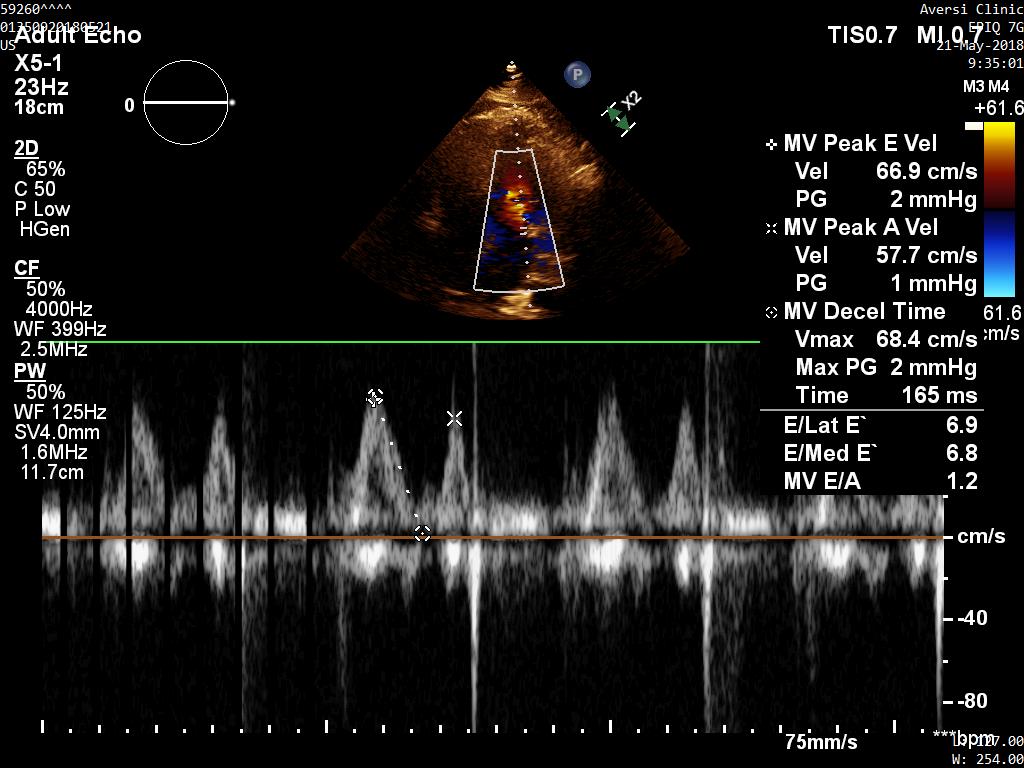
1)In patients with mild diastolic function early(e’) and late diastolic(a’) pulsed-DTI medial velocity ratio decreased compared with subjects with normal diastolic function.

2) e’/a’med. ratio has a good correlation  to  E/A ratio in patients with mild diastolic dysfunction.

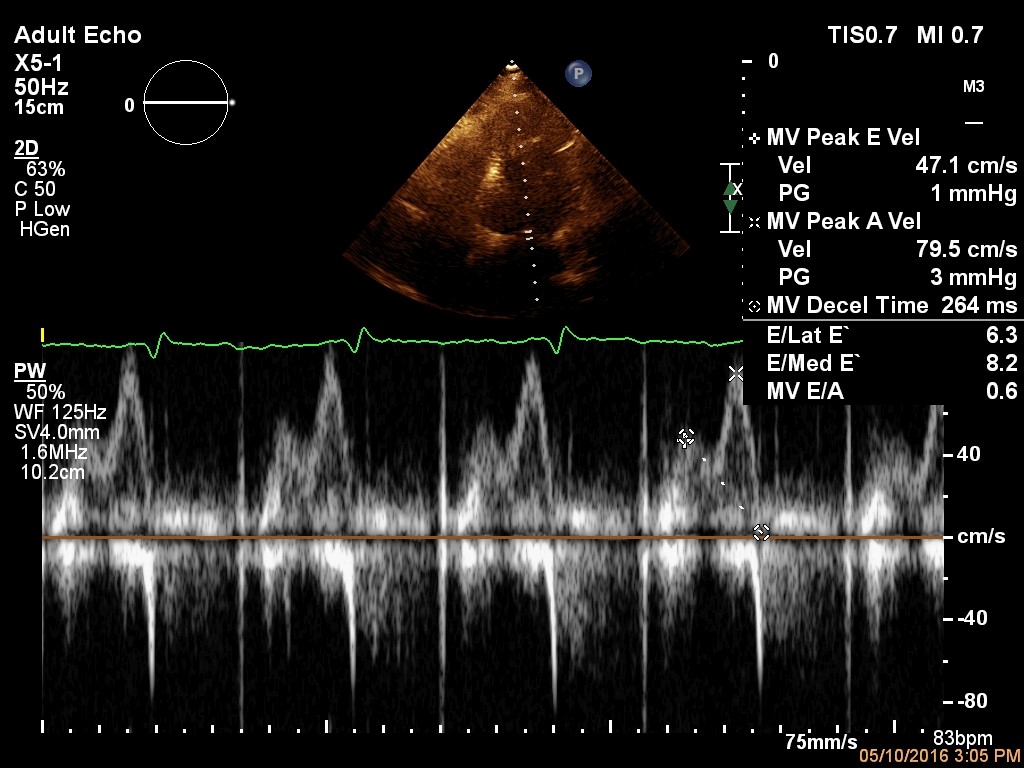
3)Future studies need to determine e’/a’med. ratio as a useful parameter to evaluate diastolic function



Image#1



Image#2



Image#3

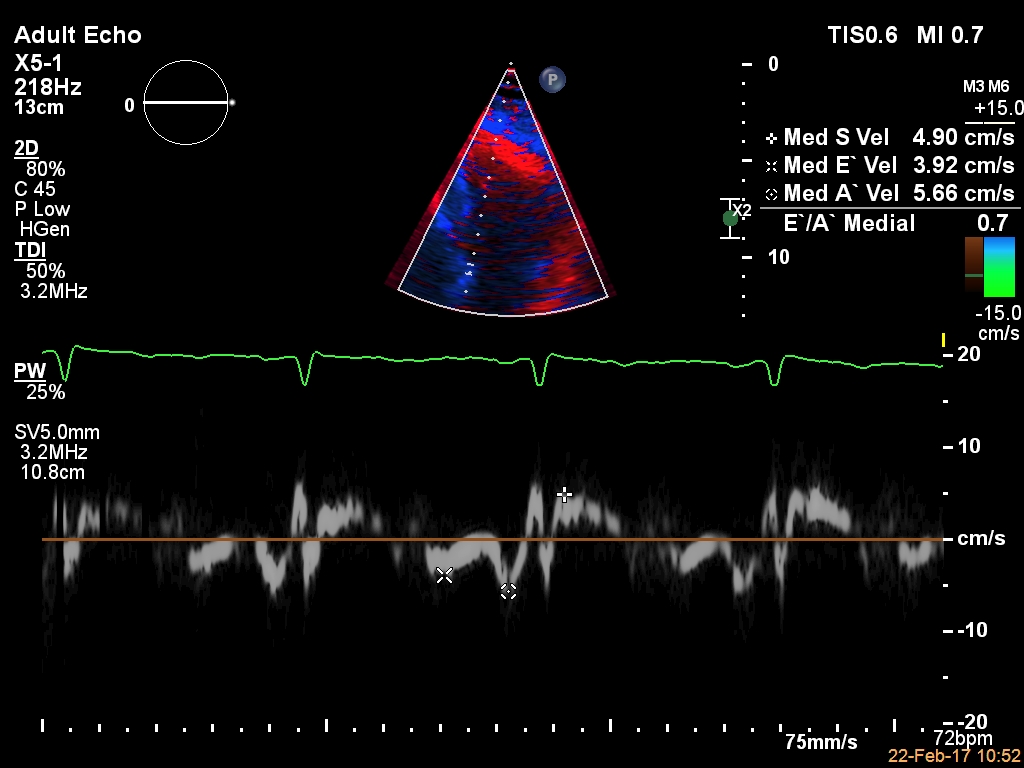


Image #4

**References**

**1.** Cheuk-Man Yu, MD, FRCP, FRACP,\* John E. Sanderson, MD, FRCP, FACC,† Thomas H. Marwick, MD, PHD, FACC,‡ Jae K. Oh, FACC. Tissue Doppler Imaging A New Prognosticator for Cardiovascular Diseases JACC Vol. 49, No. 19, 2007. .

**2.** Gorcsan J, Gulati VK, Mandarino WA, Katz WE. Color-coded measures of myocardial velocity throughout the cardiac cycle by tissue Doppler imaging to quantify regional left ventricular function. Am Heart J 1996;131:1203–1

3.Yu CM, Lin H, Ho PC, Yang H. Assessment of left and right ventricular systolic and diastolic synchronicity in normal subjects by tissue Doppler echocardiography and the effects of age and heart rate. Echocardiography 2003;20:19–27.

4. Piyush M. Srivastavaa,b, \*, Louise M. Burrella , Paul Calafioreb

Lateral vs medial mitral annular tissue Doppler in the echocardiographic assessment of diastolic function and filling pressures: which should we use?.Eur J Echocardiography (2005) 6, 97e106

**5.** S. Kou1 , L. Caballero1 , R. Dulgheru1 , C. Henri1 , I. Bensahi1 , A. Elfhal1 , G. Ferro1 , P. Lancellotti1 ,  1University Hospital of Liege (CHU), Cardiology Department ­ Liege ­ Belgium, Differences in Tissue Doppler Imaging parameters of left ventricular systolic function according to gender and age in healthy subjects. European Heart Journal ( 2014 ) 35 ( Abstract Supplement ), 288.

6. Tor Biering-Sørensen, MD, Jan Skov Jensen, MD, PhD, DMSc, Sune Pedersen, MD, PhD, Søren Galatius, MD, DMSc, Soren Hoffmann, MD, PhD, Magnus Thorsten Jensen, MD, and Rasmus Mogelvang, MD, PhD, Copenhagen, Denmar. Doppler Tissue Imaging Is an Independent Predictor of Outcome in Patients with ST-Segment Elevation Myocardial Infarction Treated with Primary Percutaneous Coronary Intervention კJ Am Soc Echocardiogr 2014;27:258-67.

7. Carstensen, MD, PhD, Linnea Hornbech Larsen, MD, PhD, Christian Hassager, MD, DMSc, Klaus Fuglsang Kofoed, MD, DMSc, Morten Dalsgaard, MD, PhD, Charlotte Burup Kristensen, MD, Jan Skov Jensen, Prof, MD, PhD, DMSc, and Rasmus Mogelvang, MD, PhD, Copenhagen, Denmark. Tissue Velocities and Myocardial Deformation in Asymptomatic and Symptomatic Aortic Stenosis.JASE,2015,03.13

8. Tor Biering-Sørensen1,2†\*, Flemming Javier Olsen1†, Katrine Storm1, Thomas Fritz-Hansen1, Niels Thue Olsen1, Christian Jøns1, Michael Vinther1, Peter Søgaard1,3, and Niels Risum1 1 Department of Cardiology, Herlev and Gentofte Hospital, University of Copenhagen, Niels Andersensvej 65, Post 835, DK-2900 Copenhagen, Denmark; 2 Department of Medicine, Cardiovascular Medicine Division, Brigham and Women’s Hospital, Harvard Medical School, Boston, MA, USA; and 3 Faculty of Medicine, Aalborg University, Aalborg, Denmark. Prognostic value of tissue Doppler imaging for predicting ventricular arrhythmias and cardiovascular mortality in ischaemic cardiomyopathy cardiomyopathy

European Heart Journal – Cardiovascular Imaging (2016) 17, 722–731 doi:10.1093/ehjci/jew066

9.Recommendations for the Evaluation of Left Ventricular Diastolic Function by Echocardiography: An Update from the American Society of Echocardiography and the European Association of Cardiovascular Imaging Sherif F. Nagueh, Chair, MD, FASE,1 Otto A. Smiseth, Co-Chair, MD, PhD,2 Christopher P. Appleton, MD,1 Benjamin F. Byrd, III, MD, FASE,1 Hisham Dokainish, MD, FASE,1 Thor Edvardsen, MD, PhD,2 Frank A. Flachskampf, MD, PhD, FESC,2 Thierry C. Gillebert, MD, PhD, FESC,2 Allan L. Klein, MD, FASE,1 Patrizio Lancellotti, MD, PhD, FESC,2 Paolo Marino, MD, FESC,2 Jae K. Oh, MD,1 Bogdan Alexandru Popescu, MD, PhD, FESC, FASE,2 and Alan D. Waggoner, MHS, RDCS1 , Houston, Texas; Oslo, Norway; Phoenix, Arizona; Nashville, Tennessee; Hamilton, Ontario, Canada; Uppsala, Sweden; Ghent and Liege, Belgium; Cleveland, Ohio; Novara, Italy; Rochester, Minnesota; Bucharest, Romania; and St. Louis, Missouri (J Am Soc Echocardiogr 2016;29:277-314

10. Niklas Dyrby Johansen, MB1; Tor Biering-Sørensen, MD, PhD2; Jan Skov Jensen, MD, PhD, DMSc1,2; Rasmus Mogelvang, MD, PhD3 1Faculty of Health and Medical Sciences, University of Copenhagen, Denmark; 2Department of Cardiology, Gentofte Hospital, Denmark; 3Department of Cardiology, Rigshospitalet, Denmark.. Diastolic Dysfunction Revisited: A New, Feasible, and Unambiguous Classification Predicts Major Cardiovascular Events EHJ-Cv(2016,17

**მარცხენა პარკუჭის სეპტალური კედლის ქსოვილოვანი დოპლერის e ’/ a’ თანაფარდობას აქვს თუ არა დამატებითი დიაგნოსტიკური მნიშვნელობა მარცხენა პარკუჭის დიასტოლური დისფუნქციის შეფასებისას?**

**დ.მაისურაძე\*, ა.ქისტაური\*\***

**ავერსის კლინიკა\*, თბილისის სახელმწიფო სამედიცინო უნივერსიტეტი\*\***

ქსოვილოვანი დოპლერის გამოსახულებამ (DTI) აჩვენა, რომ ეს მეთოდი მგრძნობიარე მაჩვენებელია გულის ფუნქციის გაუარესების შესახებ პაციენტის სხვადასხვა პოპულაციაში. ჩვენი კვლევის მიზანი იყო e ’/ a’sept თანაფარდობის გამოთვლა მსუბუქი დიასტოლური დისფუნქციის მქონე პაციენტებში და მათი დიაგნოსტიკური ღირებულების განსაზღვრა

**მეთოდები:** ჩვენ პროსპექტულად, ამბულატორიულად შევისწავლეთ 50 მოზრდილი (27 კაცი, 23 ქალი, საშუალო ასაკის 59 ± 14 წელი) მსუბუქი დიასტოლური დისფუნქციით (I კლასი) და ნორმალური LV EF.

ჩვენ გავაანალიზეთ დიასტოლური ფუნქცია სტანდარტული ექოკარდიოგრაფიით, ASE / EACVI 2016 გაიდლაინის შესაბამისად, კლინიკურ პარამეტრებთან ერთად.

E / A თანაფარდობა ≤ 0.8 პიკური E ტალღის სიჩქარით <50 სმ / წმ მიუთითებს I ხარისხის დიასტოლური დისფუნქციაზე

LV დიასტოლური ფუნქციის შესაფასებლად, ადრეული (E) და გვიანი (A) სიჩქარე იზომებოდა ულტრაბგერითი პულსური დოპლერის მოთავსებით, მიტრალური სარქვლის წვერებზე. მიტრალური რგოლის ადრეული (e ’) და გვიანი (a’) დიასტოლური სიჩქარე იზომებოდა პულსური ქსოვილოვანი დოპლერის გამოსახულებით აპიკალური ოთხი კამერიანი ხედიდან. გამოთვლილი იქნა თანაფარდობა e ’/ a’.

მონაცემები შეფასდა როგორც საშუალო ± სტანდარტული გადახრა. p <0,05 სტატისტიკურად მნიშვნელოვნად იქნა მიჩნეული

კვლევა შესრულებულია კომერციულად ხელმისაწვდომი Epiq7 სისტემაზე

**შედეგები:**

E / A თანაფარდობის მნიშვნელობები იცვლება 0.4-დან 0.8-მდე (საშუალო E / A- 0.71) - სურათი # 1

e ’/ a’ მნიშვნელობები კვლევებს შორის იცვლებოდა 0.4-დან 0.9-მდე (საშუალო E ’/ A’-0.62), სურათი # 4

EF– ის მნიშვნელობები იცვლება 50% –დან 61% –მდე (საშუალო EF-56,4%)

პაციენტების ასაკი იცვლებოდა 25-დან 91 წლამდე (საშუალო ასაკი - 59,6),

(ცხრილი # 2)

**დასკვნა:**

1) მსუბუქი დიასტოლური დისფუნქციის მქონე პაციენტებში სეპტალური ადრეული (e ’) და გვიანი დიასტოლური (a’) პულსური ქსოვილოვანი- DTI სიჩქარის თანაფარდობა <1

2) მომავალმა კვლევებმა უნდა განსაზღვროს e ’/ a’s. თანაფარდობა, როგორც დიაგნოსტიკური პარამეტრი დიასტოლური ფუნქციის შესაფასებლად

**ცხრილი#2**

-მარცხენა პარკუჭის სეპტალური კედლის ადრეული და გვიანი ქსოვილოვანი სიჩქარეების შეფარდების მაჩვენებლები მსუბუქი დიასტოლური დისფუნქციის მქონე პაციენტებში

|  |  |  |
| --- | --- | --- |
| e’/a’ სეპტ. მსუბუქი დიასტოლური დისფუნქციის მქონე პაციენტებში. **Data(N=50)** | | |
| ფაქტორი | Mean± SD | P-Value |
| ასაკი | 59.6±14 | 0.25 |
| E/A | 0.71±0.13 | <0.00001 |
| E’/A’  EF | 0.61±0.12  56.4±2.7 | <0.00001  0.008 |
| \*SD =სტანდარტული გადახრა, , p მნიშვნელოვანია<0.05,EF=განდევნის ფრაქცია | | |

**Maisuradze D\*, Kistauri A\*\*.**

**Reference values of left ventricular mechanical dispersion assessed by two-dimensional longitudinal speckle-tracking strain in normal subjects**

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**Background:**.

Left ventricular mechanical dispersion measured by two dimensional speckle tracking echocardiography (MD) is a novel strain derived parameter,that reflects temporal cardiac contraction heterogeneity and has consequently gained attention as a predictor of increased arrhythmic risk in selected cardiac diseases (1).

LV mechanical dispersion along with LV GLS may provide additional

valuable risk markers of VA and SCD in predialysis and dialysis patients.(2).

Mechanical dispersion by strain echocardiography may be a marker of ventricular arrhythmias beyond EF. Mechanical dispersion was increased in those with any arrhythmic events (nsVT or sustained VT, ) versus patients free of arrhythmic events (4).

Mechanical dispersion was pronounced in patients after TAVI. Mechanical dispersion was independently associated with mortality and could confer additional risk requiring closer postprocedural followup(5).

LV mechanical dispersion assessed by speckle tracking echocardiography increases significantly with severity of AS and is significantly associated with all-cause mortality. However, LVEF may not recover after AVR and patients may remain symptomatic. Speckle tracking echocardiographic parameters of LV shortening and mechanical dispersion have been proposed to detect LV systolic dysfunction at an earlier stage than LVEF and are related to the presence of myocardial fibrosis on cardiac magnetic resonance (6).

There is increasing interest in assessment of left ventricular mechanical dispersion but normal data are limited (3).

**Methods**: We prospectively studied, 50 adult outpatients with normal diastolic function and normal LV EF.A complete two dimensional echocardiography examination was performed,including speckle tracking with measurements of LV systolic global longitudinal strain and Mechanical Dispersion on a commercially available system Epiq7.

Time intervals from start Q/R on electrocardiogram to peak negative strain during the study were assessed. Mechanical dispersion was defined as the standard deviation of this time interval from 16 left ventricular segments, reflecting myocardial contraction heterogeneity.

p value is significant at <0.05  
**Results:** The values of GLS among the studies varied from /-16.7/ to /-24.2%/ (mean GLS= -19±1.59%), p.0.0001, (T.N1)  
The values of MD varied from 1.4 to 33.6 (mean MD-14. 4±8.5), p.0.0002(Image#1)  
The values of EF varied from 55% to 63% (mean EF-58±2.5),p.0.0004  
Age of patients varied from 16 to 52, (mean age-60.8), n=52, %, 26 were male, n=48%, 24 were female  
**Conclusion:**   
1) This study determined values of mechanical dispersion in subjects with a normal EF and normal GLS  
2) Further studies are needed to clarify the relation between mechanical dispersion and different cardiac disease



Image#1.**Mechanical dispersion measured by speckle-tracking echocardiography**

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Key words: MD-mechanical dispersion , LV-left ventricule. GLS-global longitudinal strain, VA-ventricular arrhythmia, SCD-sudden cardiac death, VT-ventricular tachycardia, TAVI-transaortic valvular intervention.

**References**

**1**.H.Rodriges-Zanella.,F.Boccalini and Co.

Dpt,of cardiac,thoracic and vascular science of Padua school of medicine,Padua,Italyr..National Iinstitute of cardiology.Mexico City,Mexico

speckle tracking

.Left ventricular mechanical dispersion measured with twodimensional.echocardiography predicts severe arrhythmic events in patients with ischemic and nonischemic

cardiomyopathy.

European Heart Journal Supplements ( 2017 ) 18

**2**. Liselotte C. R. Hensen, MD, Kathleen Goossens, MD, Tomaz Podlesnikar, MD, Joris I. Rotmans, MD, PhD,

J. Wouter Jukema, MD, PhD, Victoria Delgado, MD, PhD, and Jeroen J. Bax, MD, PhD, Leiden, The NetherlandsLeft Ventricular Mechanical Dispersion and

Global Longitudinal Strain and Ventricular Arrhythmias in Predialysis and Dialysis

Patients. J Am Soc Echocardiogr 2018;31:777-83.)

**3**.Erika N. Aagaard1,2, Brede Kvisvik1,2, Mohammad O. Pervez1,2,

Magnus N. Lyngbakken1,2, Trygve Berge2,3, Steve Enger3, Eivind B. Orstad1,

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Left ventricularmechanical dispersion in a general population: Data from the Akershus

Cardiac Examination 1950 study.

European Heart Journal - Cardiovascular Imaging (2020) 21.

**4.** Justin R. Ryan, MS,Tabitha G. Moe, MD,Randy Richardson, MD

David H. Frakes, PhDmJohn J. Nigro, MD,Stephen Pophal, MD

Phoenix Children’s Hospital,Children’s Heart Center.

Mechanical Dispersion by Strain Echocardiography: A Predictor of

Ventricular Arrhythmias in Subjects With Lamin A/C Mutations

JACC : CARDIOVASCULARIMAGING ,VOL,8,NO,1,2015

JANUARY,2015.

**5.** L G Klaeboe1, PH Brekke1, OH Lie1, L Aaberge1, KH Haugaa1, T Edvardsen1, 1Oslo University Hospital,

Department of Cardiology and Center for Cardiological Innovation, Rikshospitalet Oslo.

Prognostic value of mechanical dispersion after transfemoral aortic valve implantation.

European Heart Journal Cardiovascular

Imaging ( 2019 ) 20 ( Supplement 1 ), i705.

**6.** Edgard A. Prihadi1, E. Mara Vollema1, Arnold C.T. Ng1,2, Nina Ajmone Marsan1,

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Determinants of LV mechanical dispersion in AS

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**რეზიუმე:**

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ორგანზომილებიანი სიგრძივი დაჭიმულობის speckle-tracking მეთოდით განსაზღვრული მარცხენა პარკუჭის მექანიკური დისპერსიის ნორმული მაჩვენებლები ჯანმრთელ სუბიექტებში

ავერსის კლინიკა\*, თბილისის სახელმწიფო სამედიცინო უნივერსიტეტი\*\*

მარცხენა პარკუჭის მექანიკური დისპერსიის მაჩვენებელი,რომელიც განისაზღვრება ორგანზომილებიანი speckle tracking მეთოდით,წარმოადგენს შედარებით ახალ პარამეტრს,რომელიც ასახავს გულის კონტრაქტილობის ჰეტეროგენურობას და ყურადღებას იქცევს როგორც მომატებული არიტმიის რისკის პრედიქტორი ცალკეულ კარდიული პათოლოგიის დროს.მექანიკური დისპერსია,გლობალური სიგრძივი დაჭიმულობის მაჩვენებლებთან ერთად შესაძლებელია წარმოადგენდეს მნიშვნელოვან მარკერს პარკუჭოვანი ექსტრასიტოლიის და უეცარი კარდიული სიკვდილის პროგნოზისთვის პრედიალიზის და დიალიზის მქონე პაციენტებში. მექანიკური დისპერსიის მიმართ გაზრდილია ინტერესი,თუმცა მონაცემები ნორმული მაჩვებელების შესახებ.მწირია. კვლევის დროს ,პროსპექტულად შესწავლილი იქნა 50 მოზრდილი ჯანმრთელი სუბიექტი ,ნორმალური დიასტოლური ფუნქციით და ნორმალური განდევნის ფრაქციით. სრული ექოკარდიოგრაფიული კვლევა ,გლობალური სიგრძივი მაჩვენებლის და მექნიკური დისპერსიის მაჩვენებლების განსაზღვრით განხორციელდა ექსპერტული კლასის ფილიპსის ფირმის აპარატზე-Epiq7, p-მაჩვენებელი იყო მნიშვნელოვანი <0.05 ს დროს. ჩვენი კვლევით,მექანიკური დისპერსიის ნორმული მაჩვენებელი ,ჯანმრთელ სუბიქტებში განისაზღვრა-საშუალო -MD-14. 4±8.5 გლობალური სიგრძივი დაჭიმულობა-საშუალო--GLS-19±1.59%, განდევნის ფრაქცია-EF-58±2.5,

**Parallel study of hemorheologcal, inflammation and anemia parameters before, during and after surgery in patients with stomach cancer with splenectomy.**

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The aim of our work was to study the biomechanical markers of blood flow in patients with stomach cancer. Therefore, we paid attention to the parameters of hemorheology, rheology, inflammation and anemia in the group of patients with stomach cancer and in the control group; with the help of a new surgical technique, we simultaneously examined the flow parameters in the central blood and locally at the site of tumor growth during the operation. As a result of the matrix analysis and statistical data processing, it turned out that in the group of patients the average values ​​of hemorheological parameters went beyond the limits of the clinical norm and significantly differed from the parameters in the control group. Moreover, the parameters of inflammation and anemia also differed in the group of patients from the values ​​of the control group, but with a little difference. Consequently, the parameters of hemorheology, inflammation, and the parameters that determine the presence of anemia are variable in the local circulation as compared to the central one, mainly due to the hemorheological component.

**Keywords**: stomach cancer, hemorheology, inflammation, anemia, splenectomy.

**Introdaction**

Stomach cancer is a cancer, which develops from the lining of the stomach. There are early symptoms (heartburn, upper abdominal pain, nausea and loss of appetite) and later symptoms (weight loss, yellowing of the skin and whites of the eyes, vomiting, difficulty swallowing and blood in the stool). The cancer may spread from the stomach to other parts of the body [1]. Most of the time, stomach cancer develops in stages over years [2]. Diagnosis is usually by biopsy done during endoscopy [3]. Medical imaging to determine if the disease has spread to other parts of the body [3] follows this. Treatments may include some combination of surgery (lymphadenectomy D1/D2 with splenectomy), chemotherapy, radiation therapy and targeted therapy [3,4]. If treated late, palliative care may be advised [2]. Globally, stomach cancer is the fifth leading cause of cancer and the third leading cause of death from cancer, making up 7% of cases and 9% of deaths [5]. These data indicate the relevance of the topic. We looked at the problems in the new perspective. The aim of our work was to study the biomechanical markers of blood flow in patients with stomach cancer. Therefore, we paid attention to the parameters of hemorheology, rheology, inflammation and anemia in the group of patients with stomach cancer and in the control group.

**Materials and methods**

We examined 5 case, with stomach cancer. The diagnosis of stomach cancer was made by studying the hystopathomorphology. All patients were prescribed surgery in accordance with the medical therapeutic standard. The duration of the disease could not be identified, since the inclusion of patients in our group was carried out immediately after diagnosis. From the moment of diagnosing cancer prior to the operation, standard studies were carried out in patients, approved by the Ministry of Labor, Health and Social Protection of Georgia. All patients had positive rhesus and the first blood group. We investigated the parameters determining the rheological state of the blood, the presence of anemia and inflammation as biomechanical determinants of the blood flow. Specifically, erythrocytes aggregation index (EAI), erythrocytes deformation index (EDI), blood plasma viscosity (IBP) and HCT, ESR, WBC, FB, CRP, HGB, RBC, MCV, MCH. We investigated these parameters: 1) in patients before the surgery 48 hours during from v. cubital is; 2) during the operation in - a) the local blood flow of the patient in v. Splenic vein and b) in the peripheral circulation in v. Cubital is of a patient. 3) after the surgery 48 hours during from v. cubital is,4) 2 weeks after the surgery from v. cubital is. We investigated in analogical parameters in the simples of blood from v. Cubital is in control group. Blood from v. Cubital is blood was collected in accordance with laboratory standards. We proposed an innovative method for studying the fluidity of blood directly at the tumor growth point, in order to study the local blood flow during surgery. In this regard, we took blood locally from v. Spleen vein.. For control, we selected three healthy men of respective age and weight, with the first positive blood group, in which we conducted similar studies that were conducted in our patients before surgery. We took the informational consent in both of patients and persons in control group in accordance with the International Standards [6], the form of which was specially prepared by our organizations and approved by the Ethical Committee of the I. Beritashvili Center for Experimental Studies of Biomedicine. We used the optimized texture analysis method "Tas-plas" [7] Leits, Germany) to determine the rheological parameters. The statistical analysis was carried out by the “Origin 8.1 for IoS” statistical processing program (USA).

**Results**

Our studies showed that in the group of patients, the average values of hemorheological parameters went beyond the limits of the clinical norm and significantly differed from the parameters in the control group. The parameters of inflammation and anemia also differed in the group of patients from the values in the control group, but with a lesser percentage degree, which was unreliable as well. According to our data, the parameters of hemorheology, inflammation, and determining the presence of anemia are variable in the local circulation as compared with the central one, mainly due to the hemorheological component. The data of all parameters are in Table #1.

**Tab #1. Parameters of hemorheology, inflammation, anemia in patients group and in sontrol group. (M±m).**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Hemorheologycal Parameters** | | | | **Inflammation Parameters** | | | | **Parameters of Anemia** | | | |
| **EAI,%** | **EDI,%** | **IBV,sP** | **Hct,%** | **ESR, %** | **WBC, 109/l** | **CRP, mg/l** | **FBg/l** | **HGB,g/l** | **RBC, 10 12** | **MCV** | **MCH, g/l/hgb** |
| **Patients:**  **V.Cubitalis** | **39±3,4** | **2.2±0.05** | **1.35±0.02** | **42±3,4** | **25±2,2** | **6.6±1.1** | **7±0** | **513±23** | **121±5** | **4.84±0.1** | **88.5±2.0** | **25.03±1.1** |
| **Control: V.Cubitalis** | **28±2,5** | **2.1±0.05** | **1.2±0.02** | **43±5,4** | **8±1.0** | **4,3±1.2** | **4±0,5** | **350±53** | **95±10** | **4±1.2** | **81±1.2** | **23±2.2** |

**Discussion**

Our studies showed that before the operation in blood taken from v.cubitalis, the average values ​​of rheological parameters, parameters of inflammation and anemia in patients with cancer differed compared with the corresponding parameters of the control group, however some of them ranged within the existing clinical and therapeutic standards. We found that the average values ​​differed from each other in cancer patients during surgery, in blood samples taken from v. cubital is and spleen vein. Moreover, average values ​​of the studied parameters of blood samples taken from v. cubital is corresponded to the average values ​​of similar parameters in blood samples before the operation, which may mean that the studied factors are resistant to anesthesia and other stressors that affect the body in the operation. This speaks in favor to the tactics and algorithm of the surgical intervention itself for stomach cancer. However, our main goal was to study the biomechanical changes in the fluidity of peripheral blood and locally in the area of ​​neoplasms. In order to describe mathematically the biomechanical changes, the clinical data of which we presented in the “Results” section of this article, we reviewed the data area. This is the 12-factor set (EAI, EDI, IBV, HCT, ESR, WBC, FB, CRP, HGB, RBC, MCV, MCH) for 2 degrees of freedom (blood from v. Cubital is and blood from v. Spleen vein) in the case of n patients (5 patients). We will create matrixes [8], the elements of which will correspond to the difference between the measured parameters in the local and peripheral blood, while maintaining the y sign to all patients during the operation for: A) hemorheological parameters; B) for the parameters of inflammation; C) for parameters determining anemia in the same patients. In matrix A are following data EAIc -EAIs, when EAIc is EAIs in blood samples from v. Cubital is and EAIs is EAI in v. Spleen vein in the columns for all patients separately (the first column is patient # 1; the second column is patient # 2; the third article is patient # 3). Index “c “and “s “we used in all parameters for show, when we take blood: in V. Cubital is or V. Vein Spleen. In matrix B, data are presented EAIc -EAIs, etc. in columns for all patients individually (the first column is patient # 1; the second column is patient # 2; the third article is patient # 3). Matrix C presents data EAIc -EAIs, ect. in columns for all patients individually (the first column is patient # 1; the second column is patient # 2; the third article is patient # 3).

We make matrixes I, II, III. This is three matrixes.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| I | 10 | 1 | 1 | 5 | II | 22 | 0 | 22 | 0 | III | 3 | 0 | 2 | 0 |
| 15 | 1 | 1 | 5 | 2 | 0 | 13 | 12 | 12 | 0 | 0 | 0 |
| 8 | 1 | 1 | 12 | 10 | 0 | 31 | 85 | 20 | 2 | 0 | 2 |

We calculated the ranks of the matrixes. The rank of all matrixes equals to 3rd. Next, we laid them skeletal in AI, AII, AIII.

This is matrix I equals AI.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AI= | 10 | 1 | 1 | 5 | P= | 0 | 0 | 1 | Q= | 15 | 1 | 1 | 5 |
| 15 | 1 | 1 | 5 | 1 | 0 | 0 | 8 | 1 | 1 | 12 |
| 8 | 1 | 1 | 12 | 0 | 1 | 0 | 10 | 1 | 1 | 5 |

This is matrix II equals AII.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AII= | 22 | 0 | 22 | 0 | P= | 0 | 0 | 1 | Q= | 15 | 1 | 1 | 5 |
| 2 | 0 | 13 | 12 | 1 | 0 | 0 | 8 | 1 | 1 | 12 |
| 10 | 0 | 31 | 85 | 0 | 1 | 0 | 10 | 1 | 1 | 5 |

This is matrix III equals AIII.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AIII= | 3 | 0 | 2 | 0 | P= | 0 | 0 | 1 | Q= | 20 | 2 | 0 | 2 |
| 12 | 0 | 0 | 0 | 1 | 0 | 0 | 12 | 0 | 0 | 0 |
| 20 | 2 | 0 | 2 | 0 | 1 | 0 | 3 | 0 | 2 | 0 |

|  |  |  |
| --- | --- | --- |
| |  | | --- | |  | |  |

The rows of the single matrix are linearly independent.

The nature of the linear dependences of the matrix does not change with a random transposition of its rows or columns. According to the existing theorems of mathematical operations on matrixes, rows of a matrix are dependent only if one of them is a linear combination of the other rows and if some of the lines are linearly dependent, then all of them are linearly dependent. Consequently, if there is a zero row among the rows of the matrix, then these rows are linearly dependent, and if there are proportional rows among the rows of the matrix, then all of them are linearly dependent. Based on this, it is clearly seen that the linear dependence of the parameters exists only in the hemorheological component of blood fluidity. We will try to explain this, relying on the physiological features of the blood and its' circulation. Blood is inhomogeneous; it circulates in the systems of micro and macro-circulation, having its own patterns. The continuity of movement is provided by the pressure gradient at the ends of the vessels and resistance, which is overcome by the blood flow. Under normal physiological conditions, the blood flow is characterized by comparative constancy and compensatory adequacy. However, with all pathophysiological abnormalities, this process is disturbed. This is especially noticeable in oncological diseases, when resistance to blood flow is caused not only by changes in the composition of blood and plasma, but also by mechanical barriers. From the mechanics of blood flow point of view (not to be confused with the mechanics of blood circulation), we paid attention to the set of factors that are most important for the clinic of stomach cancer. These are hemorheological factors, factors of inflammation, factors that cause an anemic condition or, on the contrary, hyperhemoglobinemia. Blood flow is ensured by two parallel systems (on the one hand, it is rheological, and on the other hand, it is coagulative-anticoagulation). The question may arise: why we did not consider the parameters of the hemostasiogram in our work (coagulogram). As for the standards proposed for the treatment of stomach cancer, as well as other operable cancer diseases, on the day of cancer diagnosis in order to prevent operative and postoperative complications, anticoagulation therapy is prescribed to patients, regardless whether the patient’s coagulation system is impaired or not. We do not focus on coagulation mechanisms in this work, since we cannot identify them with reality in view of the anticoagulant therapy received by patients in accordance with accepted standards of treatment of such patients. However, we investigated the adjacent parameter (FIB), which is one of the anticoagulant factors that in the scientific literature is often identified with inflammatory processes [9]. Fibrinogen under the influence of exocoagulants is the most static of the parameters of hemostasiology, so it can be determined as a factor of inflammation. According to the laws of theoretical biomedicine, resistance and pressure difference at the ends of blood vessels act as a basis of blood circulation. The resistance to blood flow depends on the nature of the blood flow - turbulent or laminar. Under conditions of physiological rest in almost all parts of the circulatory system, laminar flow, i.e. a layered blood flow, is observed without turbulence and layer mixing. A plasma layer is located near the vessel wall, the speed of which is limited by the fixed surface of the vessel wall, and the layer of erythrocytes moves along the axis at high speed. The layers’ slide against each other, which creates resistance (friction) for the blood flow as a heterogeneous fluid. Shear stress arises between the layers, inhibiting the movement of the faster layer. According to our data, the parameters studied in regional networks and in the general blood circulation differed from each other. We found a particular difference in hemorheological parameters. Apparently, this is due to the diameter and angle of separation of the branch from the main artery; it may change the ratio of the volume of formed elements and plasma. This is due to the fact that in parietal blood layer there is a greater proportion of plasma, and in the axial - red blood cells, therefore, in the dichotomous division of the vessel, a smaller branch or branch that extending at a right angle receives blood with a high plasma content. The viscosity of moving blood varies depending on the nature of the blood flow and the diameter of the vessels. The length of the vessel does not have a special meaning as a factor affecting the blood flow, because we take blood directly during the operation not from the pool of the abdominal cavity, but from the leading artery. Turbulent flow is characterized by twists, while the blood moves not only parallel to the axis of the vessel, but also perpendicular. Turbulent flow is observed in the proximal sections of aorta and pulmonary trunk during the expulsion of blood from the heart, local turbulence can be created in places of branching and narrowing of the arteries, in the area of ​​sharp bends of the arteries. The movement of blood can become turbulent in all large arteries with an increase in the volumetric blood flow velocity (for example, with intensive muscular work) or with severe anemia. Turbulent movement significantly increases the internal friction of blood, and for its advancement, much more pressure is required. Hemorheological parameters in the local blood were significantly changed compared with those in the central circulation, whereas the parameters of inflammation and determining the anemic state remained equivalent locally and centrally. This suggests that from the biomechanics point of view it is the rheological parameters that are responsible for the fluidity of the blood, which determines the condition of the patient in the postoperative period. The postoperative period determines the outcome of treatment of such patients. Rheological parameters are responsible for resistance and even for the total length of the vessels. In view of the rheology laws, small-caliber vessels are often blinded, especially during pathological processes. Sometimes, on the contrary, angiogenesis occurs, anastomoses grow, new small vessels open and the length of the common network of blood vessels increases. But as we indicated above in our specific cases, the Δth length of a specific vessel can be neglected, because we take blood directly from the adducting artery during the operation. The process of taking blood directly from the artery during the operation is our technical knowhow. This is the most optimal method to monitor several body systems simultaneously at the site of tumor growth [10, 11]. Our proposed tactics do not increase the duration of the operation; the risks of complications remain unchanged. Blood circulation of the organ itself does not change due to the small size of a vessel. The obliteration of the vessel produced by us is the prevention of local bleeding, thrombosis, and stasis. It would be appropriate to continue research in this direction, to investigate a large cohort of patients, not only before/during the operation, but also in the postoperative period. We hope that our joint research of hem rheological, inflammatory parameters, as well as of the parameters that determine anemia in patients who suffer from a stomach cancer, will initiate multidisciplinary research. For the first time in this article, we were able, to determine the variability of blood flow in the central and local blood circulation during stomach cancer, by means of elementary mathematical transformations, to find out which system provides this change. Our findings are based on basic knowledge of biomedicine blood circulation in cancer diseases and are based on mathematical determinants.

**Conclusion**

You can list only a number of assumptions about the most likely stimuli and manifestations of the disease, but none of them can act separately, in each case we should speak about a complex of possible factors that have not yet been fully studied in the context of multidisciplinary biomechanics and biomedicine. In this article, for the first time, we were able to determine the variability of blood flow in the central and local blood circulation during stomach cancer, by means of elementary mathematical transformations, in order to find out which system provides this kind of change. Our findings are based on basic knowledge in the sphere such as biomedicine, blood circulation in cancer diseases and are based on mathematical determinants.

**Reference**

1. Mantskava M., Davlianidze L., Momcelidze N. Rheological properties of Blood (experimental study). <https://doi.org/10.15360/1813-9779-2014-5-27-32>
2. "Gastric Cancer Treatment (PDQ®)". NCI. April 17, 2014. Archived from the original on July 5, 2014. Retrieved July 1, 2014.
3. <http://rostgmu.ru/wp-content/uploads/2014/12/WMA_Helsinki.pdf>
4. Korotkova E., , Ivannikov A., Ognerubov N. et al. Stomach cancer: molecular biological features // Tambov University Bulletin. Series: Natural and Technical Sciences. 2014. №3. URL:https://cyberleninka.ru/article/n/rak-zheludka-molekulyarno-biologicheskie-osobennosti
5. Martynova Yu.S., Martynov A.N., Turkov V.G., Kletikova L.V. The role of proteins of the acute phase of inflammation in the pathogenesis of pyometra //Scientific notes KGAVM them
6. N.E. Bauman. 2015. №1, p.5 URL: <https://cyberleninka.ru/article/n/rol-belkov-ostroy-fazy-vospaleniya-v-patogeneze-piometry>
7. Yoshino K. Splenectomy in cancer gastrectomy: reccomendation of spleen - preserving for early stage / K. Yoshino, Y. Yamada, F. Asanuma et al. // Int. Surg. - 1997. - Vol.82. - P.150 - 154.
8. Ruddon R. Cancer biology (4th Ed.). Oxford: Oxford University Press. p. 223. ISBN 9780195175431. Archived from the original on September 15, 2015.
9. Tyrtyshnikov E. Matrix analysis and linear algebra. - Fizmatlit, 2007-01-01. - 488 p. - ISBN 9785922107785.
10. Wagner A., Syn N., Moehler M. et al. "Cochrane Database of Systematic Reviews". The Cochrane Database of Systematic Reviews. 8: CD004064. doi: 10.1002 / 14651858.cd004064.pub4. PMID 28850174., 2017
11. World Cancer Report 2014. World Health Organization. 2014. pp. Chapter 5.4. ISBN 978-9283204299
12. World Cancer Report 2014. World Health Organization. 2014. ISBN 978-9283204299.
13. დასკვნა
14. თქვენ შეგიძლიათ ჩამოთვალოთ მხოლოდ რამდენიმე ვარაუდი დაავადების ყველაძე სვარაუდო სტიმულისა და გამოვლინების შესახებ, მაგრამ არცერთ მათგანს არ შეუძლია ცალკე იმოქმედოს, თითეულ შემთხვევაში უნდა ვისაუბროთ შესაძლო ფაქტორების კომპლექსზე, რომლებიც ჯერ კიდევ არ არის ბოლომდე შესწავლილი. მულტიდისციპლინარული ბიომექანიკა და ბიომედიცინა. ამ სტატიაში პირველად ელემენტარული მათემატიკური გარდაქმნების საშუალებით, კუჭის კიბოს დროს სისხლის ნაკადის ცენტრალურ და ადგილობრივ მიმოქცევაში სისხლის ნაკადის ცვლაებადობის დადგენა მოვახერხეთ, რათა გაგვერკვია, რომელი სისტემა უზრუნველყოფს ამ სახის ცვლილებას. ჩვენი დასკვნები ეფუძნება საბაზისო ცოდნას ისეთ სფეროებში, როგორიცაა ბიომედიცინა, სისხლის მიმოქცევა სიმსივნურ დაავადეებებში და ეფუძნება მათემატიკურ დეტერმინანტებს.

**ზურაბ ხელაძე,ზვიად ხელაძე - 25 მაისი-E-mail**

**ეს რა უცნაურ ვალდებულებებს შესაძლოა ასრულებდეს ამ სამყაროში ადამიანი: საკითხები,რომელთა ცოდნა საჭიროა დაავადებათა მკურნალობისათვის (საქართველოს კრიტიკული მედიცინის ინსტიტუტი,თბილისი).**

**https://www.interacademies.org/person/zurab-kheladze**

**Zurab Kheladze**

**President of Georgian Academy of Medical Science**

**Biography**

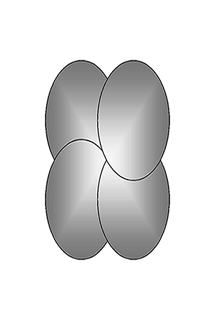
**Zurab kheladze – MD. PH.D. Full Professor. Born in 1952.He graduated of The Ozurgeti First Secondary School and of The Tbilisi State Medical University (institute) which honors. In 1983 he defended the candidate and in 1990 he studied doctoral thesis. He has undergone internship at The Albert Einstein Institute and Montefiore Medical Corporation in New-Iork, The Institute of General Reanimatology of The Soviet Union, Moscow First and Second State Medical Institutes, Kiev State Medical Institute, The Center for Catastrophe Medicine in Roma and other leading clinics in the world. From 1975 to 2015 he worked of Tbilisi State Medical University at the beginning which Chief of Anesthesiology-Reanimatology Cher’s and in later he was Chief as the Critical Care Medicine Department’s, which he is established. Also he was the head of the Rheanimatology Scientific Research Laboratory at the Tbilisi State Medical University. At the same years he was had of Anesthesiology-Reanimatologys Departments at The Georgian Central Republic Hospital and the Supervisory Board Member at The National Medical Center of Georgia. Sins 1983 years he established the reanimatiology profile clinic at The Georgian Anti-Sepsis Center, which had he has been. Since 1991 he established the Georgian Critical Care Medicine Institute, which the director is now. He is also established by the Georgian Association of Catastrophe &Critical Care Medicine which president is now. Also he is founder and Chief Editorial Editor of the Journal "Critical Care &Catastrophe Medicine” and he is founder and supervisor of the annual international symposium of Tbilisi "New Steps in Critical Care &Catastrophe Medicine”, He is one of them founder The Georgian Academy of Medical Sciences, which Vice-President he is now. Also The Association of Disaster & Critical Care Medicine of Georgia, as well as Institute of Critical Care Medicine of Georgia, which leadership he is now , considered as one of them founder The World's Global Sepsis Alliance. He was a member of the problem commission of "Reanimatology" of the Soviet Academy of Medical Sciences, Chief Specialist of the Ministry of Labor, Health and Social Affairs of Georgia in Critical Care Medicine and is currently the state expert in the Critical Care Medicine of the same Ministry, Also he was the head of the residency program and the state chairperson of the certification examination of Critical Care Medicine, chairperson of the commission for State Medical Standards of Critical Care Medicine. He is e chairperson of specialized scientific board of the defense of dissertation in Critical Care Medicine. He is author of 775 scientific works, manuals, monographs, inventions and patents. He is considered of the founders of the Critical Care Medicine technology of Georgia and he is prepared by more than 700 Critical Care Medicine doctors, the majority of them physicians working in this field of Georgia.. His guidance is preserved 15 candidate and doctoral dissertation, the authors of which are currently working in leading Critical Care Medicine Clinics in Georgia. Also he is treated by him more than 75,000 patients, including in recent years Georgia is more or less familiar with the critical condition all state or Government or Social Persons. In 1989 he headed the process of treatment of the victims during the April 9 tragedy in Tbilisi. He also headed sins the first day from the last one day to the treatment of life-threatening wrestlers in the fight for territorial integrity of Georgia.**

1. **samyaros Sesacnobad uamravi Sroma da saSualeba aris daxarjuli. samwuxarod am process arTulebs samyaros aRqmis iluzia,romlis erT-erT mizezi samyaros zomebis grandiozulobaa misi mkvlevarebis zomebTan SedarebiT. saxeldobr, samyaro 10..21sm-iT grZeli da 10.56g-iT mZimea adamianze.amasTan samyaro trilionamde galaqtikas iTvlis da mxolod Cvens galaqtikaSi as miliardze meti mzis msgavsi varskvlavia.aseve mzis masa dedamiwis masaze 1000-jer metia,xolo yvelaze didi varskvlavis “V.Y.Canina Major” diametri 2000-jer metia mzis diametrze.amasTan yvelaze uaxloesi varskvlavi “alfa centavari” 4,5 sinaTlis wliT, yvelaze axlo myofi galaqtika “andromeda” 2,5 milioni sinaTlis wliT,xolo yvelaze Soreuli varskvlavi - ”UDFY-38135539” 13,1 miliardi sinaTlis wliT aris daSorebuli dedamiwidan da “didi afeTqebidan 520 milioni wlis Semdeg warmoiqmna.aseve Cvens mSoblebs aswavlidnen,rom materiis dayofis zRvari atomia,Cven vicodiT, rom am zRvars subatomuri nawilakebi qmnian protonebis,eleqtronebisa da neitronebis saxiT,Cvenma Svilebi ki darwmunebuli arian,rom es zRvari 20-mde elementaruli nawilakia,romelTa Soris 6 kvarkia,6 leptoni da 5 bozoni. am TvalsazrisiT samyaro daaxloebiT 10.78 atoms Seicavs,romelic 90,0%,wyalbadis, 8,0% heliumis, 2,0%-mde Jangbadis da sxva elementebis atomebiT arian warmodgenili.aseve uaRresad mcirea atomis masac,romlis 99,9% birTvSia moqceuli protonebisa da neitronebis saxiT. subatomuri nawilakebidan yvelaze msubuqi eleqtronebia,romlebic atomis birTvis garSemo oTx energetikul doneze arian gadanawilebuli,magram**
3. **სამყარო**
4. **maTi”mogzaurobis” zusti grafikis amocnoba SeuZlebelia,rac kidev ufro arTulebs samyaroSi mimdinare procesebis aRqmas.miT umetes,rom qvanturi fizikis Tanaxmad es eleqtronebi talRis da nawilakis bunebas amJRavneben.amasTan isini yovelTvis iq aRmoCndebian sadac mkvlevars surs.es ki pirovnebas kvlevis “mxared” aqcevs.amitom es procesi didad aris damokidebuli pirovnebaze,ufro sworad am pirovnebis Tavis tvinze da misi ar arsebobisas is ar Sedgeba. am TvalsazrisiT Tavis droze a.ainStainsa da n.bors Soris warmarTuli kamaTi a.ainStainis cnobili fraziT “RmerTi kamaTels ar TamaSobs” damTavrda. a.ainStaini swamda,rom eleqtroni aris iq,sadac obieqturi realobisgan gamomdinare unda imyofebodes. movlenaTa Semdgomma msvlelobam ki simarTled n.boris alternatiuli mosazreba miiCnia,romelmac kidev ufro idumali gaxada yovelive. samyaros Secnobas aseve arTulebs sinaTlis sxivis siCqarisASezRuduli xasiaTi, romelic miuxedavad imisa,rom dRemde aRricxuli yvelaze**
5. **შემოქმედი**
6. **maRali siCqarea,samyaros zomebTan SedarebiT mainc ukmarisi Cans.saxeldobr,mzis sxivis dedamiwamde moRwevas 8 wuTi sWirdeba,uaxloesi varskvlavebisgan wamosul sinaTles ki mxolod 10-12 wlis Semdeg aRviqvamT.amitom is rac Cven yovel saRamos dagvnaTis Tavze warsulia da ara awmyo. amasTan es cudad danaxuli warsulia,radganac varskvlavebidan wamosuli sinaTle yovelTvis sworxazovnad ar vrceldeba da gravitaciis gamo didi galaqtikebisken miidrikeba.aseve samyaroSi arsebuli xiluli materia mxolod mTeli materiis 5%-s Seadgens da am materiis 95%-i warmodgenilia “bneli energiisa”(24%) da“bneli materiiis”(71%) saxiT.adamianis Tvals ki dRemde maTi arc erTi nawilaki ar unaxavs. fiqroben,rom “bneli materia” galaqtikebis asaSeneblad “xaraCoebs” qmnian,xolo “bnel energias”, samyaros yvela mimarTulebiT 1,6.106 km/sT siCqariT gafarToebis mizezad miiCneven.am TvalsazrisiT, isic mniSvnelovania,rom adamians informaciis aRqma ufro xSirad mxedvelobiTi da smenis analizatorebis meSveobiT uxdeba.maTi SesaZleblobebi ki SezRudulia, radgan adamiani xedavs 30-950–herci da ismens-10-30000herci sixSiris talRebs,samyaroSi arsebuli bevri informacia ki am farglebs gareTaa. aseTive suraTs vxvdebiT cocxali samyaros Seswavlis drosac,romelSic calkeul saxeobaTa raodenoba miliards aRwevs,xolo adamianis sxeulSi daaxloebiT 40.10.12 ujredia.am ujredebidan nawlavis ujredebi icvleba 2-5 dReSi.amis gamo adamiani mxolod erTi wlis ganmavlobaSi 90-jer “icvlis” sakuTar nawlavebs,saerTod ki ki sicocxlis ganmavlobaSi adamianis organizmSi ujredebis raodenoba ramdenjerme icvleba da sikvdilis win mas dabadebidan gamoyolili ujredebis mxolod mcire raodenoba SemorCeba. aseve adamianSi 7,0.10.27 raodenobis atomia da SeuZlebelia imis gamocnobac ki “didi afeTqebis” dros warmoqmnilma am atomebma romeli usulo sagnis, mcenaris, cxovelis an adamianis organizmSi gamoiares amJamindeli “maspinZlis” sxeulSi “Casaxlebamde”. sainteresoa,rom amgvari sirTuleebis miuxedavad kacobriobam SesZlo sakmaod mwyobri swavlebis Seqmna samyaros Sesaxeb,romelic SesaZloa gavyoT a.aimnStainamdel da a.ainStainis Semdgom periodad.saxeldobr meoce saukunis dasawyisamde mecnierebaSi gabatonebuli iyo germaneli e.kantis Teoria mudmivi,ucvleli da usasrulo samyaros Sesaxeb,romelic man ingliseli i.niutonis fizikis kanonebis mixedviT Camoayaliba. e.kantis mecnieruli avtoriteti ki imdenad maRali iyo,rom samyaros es modeli yovelgvari kritikis gareSe iqna aRiarა**
8. **ა.აინშტაინი**
9. **ebuli da imasac ar aqcevdnen yuradRebas,rom am Teoriis mixedviT varskvlavebidan wamosul sinaTlis sxivebs zeca Ramis ganmavlobaSic unda gaenaTebina. e.kantis avtoritetma etyoba adamianis inteleqtualuri SesaZleblobis imgvar metrzec ki imoqmeda,rogorc es a.ainStaini iyo.zogadi fardobiTobis Teoriis Seqmnis dros mis mier warmoebuli gamoTvlebi aRniSnul modelTan winaaRmdegobaSi movida.amitom a.ainStaini iZulebuli gaxda eRiarebina,rom samyaro cvalebadia,magram man e.kantsac gauwia angariSi da miuTiTa,rom samyaro mainc umoZraod aris. is mudmivad**
11. **იცხაკ ლურია**
12. **ganicdis erTmaneTis damabalansebeli gamafarToebeli da mimzidveli Zalebis erTdroul gavlenas. am Zalebis sididis gamosaxatavad a.ainStainma “kosmosuri mudmivas” sidide SemoiRo,romelic SemdegSi uaryo.Tumca movlenaTa ganviTarebam uCvena,rom etyoba a.ainშtaini marTali iyo da “kosmosuri mudmiva” SesaZloa dRes samyaroSi gabatonebuli “bneli energiis” gamoxatva iyos. SemdegSi,rusma g.fridmanma moawoda arastacionaruli samyaros modeli da ivarauda samyaros afeTqebis meSveobiT warmoqmnis SesaZlebloba. sagulisxmoa,rom afeTqebis meSveobiT samyaros Seqmnis SesaZlebloba manamde mxolod erT adamians da isic me-14 saukuneSi hqonda gacxadebuli kabalas mimdevar icxak lurias .**
13. **გ.ფრიდმანი**
14. **saxiT. “WurWlebis mtvrevis” saxeliT cnobil traqtatSi is miuTiTebda,rom samyaro warmoSva kosmosSi momxdarma afeTqebam,romelic Secdomis Sedegad warmoiqmnao.am SemTxvevaSi unda gavixsenoT,rom msgavsi Secdomisgan Teoriuli TvalsazrisiT arc did androgenul kolaiderze Catarebuli eqsperimentebia dazRveuli da maRali temperaturis pirobebSi sinaTlis siCqariT moZravi elementaruli nawilakebis dajaxeba SesaZlebelia umarTav procesSi gadaizardos jaWvuri reaqciis saxiT,romelSic kosmosSi arsebuli yvela elementaruli nawilaki CaerTos da Sroma “arastacionaruli samyaros” Sesaxeb.Tumca termini**
16. **პლანკის დრო**
17. **samyaros dasasruli gamoiwvios. sainteresoa,rom SemdegSi afeTqebis Teoriis yvelaze myari mecnieruli dasabuTeba e.hablma moipova,romelmac teleskopis meSveobiT warmoebuli kvlevebisas uCvena galaqtikebis dedamiwidan daSorebis manZilis zrdis Sesabamisad wiTeli feris intensivobis zrda.am Teoriis umTavresi momxre ki mainc belgieli Teologi JorJ le metri aRmoCnda,romelic Semdeg papis akademiis prezidenti gaxda da romelmac gamoaqveyna“didi afeTqeba”,romliTac es Teoria monaTles, am Teoriis “dauZinebelma” mowinaaRmdegem ingliselma o.hoilma SemoiRo.”didi afeTqebis” Sesaxeb sinamdvilis dadgenaSi sagrZnobi roli Seasrula aseve aSS samuSaod gadasulma rusma g.gamovma.man pirvelma gamoTqva varaudi “cxeli AafeTqebis” Sesaxeb da“cxeli samyaros”saxeliT gamoqveynebul SromebSi daasabuTa samyaros Camoyalibebis procesis dros temperaturis TandaTanobiT Semcirebis faqti. am Teoriis aRiarebisaTvis mniSvnelovani iyo a.penzianis da r.uikilsenis mier fonuri radiaciuli gamosxivebis aRmoCenac,romelsac Cven TiTqmis yoveldRe vxvdebiT televizoris ekranis CarTvis dros.am TvalsazrisiT sagulisxmo iyo agreTve samyaroSi arsebuli wyalbadis da heliumis maragis dadgena, did adrogenul kollaiderze Catarebuli eqsperimentebi da sxva faqtebis dadgena.varaudoben,rom 13,7.10.9 wlis win afeTqda e.w. “singularul garemoSi” aRmoCenili -10.-35sm radiusis da 10.95g/sm.3 simkvrivis sferos formis ucnobi warmonaqmni,romlis drosac temperatura 10.32kelvinis Sesabamisi unda yofiliyo.**
18. **dro epoqa teqnologiuri procesi dro**
19. **0 singularob 13,7 .10.9. weli**
20. **0 — 10−43wm plankis epoqa Nnawilakebis Seqmna 13,7 .10.9. weli.**
21. **10−43 — 10−35 wm didi gaerTianebis epoqa gravitaciis gamoyofa,didi gaerTianeba,monopolebis arseboba 13,7 .10.9. weli**
22. **10−35 — 10−31 wm inflaciuri epoqa .hiperinflancia,bariogenezi 13,7 .10.9. weli.**
23. **10−31 — 10−12 wm susti eleqtruli Zalebis epoqa leptonebis,fotonebis,bozonebis,,maT Soris higsis bozonebis warmoSoba,supersimetriis darRveva. 13,7 .10.9. weli.**
24. **10−12 — 10−6 wm kvarkebis epoqa oTxive fundamenturi urTierTdamokidebuleba gancalkevebulia,kvarkebi andronebad jer ar gaerTianebulan,samyaro kvlav savsea kvark-gliuonuri plazmiT,leptonebiT da fotonebiT, susti eleqtuli simetria darRveulia 13,7 .10.9. weli.**
25. **10−6 — 1 wm andronuli epoqa androgenezi,barion-antibarionuli wyvilebis anihilacia 13,7 .10.9. weli**
26. **1 wm — 3 wT leptonebis epoqa leptonebis da antileptonebis wyvilis anihilacia,neitronebis daSla,nivTiereba gamWirvalea neitrinnosTvis 13,7 .10.9. weli**
27. **3 wT — 380 000weli protonebis epoqa heliumis nukleosinTezi,nivTiereba iwyebs dominirebas gamosxivebaze,mcirdeba samyaros gafarToebis siswrafe, samyaro naTdeba 13,7 .10.9. weli.**
28. **380 000—150 .10.6 weli bneli saukuneebi samyaro savsea wyalbadis da heliumis atomebiT,Cndeba reliqtiuri gamosxiveba, 13,55 млрд.**
29. **150 .10.6 weli — 1 10.9 weli reionizacia pirveli varskvlavebis Seqmna,kvazarebis,galaqtikebis da klastirebis Seqmna, wyalbadis reionizacia 12,7 10.9. weli.**
30. **1 .10.9weli — 8,9 10.9 weli. nivTierebebis era mzis sistemis Seqmneli kosmosuri mtveris Camoyalibeba,mzis “dabadeba” 4,8 10.9. weli**
31. **8,9 .10.9 weli — 9,1.10.9 weli dedamiwis da mzis sistemis sxva planetebis Seqmna 4,6 10.9. weli**
32. **samyaros Seqmnis qronologia**
33. **sagulisxmoa,rom “didi afeTqebis” 10-35wamze,romelic “plankis droiT” 10.-43wm-s Seesabameba imave plankis drois 10-45wm-mde monakveTSi adgili hqonda samyaros eqsponencialur gafarToebas,romelic amerikeli s.koulmenis mier kosmologiur inflaciad iqna monaTluli. drois am monakveTSi samyaros zomebi gaizarda 10.50-jer.am droisaTvis “didi afeTqebis” droindeli temperatura 10.6kelvinamde Semcirda afeTqebaSi monawile Zalebs gravitacia gamoeyo da pirvelad materiad Camoyalibda plazmis saxiT.plankis droiT 10.-53wm temperatura 10.5 kelvinamde Semcirda.es ki mZlavri da susti birTvuli Zalebis gamocalkavebiT damTavrda.plankis droiT 10.-58 wm temperatura 10.4kelvins gautolda.am etapze adgili hqonda protonebisa da neitronebis mier wyalbadisa da heliumis birTvebis Camoyalibebas.afeTqebis me-3 wuTidan moyolebuli 300000-380000 wlis ganmavlobaSi ki,maSin rodesac temperatura 3.10.3 kelvinamde daeca,eleqtronebma atomis birTvi SeboWes da nivTierebis warmoSoba ganapirobes.amave etapze eleqtronebma veRar “Seakaves” fotonebi,ris gamoc varskvlavebma cimcimi daiwyes da samyaro ganaTda. savaraudod es is reliqtiuri sinaTlea,romelsac yoveli aRdgomis dros gvigzavnian marTlmadidebel qristianebs da romlis dedamiwaze gamoCena kvanturi portaciis gziT unda xorcieldebodes.ase da amgvarad “didi afeTqebis” sawyis etapze warmoSobili wyalbadisa da heliumisgan droTa ganmavlobaSi am samyaroSi warmoiSva kosmosuri mtveri da Rrubeli,romlebic gravitaciuli Zalebis da sxva faqtorebis gavleniT Camoyalibdnen samyaroSi arsebuli “ierarqiuli kibis”-planetebis, varskvlavebis, galaqtikebis da sxva komponentebis saxiT.**
34. **დიდი აფეთქება**
35. **sagulisxmoa,rom arsebobs samyaros warmoqmnis sxva Teoriebic,magram arcerTi ar pasuxobs kiTxvebs imis Sesaxeb Tu ratom Seiqmna samyaro da ra rols asrulebs am samyaroSi adamiani? es ki umTavresi kiTxvebia da maTze pasuxis gacemisas unda gaviTvaliswinoT,rom samyaros arsebobis safuZveli energiaa.metic, samyaroSi mimdinare yovelgvari movlena energias saWiroebs da samyaros sivrceSi ar xdeba sruliad umniSvnelo saxis qmedebac ki am energiis gareSe.metic,Tu ki yovelives detalurad ganvsjiT samyaro am energiis saimedod Senaxvis da misi advilad mosaxmari formiT tranformaciis mizniT unda Seqmniliyo.samyaros damaxasiaTebeli meore umTavresi komponenti**
37. **„ცის გახსნა“**
38. **informaciaa,romelic energiasTan erTad uSualod “did afeTqebamde” arsebobda.samyaros arsebobis mesame umTavresi komponenti sivrcea.sainteresoa,rom dRemde arsebuli TiTqmis yvela mecnieruli Tu paramecnieruli Teoria samyaros Seqmnis problemas materiis “dabadebidan” iwyebs da im sivrcis warmoqmnis sakiTxi,romelSic es materiaa ganTavsebuli,uxSiresad problemis gareT rCeba.am TvalsazrisiT erTgvar gamonakliss SesaZloa “biblia” warmoadgendes,romlis mixedviTac Semoqmedis mier samyaros “dabadebis” pirvel dRes “ca da miwa” iyo Seqmnili.am SemTxvevaSi termini “ca” sivrces unda gulisxmobdes,xolo “miwa”-materias.”aseve savaraudoa,rom informacia,sivrce da materia energiis arsebobis calkeuli gamovlinebebi iyos da mis SekavSirebul formebs warmonaqmnis anu 10.-35.sm radiusis mqone sferos 10.50- jer warmoadgendnen, romelTa gaerTianebisas energiis simZlavrem**
40. **პირველი ვარსკვლავები**
41. **SesaZloa kritikul dones miaRwios da afeTqdes “didi afeTqebis”saxiT.amas ki temperaturis mkveTri momateba da “sivrcis anu cis gaxsna” mosdevs.Sedegad kolosaluri zomis energia axlad gaxsnil Caketil sivrceSi moeqceva.imavdroulad xdeba wnevis gazrda, sivrcis gafarToeba da afeTqebisas warmoSobili fantastikurad maRali temperaturis Semcireba.amis kvalobaze es kolosaluri zomis erTiani energia mcire simZlavris mqone fragmentebad nawevrdeba da usulo da sulieri materiis calkeuli komponentebis saxiT yalibdeba. samyaros mier energiis Senaxvis Sesaxeb cnoba SesaZloa miviRoT Semdegi gaTvlebidan, romelTac a.ainStainis cnobili formulis - E=mc2 modificirebuli varianti udevs safuZvlad.modificirebis Sedegad ki nacvlad sinaTlis sxivis siCqaris siswrafisa,romelic Seesabameba 299 792 458 m/wm=300000km/wm=3.10.10.sm/wm sidides da romelsac am formulis Sedgenisas gulisxmobda a.ainStaini, gamoyenebulia gamosaTvlel etapze realurad arsebuli siCqareebi.ase rom am gamoTvlisas uSualod“didi afeTqebisas” regitrirebuli energia unda Seesabamebodes Semdeg sidides: E=mc2=dvc2=dr3(s/t)2=10.93g/sm.3x(10.-35).3sm3.x(10.-35smX10.50:10.-35wm)2 sm2.wm2.= 10.88.gsm2/wm2,sadac m-afeTqebuli warmonaqmnis masaa,c–afeTqebisas ganviTarebuli siCqarea,d-afeTqebuli warmonaqmnis simkvrivea,v -afeTqebuli warmonaqmnis moculobaa,r-afeTqebuli warmonaqmnis radiusia da Seesabameba 10.-35sm, s-afeTqebuli warmonaqmnebis mier gavlili manZilia da warmodgenilia pirveladi warmonaqmnis radiusis im zomiT,romelic mas hqonda “kosmosuri inflaciisas“.es ukanaskneli “didi afeTqebidan” 10-35wm-ze ganviTarda da Tavdapirveli gadidebaSi gamoixata, rac Seexeba t-s,is am manZilis gavlis droa da rogorc aRniSnuli iyo 10.-35wm-s Seesabameba.samyaroSi amJamad arsebuli energia ki unda Seesabamebodes Semdeg sidides: E=mc2=dvc2=dr3c2= 10.-23g/sm.3 x(10.21 ). 3sm3. x(10.6).2.sm2/wm2= 10.52gsm2/wm2,sadac d-samyaros sivrcis simkvrivea amJamad, romelic 10.-23g/sm.3,v-samyaros moculobaa,romlis radiusadac SesaZloa warmovidginoT dReisaTvis yvelaze daSorebul varskvlavamde manZili,romelic rogorc aRniSnuli iyo Cvengan 13,1.10.9 sinaTlis weliT aris dacilebuli.Tu gaviTvaliswinebT,rom sinaTlis sxivi wamSi 3.10.5km-s gadis,maSin Cvenamde moRwevamde am sinaTlis sxivs unda gamoeara r=13,1.10.9**
43. **პარელური სამყაროები**
44. **sinaT.welix.3.10.10sm/wm =39,3.10.19sm.=10.21sm gza.rac Seexeba C-s,is siCqarea da mis maCveneblad aRebuli iqna samyaroSi amJamad arsebuli gafarToebis procesebis dros gamovlenili siCqare,romelic 4.10.4km/sT=1.10.6sm/wm=10.6wm-s Seesabameba. aqedan gamomdinare,energiis dRes arsebuli raodenoba gacilebiT naklebi Cans TavdapirvelTan SedarebiT da daaxloebiT 41,0%-iT aris Semcirebuli. sainteresoa,rom es winaaRmdegobaSi modis Termodinamikis kanonTan energiis mudmivobis Sesaxeb.am TvalsazrisiT SesaZloa vivaraudoT,rom energiis es danaklisi gamowveulia imiT,rom samyaros zomebi,gansakuTrebiT ki misi radiusi gacilebiT didia,vidre Cvens mier gamoyenebuli zomebia.amasTan arc is aris gamoricxuli,rom energiis es daklebuli nawili ukve gadaedina antimateriuli nawilakebis meSveobiT aSenebul Cveni samyaros mezobel simetriul samyaroSi,romelic, savaraudod,aseve „didi afeTqebisas“ unda warmoSobiliyo. amasTan momavalSi Tavisufali energiis iq Seqmnil marags daemateba Cvens samyaroSi dReisaTvis SemorCenili energiis nawili,romelic xarjvis amgvari tempis SenarCunebis SemTxvevaSi “didi afeTqebidan 35.10.9 -40.10.9 wlis Semdeg sruliad gamoileva.es ki samyaros dasasrulTan asocirdeba.samagierod mezobel antimateriul samyaroSi energia kvlav kritikul mdgomareobaSi aRmoCndeba da isev “didi afeTqebis” suraTs gamoiwvevs. Tumca am gamoTvlebis Termodinamikis kanonTan Seusabamoba SesaZloa informaciis fenomenis gauTvaliswineblobiT iyos gamowveuli.energia uxilavi sididea da mis mier gamowveul gamovlinebebs Soris umTavresia informacia, masa,siCqare, temperatura,wneva da sxva faqtorebi,romelTa mimarT misi damokidebuleba**
45. **გიგანტური მაგნიტური ტალღები დედამიწის ბირთვის გარშემო.**
46. **proporciulia.a.ainStaini albaT fiqrobda,rom am komponentebidan umTavresi materiis masa da siCqarea,radganac sxva ganzomilebebaTa cvlilebani isedac aisaxeba am ukanasknelTa cvlilebis dros.magram energiis gamovlinebis informaciuli komponentis cvlilebebis asaxva mxolod materiis masisa da siCqaris gamovlinebiT**
47. **პირველი სინათლე**
48. **SeuZlebelia.metic,informaciis gamovlinebisaTvis saWiroa moxmarebis procesi,romelic Tavis mxriv momxmareblis anu adamianis arsebobis pirobebSia SesaZlebeli.amitom adamianis faqtoris gaTvaliswinebis mixedviT zemoTaRniSnuli formula SesaZloa Semdegi saxiT iyos warmodgenili: E=imc2,sadac I-informaciis sididea,xolo m da c igive mniSvneloba aqvT, rac Tavdapirveli gamoTvlisas hqondaT. uSualod “didi afeTqebisas” arsebuli energiis gamoTvlisas unda gaviTvaliswinoT,rom am dros informacia umciresi sididis iyo da or niSans “kritikuli energia” Seicavda da 1 biTs Seesabameboda.aqedan gamomdinare samyaroSi “didi afeTqebisas arsebuli energia warmodgenili iqneba Semdegi saxiT E=imc2= 1b x10.88.gsm2/wm2= 10.88b.gsm2/wm2. samyaroSi amJamad arsebuli energiis am wesiT gamoTvlis dros umTavres sirTules informaciis sididis gamoangariSeba warmoadgens.Tumca, Tu gaviTvaliswinoT, rom “didi afeTqebis” Semdgom periodSi informaciis raodenoba progresulad izrdeboda.amitom am informaciis sidide savaraudod samyaros sivrceSi arsebuli yvelaze didi kodis mier Senaxuli informaciis raodenobaze naklebi mainc ar unda iyos.am samyaroSi yvelaze didi raodenobis informaciis Senaxvis wesi ki eleqtronis spinis mixedviT unda iyos warmodgenili. cnobilia,rom amJamad samyaroSi 10.78 erTeuli eleqtronia.maTi meSveobiT ki SesaZlebelia orjer naklebi anu daaxloebiT 10.39 biTi informaciis Senaxva. saqme is aris,rom TiToeul eleqtrons 1/2½spini aqvs da erTi eleqtronis niSani “spini zemoT” SesaZloa Seesabamebodesa + informacias, meore eleqtronis niSani “spini qvemoT ” \_” informacias,orive niSani erTad ki 1 biT informacias.ase rom am wesiT gamoTvlisas samyaroSi amJamad arsebuli energia warmodgenili unda iyos Semdegi saxiT: E=imc2=10.39b.x10.52gsm2/wm2=10.91bgsm2/wm2. es ki daaxloebiT 75,0%-iT aRemateba informaciis gaTvaliswinebis gareSe gamoTvlil samyaroSi amJamad arsebuli energiis sidides (10.52gsm2/wm2), Tumca mxolod 3,4%-iT aRemateba “didi afeTqebisas” arsebul energiis im sidides,romelic miRebuli iyo rogorc informaciis, ise informaciis gareSe gamoTvlisas (10.88b.gsm2/wm2.).es ukanaskneli ki amgvarad didi cifrebis SemTxvevaSi uaRresad mcire gansxvavebas warmoadgens. aqedan gamomdinare SesaZloa davaskvnaT,rom samyaros Seqmnisas arsebuli energia am samyaroSi dRemde “Tvalis CiniviT” iyo Senaxuli da “didi afeTqebis” Semdeg periodSi Seqmnil informaciaSi gadanawilda.Tu vivaraudebT,rom amJamindeli samyaro Zveli samyaros niadagzea aRmocenebuli, maSin amJamindeli ciklis dasasruli maSin dadgeba,rodesac samyaroSi “didi afeTqebis” Sedegad Seqmnili energia mTlianad gamoileva da informaciis saxiT transformirdeba.am droisaTvis etyoba samyaros gafarToeba Sewydeba da samyaroSi arsebuli siCqareebi erTeulis toli gaxdeba.imavdroulad samyaros sivrce daiwyebs SekumSvas da masSi arsebuli materiis masac sabolood erTeulis toli gaxdeba.Sesabamisad gaqreba sivrce da dro,agreTve samyaroSi arsebuli yvela Zala da warmonaqmni,darCeba mxolod informacia da masSi transformirebuli energia,romelis sidide imave formuliT gamoTvlisas gamoxatuli iqneba Semdegi saxiT: E=imc2= 10.88bX1,0gX1,0.2sm2/wm2= 10.88 bgsm2/wm2.amgvari kolosaluri zomis informaciaSi**
49. **მზის დაბადება**
50. **ganivTebuli energia ki etyoba kritikul zRvars miaRwevs da kvlav afeTqdeba “didi afeTqebis” saxiT da yovelive isev ganmeordeba,rogorc adre iyo da momavalSic ase iqneba. sagulisxmoa,rom samyaroSi energiis SenaxvasTan erTad etyoba am energiis gardaqmnasac aaqvs adgili.Tumca,Tu ki energiis Senaxva umTavresad aracocxali materiis meSveobiT warmoebs,energiis transformaciis procesi ZiriTadad cocxali samyaros, gansakuTrebiT ki adamianis mier unda mimdinareobdes. saqme is aris,rom sasmelis,sakvebisa da haeris saxiT cocxal organizmSi moxvedrili energia Tavdapirvelad atf-is molekulebis saxiT transformirdeba.atf-is**
52. **დედამიწის პირველი დღეები**
53. **molekulebSi ganTavsebuli es energia ki xmardeba organizmSi mimdinare procesebis energetikul uzrunvelyofas.darCenili nawili ki isev gamoiyofa garemoSi katabolizmis produqtebis da “fsiqiuri energiis” anu informaciaSi ganTavsebuli energiis saxiT,romelic warmodgenilia fiqrebis, sityvebis, mimikis, musikis,cekvis,sunis da informaciis Semcveli azris mqone sxva warmonaqmnebiT. am procesis sawyisi etapi hialoplazmaSi mimdinareobs anaerobul pirobebSi. am SemTxvevaSi erTi molekula glukozisgan 2 molekula atf-i warmoiqmneba.momdevno etapi, Sveicarieli r.kolikeris mier 1850 wels aRweril mitoqondriebSi mimdinareobs. citoplazmaSi Cayursuli progenotuli baqteriebis am warmomadgenlebma damoukideblobas prokariocitebisa da eukariocitebis ujredebSi “asocirebuli”cxovreba amjobines Jangbadis iolad aTvisebis mizniT.am mitoqondriebis SigniTa membranis “kristebis” sisqeSi Cayursuli fermentebis meSveobiT ki Jangbadis Tanaarsebobisas glukozis Jangvis saboloo etapi kidev 36 molekula atf-is warmoqmniT “mdidrdeba”.SemdegSi atf-is hidrolizis dros xdeba misi molekulidan jer adf,xolo Semdeg amf molekulis warmoqmna,romlis drosac erTi molekula atf-isgan gamoTavisufldeba daaxloebiT 60kj.=6.10.4x 0,24kal=1,44.10.4kal=10,7gsm2/wm2 energia. erTi adamianis mier erTi wlis ganmavlobaSi kosmosis sivrceSi dabrunebuli energiis raodenoba ki Seesabameba Semdeg sidides: E=MNnT-mT=10.7gsm2/wm2X2.10.3X4.10.13X8,8.10.3sT\_0.04.10.13g.sm2/wm2 X8,8.10.3sT =7.10.11 g.sm2/wm2=10.12g.sm2/wm2,sadac M-erTi mitoqondrias mier erT saaTis ganmavlobaSi gamomuSavebuli energiaa,romelic erTi molekula atf-is mier gamomuSavebuli energiis identuria da saSualod 10,7gsm2/wm2 Seesabameba.N-mitoqondriebis raodenobaa erTi ujredSi da saSualod 2.10.3 erTeuls Seadgens,n-ujredebis saerTo raodenobaa erT adamianSi da saSualod 40.10.12=4.10.13 erTeulis tolia,T-weliwadSi arsebuli saaTebis raodenobaa da 8784=8,8.10.3 saaTs Seesabameba.,xolo m-erTi adamianis mier erT saaTSi moxmarebuli energiaa,rac saSualod 4.10.3kal:24sT=0,04.10.13g.sm2/wm2 Seesabameba.msoflios janmrTelobis dacvis saerTaSoriso organizaciis monacemebiT dedamiwaze sicocxlis saSualo xangrZlioba dReisaTvis Seadgens 67,2wels.amis gamo erTi adamiani sicocxlis ganmavlobaSi gamoaTavisuflebs daaxloebiT E=10.12gsm2/wm2X67,2wels=67,2.10.12gsm2/wm2=10.14gsm2/wm2 energias.imave organizaciis monacemebiT amJamad dedamiwaze cxovrobs 7.10,9 meti adamiani,civilizaciis dasawyisidan ki,romelic saTaves etyoba 140000-240000 wlis win afrikis tramalebSi mcxovrebi “mitoqondriuli evasgan” unda iRebdes,holandieli mecnieris p.griunvaldis gamoangariSebiT cxovrobda 107.10,9 adamiani.amitom dRevandel adamianTa Taoba sicocxlis ganmavlobaSi gamoaTavisuflebs E=10.14gsm2/wm2X7.10.9.=7.10.23 gsm2/wm2=10.24 gsm2/wm2 energias,xolo “Wkviani adamianis civilizaciis” mier sicocxlis ganmavlobaSi gamoTavisuflebuli energia savaraudod unda**
54. **გზა წარსულისკენ**
55. **SeesabamebodesE=10.14gsm2/wm2X107.10.9.=107.10.23gsm2/wm2=10.26gsm2/wm2. es ukanaskneli ki warmoadgens samyaroSi arsebuli informaciis saerTo raodenobis 66,6%-s,romelic Cveni gamoTvliT 10.39.b-s Seadgens. es SesaZloa mianiSnebdes,rom civilizaciis mier gamomuSavebuli es energia SeqmnaSi erTgvari wili maTac udevT. ZiriTadad mis mierve Seqmnilma informaciam “SeboWa”. TavisTavad cxadia,samyaroSi arsebuli danarCeni energia etyoba “gamoimuSaves” cocxali samyaros sxva warmomadgenlebma mikrobebis, mcenareebis, cxovelebis da sxvaTa saxiT.ar aris gamoricxuli,rom cocxali samyaros sxva warmomadgenelTa mier gamomuSavebuli es energiac samyaroSi arsebuli informaciis darCenil nawilSi iqna ganTavsebuli. samyaros Seswavlisas STabeWdileba rCeba,rom adamianis energiis advilad mosaxmar formad transformaciis garda “mayureblis” funqciasac unda asrulebdes.es termini,romelic qurduli samyaros realobidan iqna aRebuli am SemTxvevaSi adamianis mier samyaros Senobis “mdgradobis” SesanarCuneblad Tvalyuris midevnebaSi gamoixateba. yoveli adamianis survilia sikvdilis gadavadeba da sicocxlis gaxangrZliveba,romelic mis qvecnobierSia „CabeWdili“da misi sxva yovelgvari qcevis ganmsazRvrelia. sicocxlis gaxangrZlivebis survilis Sesasruleblad ki upirvelesad is saxli unda idges myarad,romelSic TviTon adamiani cxovrobs.adamianis “saxli” ki samyaroa.xolo samyaros myarad arsebobisaTvis saWiroa misi amSenebeli atomebi, subatomuri warmonaqmnebi da elementaruli nawilakebi zustad im adgilas idgnen,romelic misi mdgradobisTvisaa aucilebeli. es ki etyoba imis meSveobiT xorcieldeba,rom eleqtronebi yovelTvis iq dganan, sadac adamians surs.adamians ki surs,rom eleqtronebi mxolod misi sicocxlis gaxangrZlivebisTvis aucilebel adgilas idgnen.aqedan gamomdinare,adamianis qvecnobierSi „Cawerili“ primatuli survili sicocxlis gaxangrZlivebis Sesaxeb dafaruli formiT igive samyaros mdgradobis SenarCunebis survilia.ase rom, Tu ki energiis kritikuli mdgomareoba samyaros Seqmnis safuZvelia,sicocxlis kritikuli mdgomareoba samyaros mdgradobis aucilebel pirobaa. es yvelaferi miT ufro sarwmunoa,Tu gaviTvaliswinebT,rom survils uaRresad didi Zala gaaCnia da misi SemweobiT qristem lazare gaacocxla,xolo mosem nilosis talRebi gaapo Suaze.azris materializebis naTel dadasturebas “eqimTan vizitis” da “placebos” efeqtic warmoadgens.pirvel SemTxvevaSi pacientTa umetesoba ukeTesad grZnobs Tavs eqimTan vizitis Semdeg,Tundac am eqimis mier gamowerili wamlis miReba SesaZlebelia jer dawyebulic ar hqondes.meore SemTxvevaSi pacientTa umetesoba ukeTesad grZnobs Tavs wamlis saxelis mqone indiferentuli ingredientis miRebis Semdeg. ase rom azris materializebis SemweobiT adamians realurad SeuZlia monawileoba miiRos samyaros mdgradobis procesebSi.aqedan gamomdinare ar aris gamoricxuli,rom adamianebi samyaroSi arsebuli ierarqiuli kibis iseTive safexurebze “idgnen”,rogorc mitoqondriebi dganan adamianis organizmSi da Cvenc iseTive “asocirebul” mdgomareobaSi vimyofebodeT samyaros mimarT,rogorc es “sabralo” mitoqondriebi arian Cvens mimarT”: ‘mayurebelis” funqciasac Rirseulad vasrulebdeT da roca saWiroa energiasac uxvad“viwvelideT”. Tumca adamiani am samyaroSi “mayureblisa” da energiis „transformatoris“ garda etyoba kidev erT funqciasac asrulebs.es funqcia ki informaciis Senaxva unda iyos.rogorc aRniSnuli iyo informacia“munjia”da misi gamovlena mxolod moxmarebis dros aris SesaZlebeli.amas momxmareblis arseboba sWirdeba,romelmac informaciis gamoyeneba rom SesZlos upirvelesad informacias unda flobdes.es sakiTxi ki adamianis mier informaciis Senaxvis problemas ukavSirdeba.am TvalsazrisiT gasarkvevia SeuZlia Tu ara adamianis erTi ujredis qromosomul aparats samyaroSi arsebuli uzarmazari informaciis Senaxva.amisaTvis SesaZloa visargebloT formuliT: I=N.B:M,sadac I-informaciaa N-nukleotidebis raodenobaa dnm-Si, B –informaciis umciresi sidide,xolo M-determinirebis erTeulad aRebul nukleotidTaAraodenoba.axla Tu dagvainteresebs ra sididis informaciis dateva SeuZlia adamianis erTi ujredis dnm-s “cilis sinTezis” kodis muSaobis dros,maSin unda gaviTvaliswinoT, rom am SemTxvevaSi erTi aminomJavas sinTezis ganmsazRvreli erTi kodoni SesaZloa informaciis erT niSans Seesabamebodes; xolo meore aminomJavas sinTezis ganmsazRvreli nukleotidTa meore tripleti informaciis meore niSans unda warmoadgendes.orive kodonSi Semavali 6 nukleotidi ki SesaZloa Seesabamebodes informaciis erT erTeuls anu 1 biTs.amas garda cnobilia,rom adamianis erT ujredSi 6.10.9 nukleotidia.aqedan gamomdinare saboloo Sedegi SesaZloa gamoTvlili iqnas Semdegi saxiT**
56. **გზა მომავლისკენ**
57. **I=N.B/M=6.10.9nX1b:6n=10.9 biTi.miRebuli Sedegi sagrZnobad CamorCeba eleqtronis spinis mixedviT gamoTvlil samyaroSi arsebul mTel informacias. amitom ar aris gamoricxuli,rom dnm-Si es informacia sxva kodiTac,saxeldobr musikaluri notebis meSveobiTac iyos Cawerili,.am TvalsazrisiT Svidi musikaluri notidan TiToeuli noti savaraudod erT nukleotids mainc unda moicavdes,rac informaciis erT niSans Seesabameba.meore noti ki meore komplementur nukleotids unda Seesatyvisebodes,rac informaciis meore niSans. moicavs.ori komplementuri nukleotidisagan Semdgari dnm-is ubani ki informaciis erT erTeuls anu 1 biTs unda unda**
59. **ახალი აფეთქების მოლოდინში**
60. **moicavdes.aqedan gamomdinare “musikaluri” kodis meSveobiT Sesanaxi informacia zemoTaRniSnuli formulis meSveobiT gamoTvlisas unda Seesabamebebodes Semdeg sidides I =N.B/M = 6.10.9nX1b:2n=3.10.9biTi.es ki ufro metia vidre “cilis sinTezis” kodis mier Senaxuli informacia,Tumca aseve sagrZnoblad CamorCeba samyaroSi arsebuli mTeli informaciis sidides. amitom dnm-Si informaciis kodirebis es procesi SesaZloa aseve xorcieldebodes romelime anbanis asoebisagan Semdgari sityvebis meSveobiTac ki.axla Tu gaviTvaliswinebT,rom msoflios enaTa umetesoba yvelaze didi sixSiriT etyoba 5 asoani fuZes mqone sityvebs Seicavs,maSin determinirebis erTeulad dnm-is 5 nukleotidisgan Semdgari ubani unda miviCnioT.aqedan erT sityvas da informaciis erT niSans SesaZloa pirveli 5 nukleotidi Seesabamebodes.meore sityvas da informaciis meore niSans ki momdevno 5 nukleotidi.ase rom,am kodiT Senaxuli informacia unda Seesabamebodes Semdeg sidides:I= N.B/M =6.10.9nX1b:10n=0,6.10.9biTi.es naklebia musikaluri notebis meSveobiT Senaxul informaciasTan da metia “cilis sinTezis” kodis mier Senaxul informaciasTan SedarebiT,magram aseve sagrZnoblad CamorCeba samyaroSi arsebuli mTeli informaciis sidides.aqedan gamomdinare samyaroSi arsebuli informaciis srulad Senaxvis TvalsazrisiT am kodis SesaZleblobebic SezRuduli Cans. es saZiebeli kodi aseve SesaZloa eleqtronis spins Seesabamebodes.amgvari kodis muSaobisas determinirebis erT niSans erTi eleqtronis spini unda warmoadgendes,xolo meore niSans-meore eleqtronis spini,orive eleqtronis spini erTad ki informaciis erT erTeuls anu 1 biTs unda Seesabamebodes.eleqtronebis raodenoba erT nukleotidSi saSualod 1445 erTeulia.ase rom am eleqtronebis mier erTi ujredis dnm-Si Senaxuli informacia unda Seesabamebodes Semdeg sidides: I= N.B/M= 6.10.9nX1445eX1b:2e= 433,5.10.9b= 4,310.11biTies ki gacilebiT meti informacia imasTan SedarebiT, romlis Senaxvac ”cilis sinTezis”, “musikaluri” an “sityvismieri” kodebis meSveobiT aris SesaZlebeli.Tumca samyaroSi arsebuli informaciis srulad Senaxva misi SemweobiTac SeuZlebeli Cans.am TvalsazrisiT ukeTesad moCans saqme adamianis erTi ujredis dnm-Si yvela am kodis mier informaciis erToblivad Senaxvis SemTxvevaSi,romelic Seesabameba Semdeg sidides: I= 10.9b+3.10.9b+0,6.10.9b+4,3.10.11b=7,9.10.38b=10.39biTi.es ki TiTqmis srulad Seesatyviseba samyaroSi arsebul informacias, romelic savaraudod 10.39biTis Seesabameba.ase rom erTi adamianis erTi ujredis qromosomuli aparatis dnm-is molekulas savaraudod mxolod erTmaneTze“dadebuli”am oTxi kodis meSveobiT SeuZlia Seinaxos samyaroSi arsebuli mTeli informaciis savaraudo raodenoba da am SemTxvevaSi saqme “cilis sinTezis” da “splaisingis” kodebis arsebobaze ufro rTulad moCans. xolo “bozen-ainStainis” sainformacio xidebis arseboba SesaZloa azrs kargavdes,radganac samyaroSi arsebuli mTeli informacia etyoba dabadebidanve gadaecemodes adamians.**
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108. **Current activity:**
109. **Research – 1042,0**
110. **Overall publications stats - 151,533,0**
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116. **Zurab Kheladze**
117. **President of Georgian Academy of Medical Science**
119. **Biography**
120. **Zurab kheladze – MD. PH.D. Full Professor. Born in 1952.He graduated of The Ozurgeti First Secondary School and of The Tbilisi State Medical University (institute) which honors. In 1983 he defended the candidate and in 1990 he studied doctoral thesis. He has undergone internship at The Albert Einstein Institute and Montefiore Medical Corporation in New-Iork, The Institute of General Reanimatology of The Soviet Union, Moscow First and Second State Medical Institutes, Kiev State Medical Institute, The Center for Catastrophe Medicine in Roma and other leading clinics in the world. From 1975 to 2015 he worked of Tbilisi State Medical University at the beginning which Chief of Anesthesiology-Reanimatology Cher’s and in later he was Chief as the Critical Care Medicine Department’s, which he is established. Also he was the head of the Rheanimatology Scientific Research Laboratory at the Tbilisi State Medical University. At the same years he was had of Anesthesiology-Reanimatologys Departments at The Georgian Central Republic Hospital and the Supervisory Board Member at The National Medical Center of Georgia. Sins 1983 years he established the reanimatiology profile clinic at The Georgian Anti-Sepsis Center, which had he has been. Since 1991 he established the Georgian Critical Care Medicine Institute, which the director is now. He is also established by the Georgian Association of Catastrophe &Critical Care Medicine which president is now. Also he is founder and Chief Editorial Editor of the Journal "Critical Care &Catastrophe Medicine” and he is founder and supervisor of the annual international symposium of Tbilisi "New Steps in Critical Care &Catastrophe Medicine”, He is one of them founder The Georgian Academy of Medical Sciences, which Vice-President he is now. Also The Association of Disaster & Critical Care Medicine of Georgia, as well as Institute of Critical Care Medicine of Georgia, which leadership he is now , considered as one of them founder The World's Global Sepsis Alliance. He was a member of the problem commission of "Reanimatology" of the Soviet Academy of Medical Sciences, Chief Specialist of the Ministry of Labor, Health and Social Affairs of Georgia in Critical Care Medicine and is currently the state expert in the Critical Care Medicine of the same Ministry, Also he was the head of the residency program and the state chairperson of the certification examination of Critical Care Medicine, chairperson of the commission for State Medical Standards of Critical Care Medicine. He is e chairperson of specialized scientific board of the defense of dissertation in Critical Care Medicine. He is author of 775 scientific works, manuals, monographs, inventions and patents. He is considered of the founders of the Critical Care Medicine technology of Georgia and he is prepared by more than 700 Critical Care Medicine doctors, the majority of them physicians working in this field of Georgia.. His guidance is preserved 15 candidate and doctoral dissertation, the authors of which are currently working in leading Critical Care Medicine Clinics in Georgia. Also he is treated by him more than 75,000 patients, including in recent years Georgia is more or less familiar with the critical condition all state or Government or Social Persons. In 1989 he headed the process of treatment of the victims during the April 9 tragedy in Tbilisi. He also headed sins the first day from the last one day to the treatment of life-threatening wrestlers in the fight for territorial integrity of Georgia.**

**z.xelaZe,zv.xelaZe**

**სიახლე დაავადებათა მკურნალობაში: ძვლის ტვინის პროგენიტური პრეკურსორების კომიტირება**

**საქართველოს კრიტიკული მედიცინის ინსტიტუტი**

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**\***ეს შრომა გასული საუკუნის მიწურულს იყო დაწყებული საქართველოს კრიტიკული მედიცინის ინსტიტუტში. ეს უკანასკნელი კი ამ სფეროს ლიდერია მსოფლიოში,რაც სჩანს შესაბამისი სახელწოდების საერთაშორისო სერვერის [WWW.Critical](http://WWW.Critical) **Care Medicine Institute** მუშაობიდან,სახელდობრ აღნიშნული სერვერში განთავსებულ 567,0 მილიონ ინფორმაციის პირველი ათეული საქართველოს კრიტიკული მედიცინის ინსტიტუტის შესახებ არსებულ ინფორმაციებს უჭირავს. ამ ინფორმაციათა დალაგების თანმიმდევრობა კი მათზე არსებულ მოთხოვნაზეა დამოკიდებული.და ერთგვარად განსაზღვრავს დაწესებულების ადგილს შესაბამის სფეროში. ეს არის უპრეცედენტო შემთხვევაა, რაოდესაც განვითარებადი ქვეყნის დაბალბიუჯეტიანი სამედიცინო დაწესებულება უფრო მაღალ რეიტინგს აჩვენებს ვიდრე მასზე 10,0-და 1000,0-ჯერ უფრო მაღალი ბიუჯეტის მქონე განვითარებული ქვეყნების სამედიცინო დაწესებულებები.

რაც შეეხება უშუალოდ სამეცნიერო პრობლემას,რომელიც აღნიშნული შრომაშია წარმოდგენილი ის ძვლის ტვინის ფუნქციის სტიმულაციის საკითხებს მოიცავს კრიტიკულ მდგომარეობათა დროს.მოგეხსენებათ adamianis organizmSi sami organoa,romeliს სახელწოდებაც ტერმინ ტვინს უკაცშირდება.esaris Tavistvini,zurgistvini da Zvlis tvini. მათ შორის ყველაზე კარგად შესწავლილი ორგანო თავის ტვინია, yvelaze sustad Seswavlili კი ძვლის ტვინი.miT umetes თუ ეს kritikul mdgomareobებს მოიცავს,aseTive suraTia kvdomis da gacocxlebis procesebis drosac. 

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metic, kritikul medicinaSi Zvlis tvinSi mimdinare cvlilebebis Seswavla am saukunis dasawyisSi iqna dawyebuli da am TvalsazrisiT saqarTvelos kritikuli medicinis instituti iyo is pirveli samecniero dawesebuleba,sadac amgvari saxis Sromebiს Sesrulბა იყო დაწყებული..am Sromebma ki,romelsac ori disertacia,50-mde samecniero naSromi, 4,0gamogoneba da amdenive patenti mieZRvna erTgvari naTeli mohfina manamde burusiT mocul am sferos. maTi SemweobiT gairkva,rom Zvlis tvini ისეთივე umTavres rols asrulebs kritikul organizmSi mimdinare aRdgeniT-reparaciuli procesebis marTvaSi,როგორც ამას ჯანმრთელ ორგნიზმში აქვს ადგილი. ჯანმრთელი adamianis sxeulSi კი მოგეხსენებათ daaxloebiT 40.10.12ujredia,romelTagan 200.10.9 ujredi mudmivad icvleba,xolo 50-100.10.9 - ujredi mTeli sicocxlis ganmavlobaSi ucvlelia.am ujredebidan nawlavis ujredebi icvleba 3-5 dReSi.amis gamo adamiani mTeli wlis ganmavlobaSi 90-jer “icvlis” sakuTar nawlavebs.aseve eriTrocitebi cocxloben 120 dRes,hepatocitebi-480 dRes,xolo miocitebis da neironebis sicocxlisunarianoba 100 welze met xans grZeldeba.saerTod ki adamianis sxeulSi erTi saaTis ganmavlobaSi 10.6 ujredi kvdeba da imdenive warmoiqmneba.ამის გამო ძვლის ტვინის ფუნქციურ მდგომარეობას დიდი მნიშვნელობა ენიჭება ჯანმრთელი ადამიანის ისეთი ფიზიოლოგიური მდგომარეობების ადექვატურად მიმდინარეობაში,როგორიცაა სიბერე.ასევე მნიშვნელოვანია ააღნიშნული ორგანოს როლი სხვადასხვა მიზეზით აღმოცენებულ პათოლოგიურ მდგომარეობათა დროს ორგანიზმის ცხოველქმედებოს შენარჩუნების საქმეში.რაც. შეეხება kritikulი mdgomareobებს ამ თვალსაზრისით უფრო ღრმა ცვლილებებთან გვაქვს საქმე,რადგანაც ისინი კი calkeul organoTa ujredebis masiuri destruqciiTa da nekroziT xasiaTdebian.maTi drouli da adeqvaturi Canacvlebis gareSe ki warmatebebis miRweva sicocxlisaTvis saSiS mdgomareobaTa likvidaciis procesSi SeuZlebelia.samwuxarod, kritikul mdgomareobaTa dros sxva organoTa msgavsad Zvlis tvinis morfologia da funqcia mkveTrad ziandeba. amis gamo kritikul organizmSi reparaciis procesebis mimdinareoba ferxdeba da am dros aRmocenebuli paTologiuri cvlilebebi kidev ufro metad Rrmavdeba.aqedan gamomdinare aqtualuri xdeba kritikuli avadmyofis Zvlis tvinSi mimdinare paTologiuri procesebis SeZlebisdagvarad mowesrigeba, rac SesaZlebels gaxdis ufro efeqturad warimarTos kritikul organizmSi mimdinare reparaciis procesebi da Sesabamisad,ufro ukeTesi Sedegebi iqnes miRebuli kritikul avadmyofTa mkurnalobis procesSi. ამგვარი მიდგომით ასეთივე დადებითი შედეგები შესაძლოა მიღებული იქნეს სიცოცხლის გახანგრძლივების,სიბერის გაახალგაზრდავების და სხვადასხვა მიზეზით გამოწვეულ ცალკეულ პათოლოგიურ მდგომარეობათა მკურნალობის პროცესში.

**\*** SromaTa es cikli Sesrulebuli iqna 1661,0 kritikul avadmyofSi, romelTagan 58,9% qali iyo,xolo 41,1%-kaci. avadmyofTa asaki meryeobda 23-wlidan 91- wlamde. am avadmyofebSi kritikuli mdgomareobebi asocirdeboda iSemiur da hemoragiul insultTan,gulis ukmarisobasTan, sunTqvis ukmarisobasTan,RviZlis da Tirkmlebis ukmarisobasTan, travmasTan, mowamvlebTan,sefsisTan da postreanimaciul mdgomareobebTan.Tanmxlebi daavadebebis saxiT avadmyofTa 82,0% aReniSneboda arteriuli hipertonia,Saqriani diabeti da sxva saxis Tanmxlebi daavadebebi,maTi mdgomareoba glazgos prognozul-analogiuri Skalis mixedviT 3-dan 12 qulas Seadgenda,xolo „Appachy-2“ Skalis mixedviT 23-32 qulas. Seesabameboda. mkurnaloba moicavda filtvebis xelovnur ventilacias,sedacias da analgezias,wylisa da eleqtrolitebis cvlis koreqcias, parenteralur da enteralur kvebas,antibaqteriul Terapias, antikoagulantur Terapias da sxva standartul RonisZiebebs. 

am fonze yvela avadmyofs Cautarda Zvlis tvinis funqciis stimulacia progenituli prekursorebis komitirebis mizniT,romelic 1097 SemTxvevaSi Sesrulda Zvlis tvinis eleqtruli impulsebiT damuSavebis saxiT, 385 SemTxvevaSi ganxorcielda Zvlis tvinze plazmuri sxivebiT zemoqmedeba, 42 avadmyofs Cautarda Zvlis tvinSi adrenalinis, solo 37 pacients-Zvlis tvinSi nitroglicerinis infuzia. sagulisxmoa,rom msgavsi midgoma medicinaSi manamde ar arsebobda da yovelgvari mcdeloba organizmSi arsebuli Rerovani ujredebis „Terapiis“ Sesaxeb Semoifargleboda an donoris Zvlis tvinis ujredebis avadmyofis Zvlis tvinSi transplantaciiT an nayofis Rerovani ujredebis avadmyofis sisxlismimoqcevis wreSi infuziiT.amgvari midgomis dros ki

optimalurad CaiTvala Sesabamisi zemoqmedebis moxdena uSualod kritikuli avadmyofis Zvlis tvinze,rom ufro efeqturi gamxdariyo misi muSaoba,rac,rogorc aRniSnuli iyo, ganxorcielda kritikuli avadmyofis Zvlis tvinze eleqtruli impulsebis da plazmuri sxivebis zemoqmedebiT,agreTve adrenalinisa da nitroglicerinis uSualod kritikuli avadmyofis Zvlis tvinSi infuziis saxiT.

\*eleqtruli impulsebiT am avadmyofTa Zvlis tvinis damuSaveba xdeboda kritikuli mdgomareobis pirvelive dRidan 7-14 dRis ganmavlobaSi,eleqtruli impulsebis miwodeba xdeboda mudmivi eleqtruli denis wyarodan permanentulad,romlis drosac eleqtruli impulsebis mimwodebeli eleqtrodebi moTavsebuli iyo am avadmyofTa mkerdis Zvlis saproeqcio ares proqsimalur da distalur monakveTSi. impulsebis miwodeba xdeboda specialurad am mizniT konstruirebuli “Georgia-1”aparatis marTkuTxa eleqtroimpulsebis generatoridan,romlis saregulacio sixSire 180 hercamde, ,xolo impulsebis amplituda 30mm-mde



**cxrili**

**avadmyofTa daxasiaTeba**

|  |  |  |  |
| --- | --- | --- | --- |
| **N** | **avadmyofebi** | **raodenoba** | |
| **absoluturi** | **%** |
| 1 | Y yvela avadmyofi | 1661 | 100 |
| 2 | qali | 978 | 58,9 |
| 3 | kaci | 683 | 41,1 |
| 4 | axalgazrda asakis (23-29w) | 56 | 3,3 |
| 5 | zrdasruli asakis(30-59w) | 1231 | 74,1 |
| 6 | xansiSesuli da moxuci (60-81w) | 374 | 22,8 |

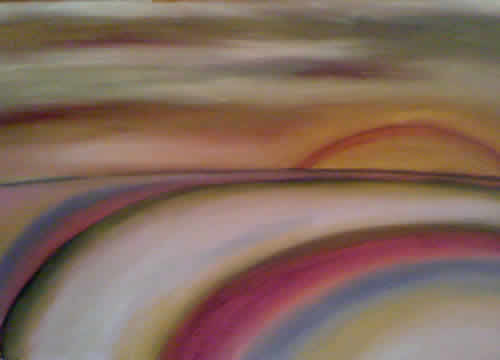


**ცხრილი**

**კრიტიკულ მდგომარეობათა სახეები**

|  |  |  |  |
| --- | --- | --- | --- |
| **N** | **avadmyofebi** | **raodenoba** | |
| **absoluturi** | **%** |
| 1 | Y yvela avadmyofi | 1661 | 100 |
| 2 | iSemiuri insultiT | 589 | 35,5 |
| 3 | H hemoragiuli insultiT | 372 | 22,4 |
| 4 | G gulis ukmarisobiT | 289 | 17,4 |
| 5 | sunTqvis ukmarisobiT | 176 | 10,6 |
| 6 | travmiT | 61 | 3,7 |
| 7 | mowamvliT | 53 | 3,2 |
| 8 | sefsisiT | 39 | 2,3 |
| 9 | RviZlis ukmarisobiT | 31 | 2,9 |
| 10 | Tirkmlebis ukmarisobiT | 27 | 1,6 |
| 11 | postreanimaciuli daavadebiT | 24 | 1,4 |

iyo.rac Seeseba plazmur sxivebs,maTi meSveobiT avadmyofis Zvlis tvinis saproeqcio ares damuSaveba xdeboda dReSi orjer,saxeldobr diliT da saRamos 5-10 wuTis ganmavlobaSi.es ukanaskneli xorcieldeboda am mizniT konstruirebuli specialur sacavSi moTavsebuli argonis gazis gaxurebiT warmoqmnili 110000-12000C temperaturis 1-5mm diametris da 10-17mm sigrZis plazmuri sxivebis avadmyofisTvis miewodebiT sxeulis zedapiridan 5-10 sm-iT daSorebuli manZilidan,sadac temperatura 45,0-50,0 გრადუსს aRwevda.rac Seexeba adrenalinisa da nitroglicerinis infuziebs isini mimdinareobda uSualod avadmyofis Zvlis tvinSi kritikuli mdgomareobis pirveli Svidi dRis ganmavlobaSi permanentulad 100,0ml fiziologiur xsnarSi gaxsnili 0,1% 1,0ml adrenalinis,romelic 1,0mg aqtiur nivTierebas Seicavda an 2,0ml nitroglicerinis SemweobiT.,romlis TiToeul mililitri 5,0mg.aqtiur nivTierbas Seicavda. aRsaniSnavia,rom arcerT msgavs SemTxvevaSi kritikul avadmyofTa mdgomareobis gauaresebas an maT organizmSi sxvadasxva saxiT gamoxatul uaryofiT efeqts,romelic am meTodebis gamoyenebasTan yofiliyo asocirebuli adgili ar hqonia.sagulisxmoa,rom mkurnalobis am meTodebs ara aqvs analogi an prototipi, isini Tavis droze aRiarebuli iyo gamogonebad da TiToeuli maTganis Sesaxeb gacemuli iyo Sesabamisi patentebi(N4857; N4825; N4858, N 4985).



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**mkurnalobis procesis daxasiaTeba**

|  |  |  |  |
| --- | --- | --- | --- |
| **N** | **mkurnalobis saxe** | **raodenoba** | |
| **absoluturi** | **%** |
| 1 | xelovnuri sunTqva | 1661 | 100 |
| 2 | sedacia da analgezia | 1661 | 100 |
| 3 | wylis balansis koreqcia | 1661 | 100 |
| 4 | eleqtrolituri balansis koreqcia | 1661 | 100 |
| 5 | Penteraluri kveba zondiT | 1661 | 100 |
| 6 | Aantibaqteriuli Terapia | 1661 | 100 |
| 7 | Eparenteraluri kveba | 217 | 13,1 |
| 8 | dehidratacia | 1017 | 61,2 |
| 9 | antikoagulantebiT mkurnaloba | 981 | 59,1 |
| 10 | Sokis sawinaaRmdego RonisZiebebi | 63 | 37,9 |
| 11 | plazmaferezi | 56 | 33,7 |
| 12 | antiariTmuli mkurnaloba | 38 | 22,9 |
| 13 | hemodializi | 25 | 1,5 |

\* sakontrolo jgufis saxiT Seswavlili iyo 506,0 kritikuliavadmyofi,maT Soris 54,0 % qali da 46,0% mamakaci. avadmyofTa asakobrivi ganawileba identuri iyo ZiriTadi jgufis avadmyofebis identuri iyo,saxeldobr axalgazrda asakis iyo avadmyofTa4,6%, zradasruli asakis jgufs Sedgenda avadmyofTa 69,2%, xoloxanSiSesulTa da moxucTa asakis iyo 22,2% pacienti.sakontrolo jgufis avadmyofebSi kritikuli mdgomareobebi ZiriTadi jgufi savadmyofTa msgavsad asocirebuli iyo iSemiur da hemoragiulinsultTan,sgulis ukmarisobasTan,sunTqvis ukmarisobasTan,mowamvlebTan,agreTve RviZlis da Tirkmlebis ukmarisobasTan.am jgufis avadmyofTa mkurnaloba aseve moicavda filtvebis xelovnur ventilacias, sedacias da analgezias,wylisa daeleqtrolitebis balansis koreqcias,parenteralur da enteralur Terapias da sxva standartul RonisZiebebs,Tumca ZiriTadi jgufis avadmyofebisgan gansxvavebiT maT Zvlis tvinis stimulacia ar CatarebiaT.aseve sagulisxmoa is faqti,rom ZiriTad da sakontrolo jgufebSi avadmyofTa SerCeva xdeboda SemTxveviT SerCevis principiT,xolo kvlevebi Catarebuli iyo“ormagi brma“ meTodiT. 

\* avadmyofTa orive jgufSi warmoebda Zvlis tvinis morfologiuri substratis da misi funqciurimdgomareobis Seswavla.morfologiuri suraTis Seswavla xeboda Zvlis tvinis punqciis meSveobiT, romelic warmoebda kasirskis nemsiT mkerdis Zvlis sagitalur xazze, me-2-3 neknTaSua sivrceSi. miRebuli punqtatidan mzaddeboda nacxi,romelic iRebeboda standartuli meTodiT da sinaTlis mikroskopis qveS xdeboda Zvlis tvinis punqtatis ujreduli Semadgenlobis Seswavla. Ppararelurad Catarebuli iyo Zvlis tvinis funqciuri unaris Seswavla paramagnituri rezonansis meTodiT,romlis drosac iswavleboda Zvlis tvinSi Tavisufali azotis oqsidisa da peroqsiradikalebis Semcveloba. K

**cxrili**

**progenituli prekursorebis komitireba**

|  |  |  |  |
| --- | --- | --- | --- |
| **N** | **Mmkurnalobis saxe** | **raodenoba** | |
| **absoluturi** | **%** |
| 1 | Zvlis tvinis eleqtrostimulacia | 1023 | 61.6 |
| 2 | Zvlis tvinis plazmuri sxivebiT damuSaveba | 550 | 33,1 |
| 3 | Zvlis tvinSi nitroglicerinis infuzia | 47 | 2,8 |
| 4 | Zvlis tvinSi adrenalinis infuzia | 41 | 2,5 |



\* kvlevis Sedegebi mocemuliadiagramebis saxiT.aRniSnuli cvlilebebis analizi miuTiTebs, rom kritikuli mdgomareobisas Zvlis tvinSi adgili aqvs axalgazrda formis “TeTri xazis” ujredTa raodenobis Semcirebis tendencias, romelTa momatebisken midrekileba SeimCneva periferiul sisxlSi. am fonze sagulisxmoa “wiTeli“ xazis ujredTa Semcireba, rogorc Zvlis tvinSi, ise periferiul sisxlSi. aseve aRniSvnis Rirsia is faqti, rom Zvlis tvinSi mcirdeba Jangbadis Semcveloba da parcialuri wneva, matulobs naxSirorJangis parcialuri wneva da mimdinareobs mJava-tutovani wonasworobis metaboluri acidozisaken gadaxra.

amasTan SesaZlebeli xdeboda Zvlis tvinSi adre ar arsebuli azotis oqsidisa da peroqsiradikalebis aRmoCena, amasTan, aRniSnuli cvlilebebi stabilur xasiaTs atarebda da umetes SemTxvevaSi registrirdeboda kritikul mdgomareobaTapirveli- ori kviris ganmavlobaSi.

**diagrama: Zvlis tvinis ujredebis cvlilebebi sakontrolo jgufis avadmyofebSi.**



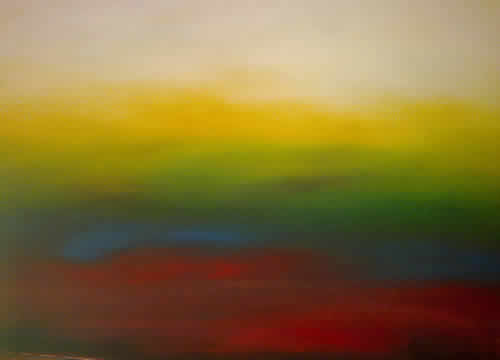


**diagrama: periferiuli sisxlis ujredebis cvlilebebi sakontrolo jgufis avadmyofebSi**



**Ddiagrama: Zvlis tvinis punqtatis mJava-tutovani wonasworobis cvlilebebi sakontrolo jgufis avadmyofebSi.**



ZiriTadi jgufis avadmyofebis kvlevis Sedegebi aseve mocemuliadiagramebis saxiT.miRebuli monacemebis analizi uCvenebs, rom eleqtro deniT mkurnalobis dros adgili aqvs Zvlis tvinis eriTrocituli, leikocituri da Trombocituri xazis ujredebis raodenobis momatebas, maT Soris upiratesad axlgazrda formebis. igive tendencia SeimCneva periferiul sisxlSi. am fonze Zvlis tvinSi mcirdeba Jangbadis Semcveloba da parcialuri wneva, matulobs naxSirorJangis parcialuri wneva da mimdinareobs metaboluri acidozis gaRrmaveba. amasTan es suraTi ufro mkveTradaa gamoxatuli kritikuli mdgomareobebis pirveli kviris ganmavlobaSi. 

aseTive monacemebi inaxa plazmuri nakadiT mkurnalobis dros. saxeldobr SeimCneoda Zvlis tvinis eriTrocituli, leikocituri da Trombocituri xazis ujredebis raodenobis momatebas, maT Soris upiratesad axlgazrda formebis. igive tendencia SeimCneva periferiul sisxlSi. am fonze Zvlis tvinSi mcirdeba Jangbadis Semcveloba da parcialuri wneva, matulobs naxSirorJangis parcialuri wneva da mimdinareobs metaboluri acidozis gaRrmaveba. amasTan es suraTi ufro mkveTradaa gamoxatuli kritikuli mdgomareobebis. pirveli kviris ganmavlobaSi.



**diagrama: Zvlis tvinis ujredebis cvlilebebi eleqtruli impulsebiT mkurnalobis dros.**





**diagrama: periferiuli sisxlis ujredebis cvlilebebi eleqtruli impulsebiT mkurnalobis dros.**



**diagrama: mJava-tutovani wonasworobis cvlilebani eleqtruli impulsebiT mkurnalobis dros**



**diagramaZvlis tvinis ujredebis cvlilebebi plazmuri sxivebiT mkurnalobis dros.**





**diagrama periferiuli sisxlis ujredTa raodenobis cvlilebebi plazmuri sxivebiT mkurnalobis dros.**



**D**

**diagrama: Zvlis tvinis punqtatis mJava-tutovani wonasworobis cvlilebani plazmurი სხივებით მკურნალობის დროს**





sayuradReboa,rom analogiuri cvlilebebi inaxa Zvlis tvinis adrenaliniT da nitrogliceriniT damuSavebis dros,Tumca eleqtrostimulaciasTan da plazmuri sxivebiT damuSavebasTan SedarebiT es cvlilebebi SedarebiT sustad iyo gamoxatuli.

**Zvlis tvinis eleqtrostimulatori da Zvlis tvinis eleqtrostimulacia** 

# „Georgia-1“



kvlevam aseve uCvena,rom Zvlis tvinis eleqtruli impulsebiT stimulaciisas,,agreTve Zvlis tvinis plazmuri sxivebiT damuSavebisas da Zvlis tvinSi ,adrenalinisa da nitroglicerinis infuziis Semdeg adgili aqvs Zvlis tvinis daperiferiuli sisxlis ujredebis eriTrocituli, leikocituri da Trombocituli xazis axalgazrda formis ujredebis raodenobis mkveTrmatebas, romelic stabilurad maRali rCeba kritikuli mdgomareobis pirveli ori kviris ganmavlobaSi. pararerulad Zvlis tvinSi izrdeba Jangbadis parcialuri wneva da garemos mJavianoba.agrTve Cnebian azotis oqsidi da peroqsiradikalebi.

am fonze agreTve sagulisxmo iyo progenituliRerZuli da imunokompetenturi ujredebis mkveTri zrda.



maT Soris statistikurad sarwmunod matulobdaCD3,CD4, CD34 da CD72limfocitTa subpopulaciebi, maSin rodesac CD8 subpopulaciis ujredebi statistikurad sarwmunod ar icvlebodnen.sagulisxmoa,rom msgavsi cvlilebebi iqna nanaxi adrenaliniT da nitrogliceriniT mkurnalobis dros,Tumca am SemTxvevaSi es cvlilebebi,maT Soris dadebiTi klinikuri efeqti SedarebiT sustad iyo gamoxatuli. sagulisxmoa,rom Zvlis tvinSi



**cxrili**

**progenituli prekursorebisa da imunokompetentur limfocitTa subpopulciis raodenobis cvlilebebi Zvlis tvinis sxvaadsxva meTodebiT damuSavebis Semdeg**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **N** | **mkurnalobis saxe** | **CD-3**  **%** | **CD4**  **%** | **CD8**  **%** | **CD34%** | **CD72%** |
|  |
| 1 | Zvlis tvinis eleqtrostimulacia | 38,0±1,0  <0,001 | 29,5±  1,1  <0,001 | 57.3±1,2  >0,05 | 12,9±  0,6  <0,001 | 13.6±1,2  <0,001 |
| 2 | Zvlis tvinis plazmuri sxivebiT damuSaveba | 35,0±1,1  <00  01 | 24,5±1,1  <0,001 | 51,3±1,4  >0,05 | 11,3±1,2  <0,001 | 12,2±1,1  <0,001 |
| 3 | Zvlis tvinSi nitroglicerinis infuzia | 33,4±1,3  <0,001 | 22,5±1,2  <0,001 | 47.3±1,6  >0,05 | 10,1±1,5  <0,001 | 11,2±1,0  <0,001 |
| 4 | Zvlis tvinSi adrenalinis infuzia | 30,2±1,6  <0,001 | 20,5±1,6  <0,001 | 46.3±1,8  >0,05 | 9,9±1,2  <0,001 | 10,3±1,4  <0,001 |



mimdinare es cvlilebebi progresulad Rrmavdeba avadmyofTa mdgomareobis damZimebis dros da sikvdilis dadgomis SemTxvevaSi. amasTan Zvlis tvinSi ganviTarebuli es paTologiuri cvlilebebi avadmyofTa mdgomareobis gaumjobesebis da kritikul mdgomareobaTa likvidaciis Semdegac sakmaod didxans rCeba organizmSi

.

aseve ZiriTad da sakontrolo jgufSi miRebuli Sedegebis Sedarebam uCvena,rom ZiriTadi jgufisavadmyofebSi sakontrolo jgufis avadmyofebTan SedarebiT 7,1%-iT Semcirda letaloba,amasTan am avadmyofTa kritikuli medicinis klinikaSi dakavebam Seadgina 8,4% naklebi sawol-dRe,vidre sakontrolo jgufis avadmyofebis kritikuli medicinis klinikaSi dayovnebam. aseve ZiriTadi jgufis avadmyofebSi sakontrolo jgufis avadmyofebTan SedarebiT 13,9%-iT gaiafda mkurnalobis Rirebuleba. yovelive es naTlad miuTiTebs Zvlis tvinis progenituli prekursorebis komitirebis meTodebis farTed danergvis aucileblobassicocxlisaTvis saSiS mdgomareobaTa klinikebSi,rac SesaZleblobas iZleva mniSvnelovani warmatebebi iqnes miRweulio kritikul avadmyofTa mkurnalobis procesSi.

საგულისხმოა,რომ აღნიშნულიმიმართულები წარმოებული შრომები ჩემს მიერ შესრულებულ სხვა 1042 შრომასთან ერთად განთავსებულია ინტერნეტის სივრცეში,სახელდონრ საერთაშორისო სერვერ [www.Researchgate](http://www.Researchgate) და მათ მსოფლიოს 156,0 ქვეყანაში ყოველდღიურად 70-ზე მეტი პიროვნება კითხულობს.რაც მათ მიმართ არსებული დიდი ინტერესის ერთგვარ გამოხარვას წარმოადგენს.



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**Edit**

* **Doctor of Medicine, PH.D,Professor,Academician**
* **CEO**
* **Georgia**

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**Overall publications stats - 151,533,0**

**Reads last week -273,0**

**Citations- 816,0**

**h-index - 5,0**

**Research Interest - 686.6**



ასევე ამას ის ფაქტიც მოწმობს,რომ ამ მიმართულებით წარმოებული შრომების შესახებ ხაზგასმით არის მითითებული მსოფლიოს აკადემიათაშორისო პარტნიორობის ორგანიზაციის ბიულეტენში გამოქვეყნებულ ჩვენს ბიოგრაფიაზე ,რომელიც სულ

ახლახანს იყო გამოცემულ

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## Zurab Kheladze

### **President of Georgian Academy of Medical Science**



**Biography**

Zurab kheladze – MD. PH.D. Full Professor. Born in 1952.He graduated of The Ozurgeti First Secondary School and of The Tbilisi State Medical University (institute) which honors. In 1983 he defended the candidate and in 1990 he studied doctoral thesis. He has undergone internship at The Albert Einstein Institute and Montefiore Medical Corporation in New-Iork, The Institute of General Reanimatology of The Soviet Union, Moscow First and Second State Medical Institutes, Kiev State Medical Institute, The Center for Catastrophe Medicine in Roma and other leading clinics in the world. From 1975 to 2015 he worked of Tbilisi State Medical University at the beginning which Chief of Anesthesiology-Reanimatology Cher’s and in later he was Chief as the Critical Care Medicine Department’s, which he is established. Also he was the head of the Rheanimatology Scientific Research Laboratory at the Tbilisi State Medical University. At the same years he was had of Anesthesiology-Reanimatologys Departments at The Georgian Central Republic Hospital and the Supervisory Board Member at The National Medical Center of Georgia. Sins 1983 years he established the reanimatiology profile clinic at The Georgian Anti-Sepsis Center, which had he has been. Since 1991 he established the Georgian Critical Care Medicine Institute, which the director is now. He is also established by the Georgian Association of Catastrophe &Critical Care Medicine which

 president is now. Also he is founder and Chief Editorial Editor of the Journal "Critical Care &Catastrophe Medicine” and he is founder and supervisor of the annual international symposium of Tbilisi "New Steps in Critical Care &Catastrophe Medicine”, He is one of them founder The Georgian Academy of Medical Sciences, which Vice-President he is now. Also The Association of Disaster & Critical Care Medicine of Georgia, as well as Institute of Critical Care Medicine of Georgia, which leadership he is now , considered as one of them founder The World's Global Sepsis Alliance. He was a member of the problem commission of "Reanimatology" of the Soviet Academy of Medical Sciences, Chief Specialist of the Ministry of Labor, Health and Social Affairs of Georgia in Critical Care Medicine and is currently the state expert in the Critical Care Medicine of the same Ministry, Also he was the head of the residency program and the state chairperson of the certification examination of Critical Care Medicine, chairperson of the commission for State Medical Standards of Critical Care Medicine. He is e chairperson of specialized scientific board of the defense of dissertation in Critical Care Medicine. He is author of 775 scientific works, manuals, monographs, inventions and patents. He is considered of the founders of the Critical Care Medicine technology of Georgia and he is prepared by more than 700 Critical Care Medicine doctors, the majority of them physicians working in this field of Georgia. His guidance is preserved 15 candidate and doctoral dissertation, the authors of which are currently working in leading Critical Care Medicine Clinics in Georgia. Also he is treated by him more than 75,000 patients, including in recent years Georgia is more or less familiar with the critical condition all state or Government or Social Persons. In 1989 he headed the process of treatment of the victims during the April 9 tragedy in Tbilisi. He also headed sins the first day from the last one day to the treatment of life-threatening wrestlers in the fight for territorial integrity of Georgia. 