PREDIKTIVNA MO] NA PERFUZIONITE I FUNKCIONALNITE PARAMETRI DOBIENI SO SPEKT MPS KAJ PACIENTITE SO KAB

D-r Marija Vavlukis dr sci

Koavtori: Нела Костова, Ирена Пејовска, Даниела Поп-Ѓорчева, Венјамин Мајсторов, Маја Здравковска, Борјанка Танева, Елизабета Србиновска-Костовска, Љубица Георгиевска-Исмаил

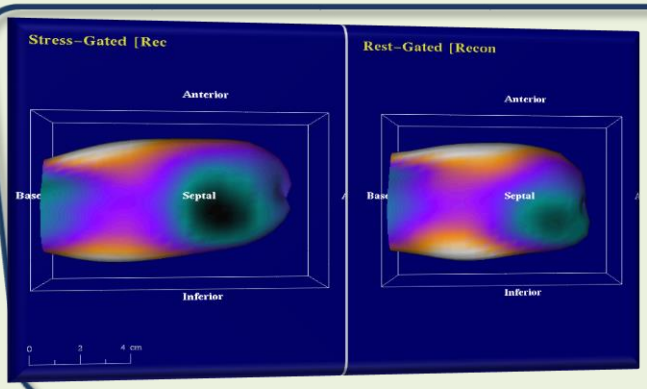
Univerzitetska klinika za kardiologija

Medicinski fakultet, Skopje

PROCENKA NA RIZIKOT - RIZIK STRATIFIKACIJA ILI PROGNOZA, PRETSTAVUVA POSTAPKA SO KOJA SE OVOZMO@UVA PREDVIDUVAWE NA KLINI^KIOT TEK NA PACIENTOT.

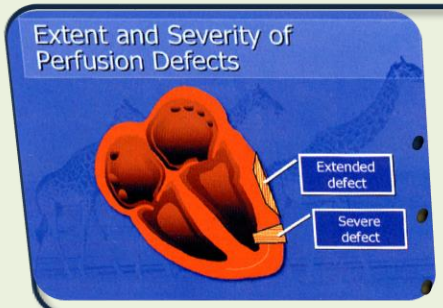
KAPACITETOT ZA PREDVIDUVAWE NA KLINI^KIOT TEK PRETSTAVUVA OSNOVA ZA PRAVILNA SELEKCIJA NA TERAPEVTSKIOT TRETMAN.

KLINI^KIOT TEK I PROGNOZATA NA BOLNITE SO KORONARNA ARTERISKA BOLEST JA DETERMINIRAAT SLEDNITE ELEMENTI



LEVOKOMORNA FUNKCIJA

- Globalna LK funkcija vo mir i kontraktilna rezerva
- Regionalna LK funkcija (segmentna kinetika)

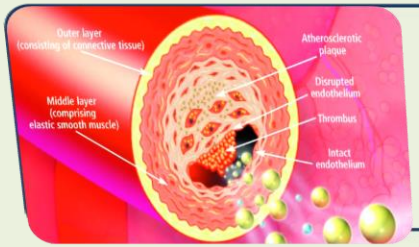


TE@INA I RASPROSTRANETOST NA KAB

Ekstenzivnost

Te`ina

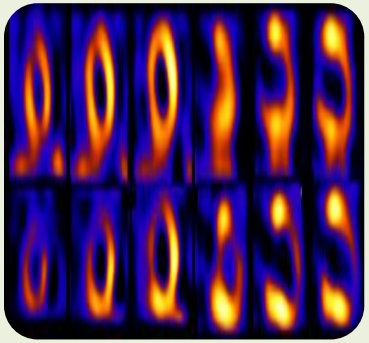
Lokacija

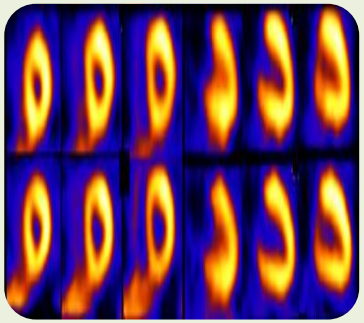


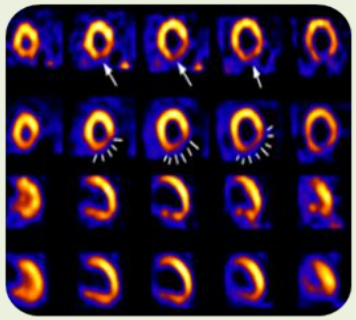
VULNERABILNOST NA PLAKA

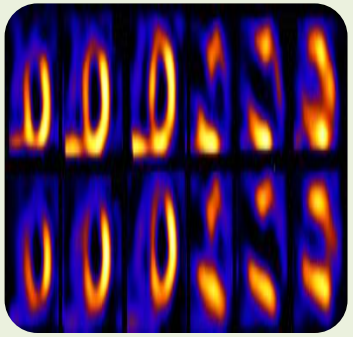
- Stabila plaka
- Nestabilna plaka

POSLEDICI OD NARU[UVAWE NA MIOKARDNATA PERFUZIJA- DETEKTIBILNI SO SPEKT MPS









MIOKARDNA ISHEMIJA

- Reverzibilna sostojba

REGIONALNA LEVOKOMORNA DISFUNKCIJA

- naru{ena segmentna kinetika

MIOKARDNA ZA[EMETENOST

- Reverzibilna sostojba

GLOBALNA LEVOKOMORNA DISFUNKCIJA

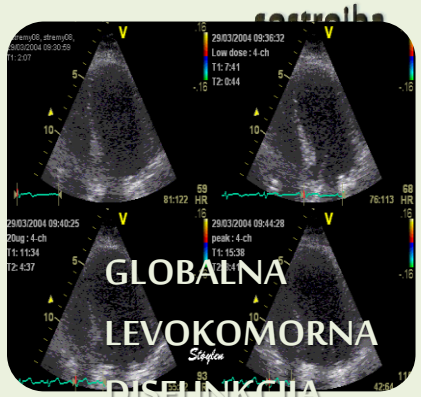
- sistolna disfunkcija vo mir

MIOKARDNA HIBERNACIJA

- Reverzibilna sostojba

MIOKARDNA LUZNA

- Ireverzibilna



GLOBALNA LEVOKOMORNA DISFUNKCIJA

- namalena kontraktilna rezerva (>5%)

DIFERENCIJALNI PREDIKTORI NA MORTALIT ODNOSNO MORBIDIT KAJ PACIENTITE SO KAB

Identifying and **quantifying myocardial scar** in acite MI offers important prognostic information regarding **left ventricular remodeling** and future cardiac events.

Hunold P, Kreitner KF, Barkhausen J. Rofo. 2007

In coronary artery disease patients with chronic infarction, the extent of **late enhancement reliably predicts the outcome of global and regional left ventricular function** after revascularization.

Hunold P, Kreitner KF, Barkhausen J. Rofo. 2007

Post-stress ejection fraction is the most significant predictor of cardiac death whereas the extent of ischemia is the best predictor of nonfatal myocardial infarction.

Leoncini M, Sciagra R. Ital Heart J Suppl. 2002

Reversible perfusion abnormalities were associated with cardiac death (RR 2.8) and hard cardiac events (RR 2.7). Perfusion abnormalities in multivessel distribution were predictive of all-cause mortality (RR 2, 0).

Elhendy A, Schinkel AF … Polderman SD. Am J Cardiol. 2006

DIFERENCIJALNI PREDIKTORI NA MORTALIT ODNOSNO MORBIDIT KAJ PACIENTITE SO KAB - POSTOJAT LI?

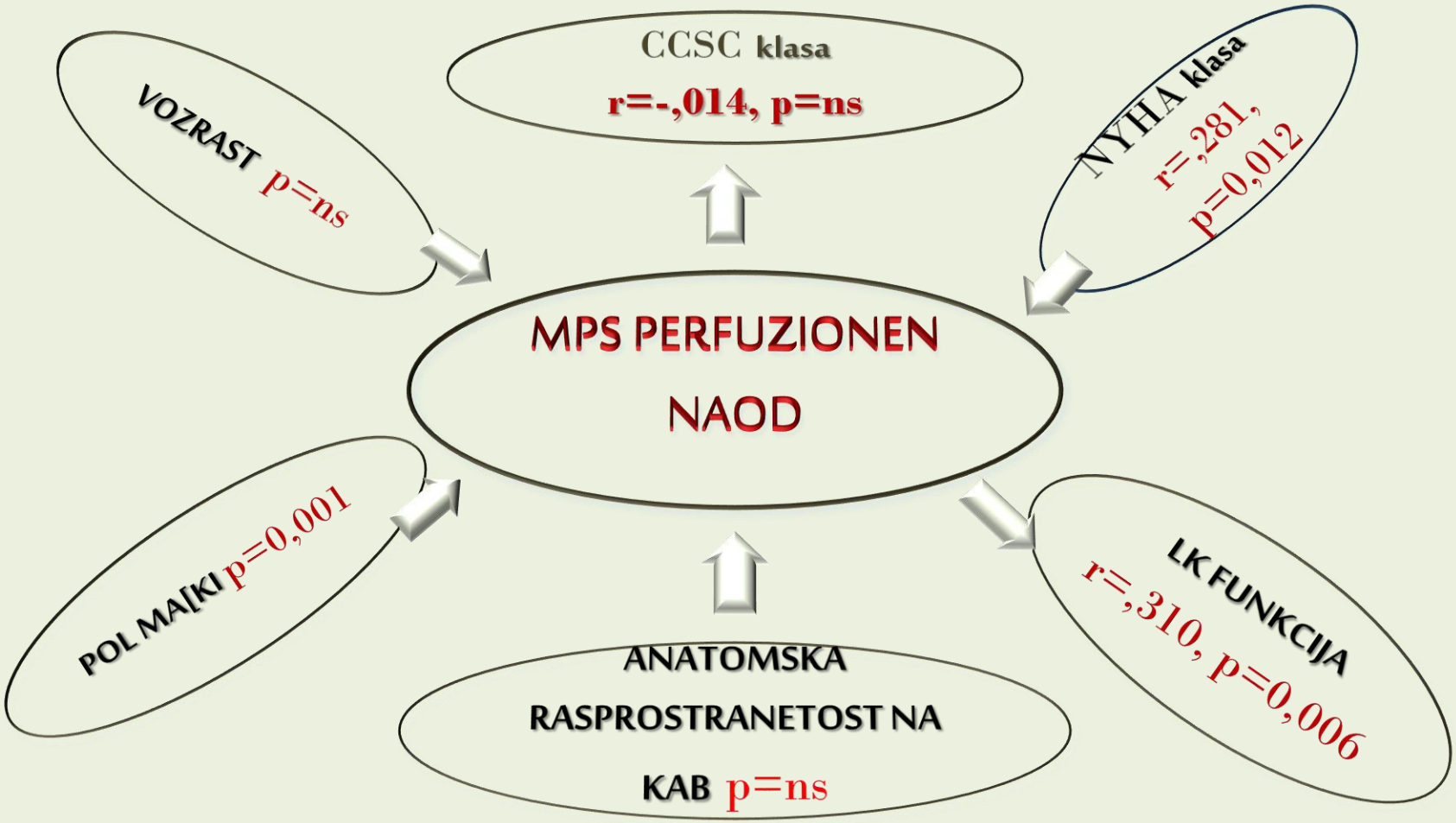
Ispituvana podgrupa na pacienti so KAB, tretirani so hirur{ka miokardna revaskularizacija.

Vklu~eni 78 pacienti kaj koi SPEKT MPS be{e izvedena predoperativno, i 96 pacienti kaj koi SPEKT MPS be{e izvedena postoperativno.

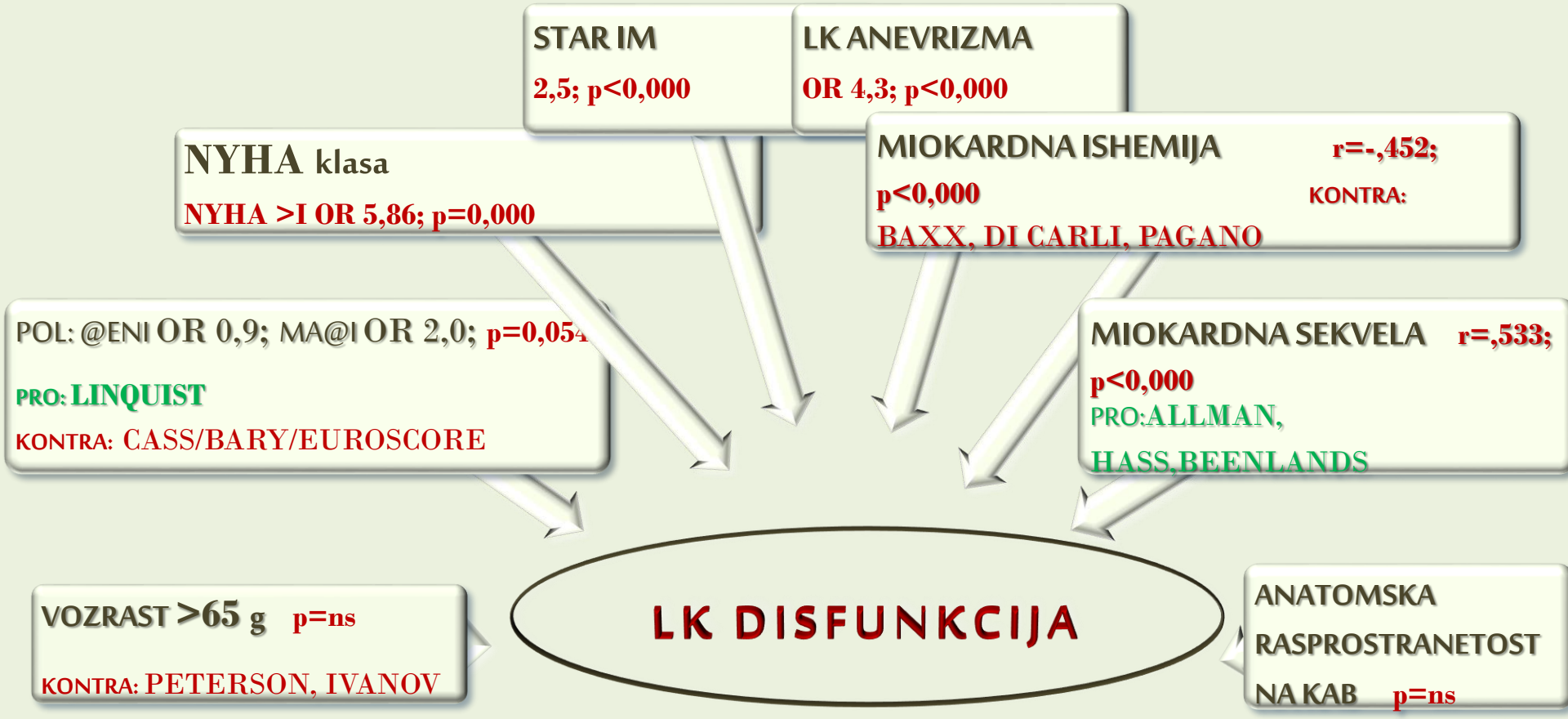
Sledena pojava na dolgoro~en morbiditet i mortalitet: ishemi~ni zbidnuvawa, srceva slabost i srceva smrt.

Sreden period na sledewe 7,8 godini.

KORELACIJA NA MIOKARDNIOT PERFUZIONEN NAOD SO: KLINI^KITE, FUNKCIONALNITE I ANGIOGRAFSKITE OBELE@JA KAJ PACIENTITE SO KAB



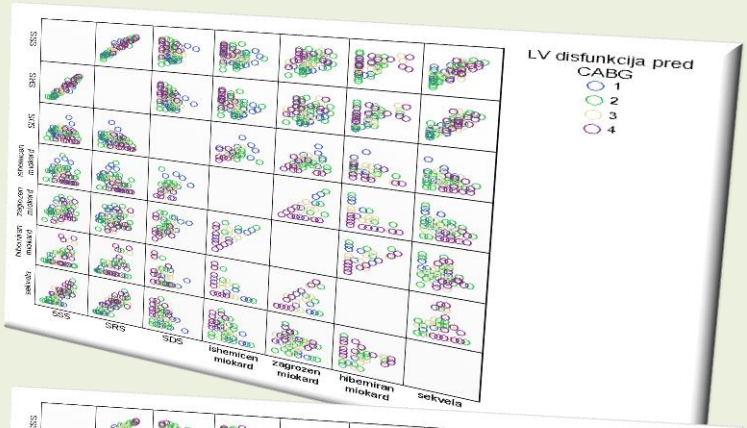
KORELACIJA ME\U LEVOKOMORNATA FUNKCIJA I KLINI^KITE, MIOKARDNITE PERFUZIONI I ANGIOGRAFSKITE OBELE@JA KAJ PACIENTITE SO KAB



KORELACIJA ME\U FUNKCIONALNITE PARAMETRI NA LEVATA KOMORA I MIOKARDNITE PERFUZIONI PARAMETRI

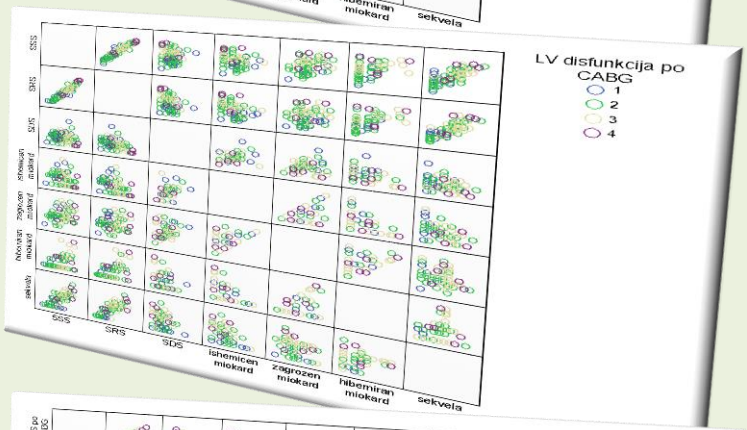
PREDOPERATIVNA LK FUNKCIJA-PREDOPERATIVEN PERFUZIONEN NAOD

EF (%)	SSS	SRS	SDS	Ishem.	Zagroz.	Hibern.	Sekvela
Corr.	-,425	-,496	,348	,362	.043	-,322	-,548
Sig.	0,000	0,000	0,002	0,001	ns	0,005	0,000



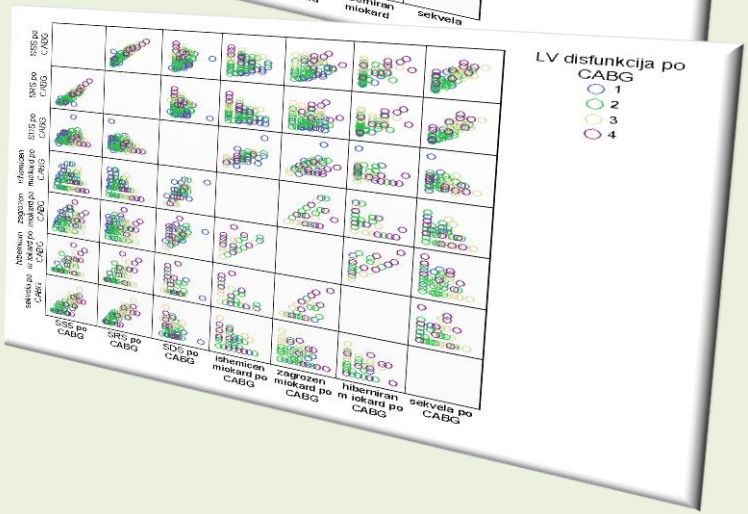
POSTOPERATIVNA LK FUNKCIJA-PREDOPERATIVEN PERFUZIONEN NAOD

EF (%)	SSS	SRS	SDS	Ishem.	Zagroz.	Hibern.	Sekvela
Corr.	-,566	-,596	,282	,284	-,043	-,348	-,598
Sig.	0,000	0,000	0,016	0,016	ns	0,003	0,000



POSTOPERATIVNA LK FUNKCIJA-POSTOPERATIVEN PERFUZIONEN NAOD

EF (%)	SSS	SRS	SDS	Ishem.	Zagroz.	Hibern.	Sekvela
Corr.	-,699	-,736	,159	,265	-,183	-,518	-,600
Sig.	0,000	0,000	ns	0,009	ns	0,000	0,000



SPEKT MPS PREDIKTORI NA ISHEMI^NI ZBIDNUVAWA

VARIJABLI -Step 1(a)	B	Sig.	Exp(B)
SSS klasa		.460	
SSS	8.206	.999	3662.186
SRS	-8.192	.999	.000
SDS	-8.149	.999	.000
% ISHEMIJA	.326	.359	1.385
% ZAGROZEN MIOKARD	-.296	.400	.744
% HIBERNIRAN MIOKARD	.268	.453	1.307
% SEKVELA	-.068	.662	.934
ISHEMIJA >15%	2.854	.116	17.352
SEKVELA		.987	
<20% (1)	-.327	.902	.721
>20% (2)	-.079	.965	.924
EFs (%)	.220	.035	1.247
EFs <50%	-1.419	.374	.242
EFr (%)	-.221	.008	.802
EDVs (ml)	-.012	.737	.989
EDVs >130ml	.088	.941	1.092
EDVr (ml)	.058	.091	1.060
ESVs (ml)	.029	.442	1.029
ESVs >70ml	-1.202	.285	.301
ESVr (ml)	-.080	.079	.923
Constant	-4.761	.388	.009

VARIJABLI -Step 4(a)	B	Sig.	Exp(B)
SSS klasa		.091	
SRS	**.510**	**.026**	**1.665**
SDS	**.408**	**.046**	**1.504**
% ISHEMIJA	3.669	.999	39.226
ISHEMIJA >15%	3.711	.074	40.902
% HIBERNIRAN MIOKARD	3.603	.999	36.714
% SEKVELA	**-.464**	**.019**	**.629**
>20% (2)	**-5.254**	**.022**	**.005**
EF <50%	**3.481**	**.027**	**32.483**
EFr (%)	**-.134**	**.042**	**.875**
EDVs (ml)	-.060	.066	.942
EDVs >130ml	-2.149	.065	.117
EDVr (ml)	.051	.115	1.053
ESVs (ml)	.064	.088	1.066
ESVr (ml)	-.075	.102	.927
Constant	8.034	.085	3085.299

- **SSS was the best independent predictor for hard cardiac events (chi(2)=12.70; P<0.001) and**
- **SDS was the strongest independent predictor for soft cardiac events (chi(2)=11.72; P<0.001)**

Zhang H, Eur J Nucl Med Mol Imaging. 2004

- **Dipyridamole-induced worsening of LVEF is a valuable nonperfusion marker of significant CAD.**

Hung GU, Lee KW, Chen CP et al. J Nucl Cardiol. 2006

SPEKT MPS PREDIKTORI NA SRCEVA SLABOST

VARIJABLI -Step 1(a)	B	Sig.	Exp(B)
SSS klasa		.115	
SSS	.199	.636	1.221
SRS	.354	.387	1.425
SDS	.266	.502	1.305
% ISHEMIJA	3.566	.999	35.362
% ZAGROZEN MIOKARD	-3.693	.999	.025
% HIBERNIRAN MIOKARD	3.492	.999	32.845
% SEKVELA	-.498	.018	.608
ISHEMIJA >15%	3.779	.088	43.768
SEKVELA		.031	
<20% (1)	-3.168	.280	.042
>20% (2)	-5.659	.022	.003
EFs (%)	-.055	.542	.947
EFs <50%	3.913	.041	50.032
EFr (%)	-.114	.126	.892
EDVs (ml)	-.061	.063	.940
EDVs >130ml	-2.460	.051	.085
EDVr (ml)	.051	.125	1.053
ESVs (ml)	.060	.115	1.062
ESVs >70ml	.406	.715	1.501
ESVr (ml)	-.072	.130	.931
Constant	9.894	.090	19813.707
-Step 16(a)			
EFs (%)	**.146**	**.019**	**1.157**
EFr (%)	**-.194**	**.002**	**.824**
EDVr (ml)	**.038**	**.015**	**1.039**
ESVr (ml)	**-.039**	**.041**	**.962**
Constant	-1.756	.430	.173

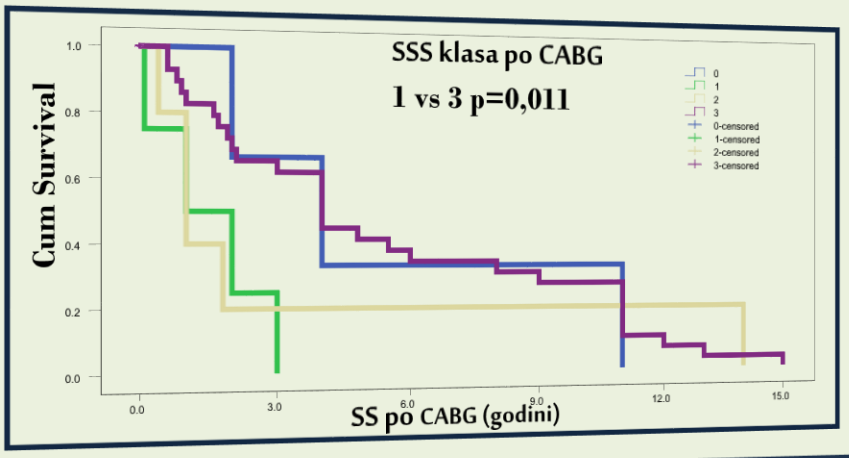
- The strong association exists between ventricular remodeling and clinical outcome (need for incorporation of LV volumes).
  Konstam MA. Am J Cardiol. 2005

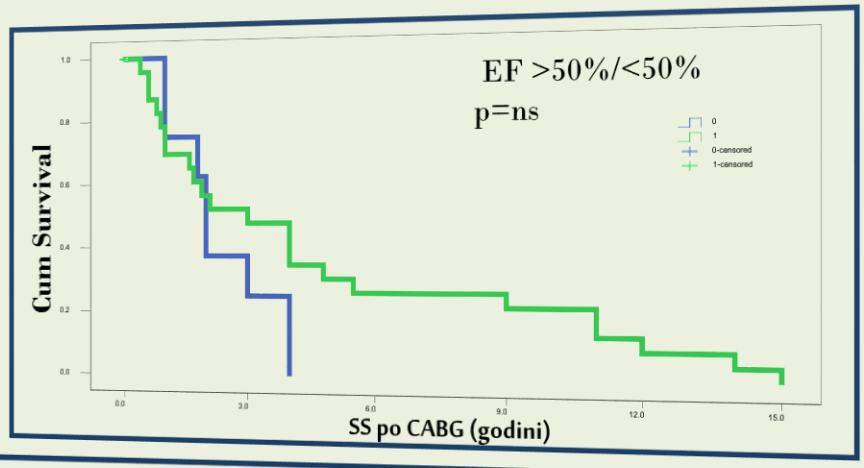
- Myocardial scar antcipates to LV changes ("remodeling")
  Hunold P, Kreitner KF, Barkhausen J. Rofo. 2007

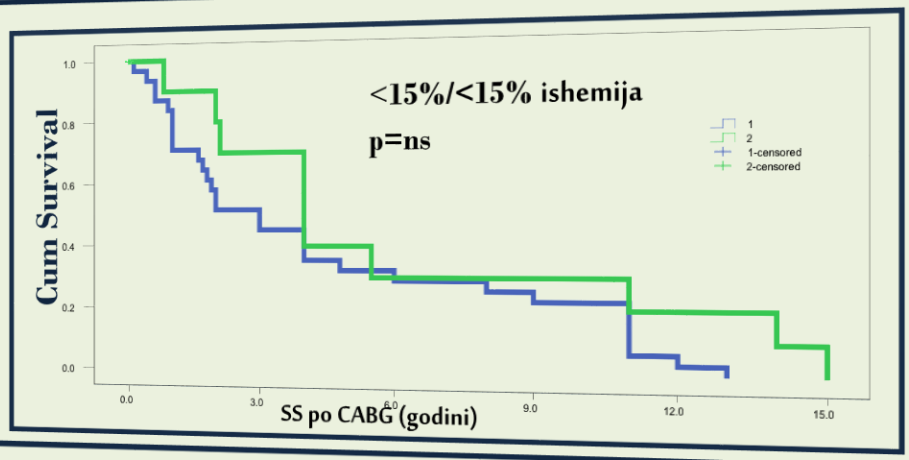
- Heart failure events are heralded by perfusion abnormalities.
  Elhendy A, Baxx JJ, Poldermans D. J Nucl Cardiol. 2004

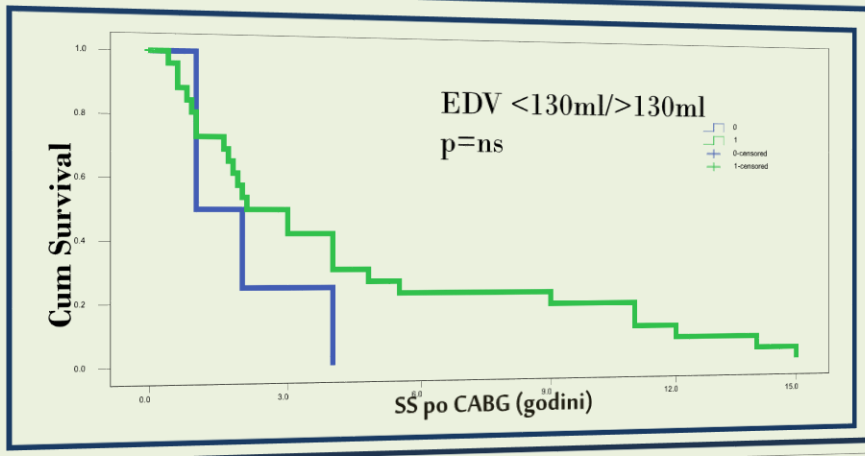
- In patients with depressed LVEF, stress-ESV was the only independent predictor of long-term outcome.
  Bestetti A, Baxx JJ.Acta Cardiol. 2004

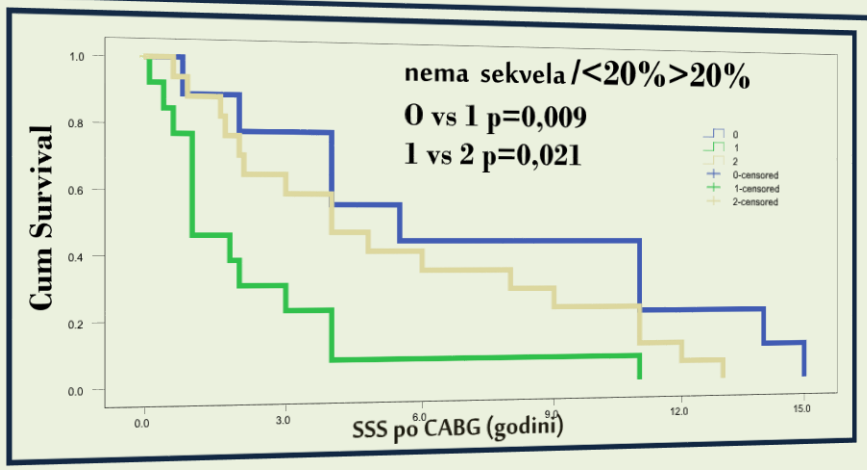
- Stress ESV has incremental prognostic value compared with wall thickening in predicting CE, in CAD patients with dilated cardiomyopathy. Perfusion parameters failed to show prognostic information in these patients.
  Besstetti A, Triulzi A, Di Leo C et al.Radiol Med (Torino). 2003

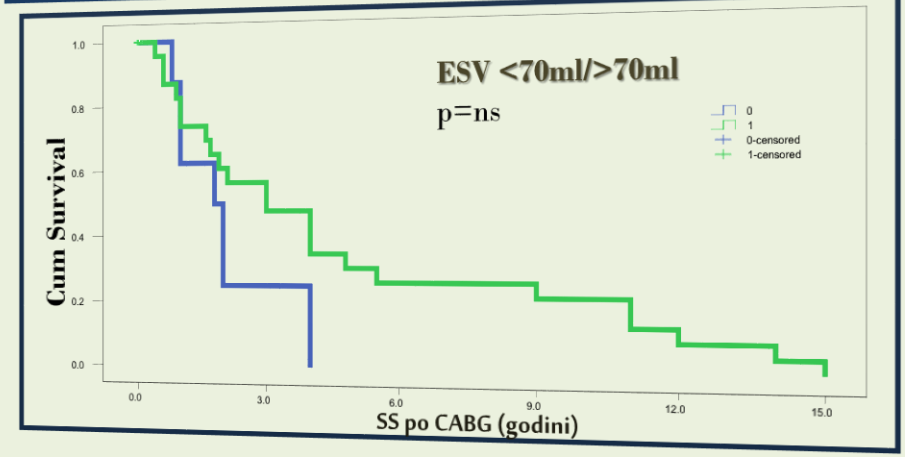

SSS klasa po CABG
1 vs 3 p=0,011
Cum Survival
SS po CABG (godini)
0
1
2
3
0-censored
1-censored
2-censored
3-censored


EF >50%/<50%
p=ns
Cum Survival
SS po CABG (godini)
0
1
0-censored
1-censored


<15%/<15% ishemija
p=ns
Cum Survival
SS po CABG (godini)
1
2
1-censored
2-censored


EDV <130ml/>130ml
p=ns
Cum Survival
SS po CABG (godini)
0
1
0-censored
1-censored


nema sekvela /<20%>20%
0 vs 1 p=0,009
1 vs 2 p=0,021
Cum Survival
SSS po CABG (godini)
0
1
2
0-censored
1-censored
2-censored


ESV <70ml/>70ml
p=ns
Cum Survival
SS po CABG (godini)
0
1
0-censored
1-censored

SPEKT MPS PREDIKTORI NA SRCEVA SMRT

VARIJABLI -Step 1(a)	B	Sig.	Exp(B)
SSS klasa		1.000	
SSS	-2.414	.929	.089
SRS	2.214	.935	9.155
SDS	1.659	.951	5.254
% ISHEMIJA	-1.087	1.000	.337
% ZAGROZEN MIOKARD	.786	1.000	2.195
% HIBERNIRAN MIOKARD	-.614	1.000	.541
% SEKVELA	.343	.078	1.410
ISHEMIJA >15%	-10.613	.181	.000
SEKVELA		.171	
<20% (1)	14.333	.063	1677133.167
>20% (2)	5.140	.171	170.665
Constant	-1.325	.871	.266
-Step 3(a)			
SSS klasa		.707	
SSS	-.859	.094	.424
SRS	.664	.164	1.943
% ISHEMIJA	-.504	.238	.604
% ZAGROZEN MIOKARD	.179	.109	1.196
%SEKVELA	**.349**	**.077**	**1.418**
>15% ISHEMIJA	-11.648	.146	.000
SEKVELA		.141	
<20% (1)	**15.165**	**.052**	**3857052.759**
>20% (2)	5.286	.167	197.635
Constant	-.801	.923	.449

Univariate Predictors of CD and Nonfatal MI in patients Undergoing Combined Adenosine Stress MRP and DSMR WM Imaging

	Univariate		
Parameter	**HR**	**95% CI**	***P***
Clinical			
Age*	**1.52**	**0.92–2.51**	**0.100**
Gender, male	**2.45**	**0.71–8.42**	**0.154**
Smoking	**1.44**	**0.59–3.55**	**0.426**
Hypertension	**1.62**	**0.47–5.57**	**0.080**
Hyperlipoproteinemia	**3.70**	**0.85–16.00**	**0.440**
Diabetes mellitus	**2.55**	**1.00–6.48**	**0.049**
Known CAD	**3.60**	**1.19–10.84**	**0.023**
Total risk factors >4	**4.20**	**1.64–10.58**	**0.002**
MR/nuclear imaging			
WMA at rest	**4.43**	**1.59–12.39**	**0.004**
LVEF	**0.56**	**0.40–0.79**	**0.001**
LVESV	**1.18**	**1.08–1.28**	**<0.001**
Inducible WMA	**5.42**	**2.18–13.50**	**<0.001**
Inducible MRP deficit	**12.51**	**3.64–43.03**	**<0.001**

Jahnke C, Nagel E, Gebker R, Kokocinski T, Kelle S, Manka R, Fleck E, Paetsch I. Circulation. 2007

ZAKLU^OK

SPEKT MPS pretstavuva dostapna, reproducibilna metoda, koja primeneta kaj bolnite so koronarna arteriska bolest ima prognosti~ko zna~ewe koe e duri i pogolemo od nejzinoto dijagnosti~ko zna~ewe.

Se razlikuvaat diferencijalni miokardno perfuzioni, odnosno LK funkcionalni prediktori za mortalitet i majornite formi na morbiditet kaj pacientite so koronarna arteriska bolest.