Nukleární metody a srdeční selhání se sníženou EF

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KNM LF UP a FN Olomouc

Nukleární metody a srdeční selhání se sníženou EF

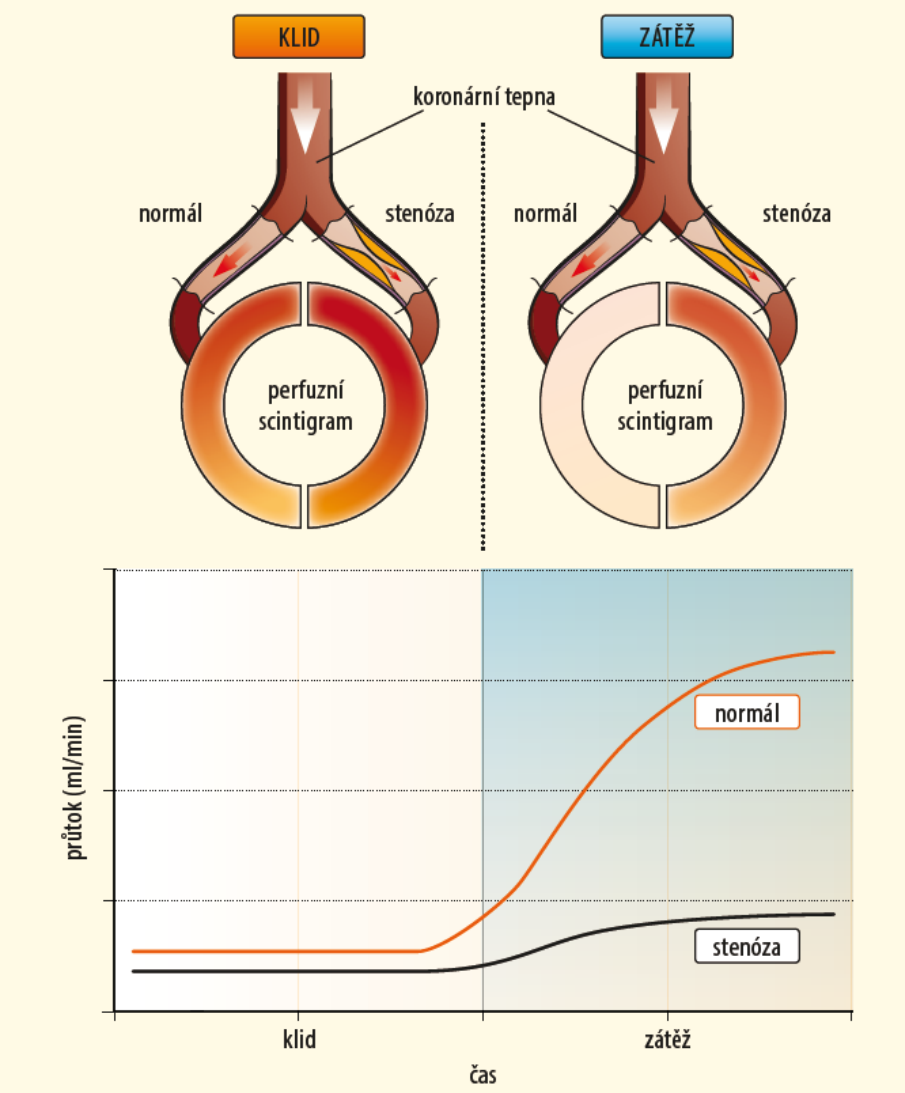
- **Zátěžový perfuzní SPECT:** **ischemie + viabilita**
- **Klidový perf. SPECT (+ event. FDG PET): viabilita**
- **…**
- **Sarkoidóza srdce (FDG PET)**
- **Amyloidóza (DPD sken, 18F-florbetaben)**
- **Adrenergní inervace (^{123}I-MIBG)**

Nukleární kardiologie

Zobrazování:

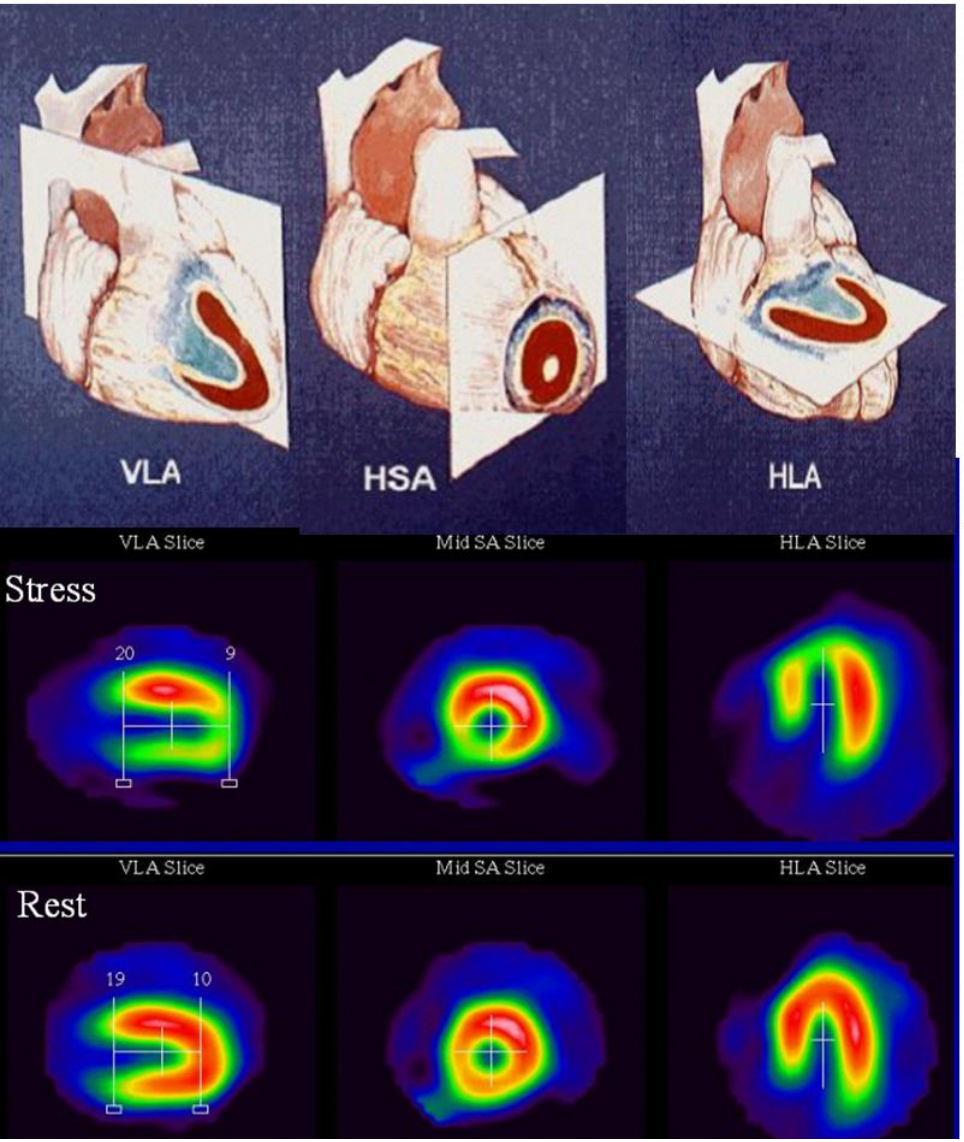
1. Myokardiální perfuze **(SPECT po zátěži, v klidu)**

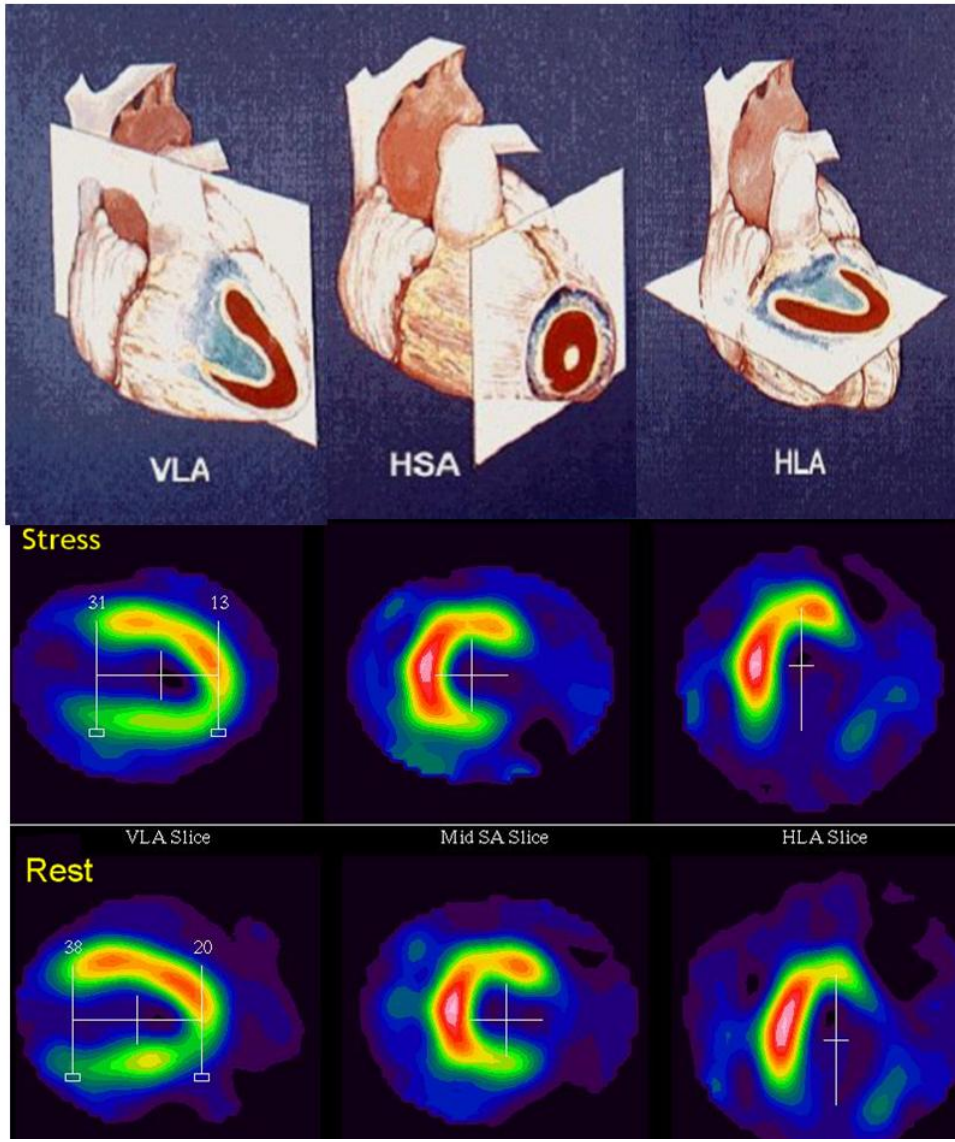
Pozátěžové navození heterogenity perfuze



Reverzibilní defekt (ischemie)

Fixní defekt (obvykle jizva)

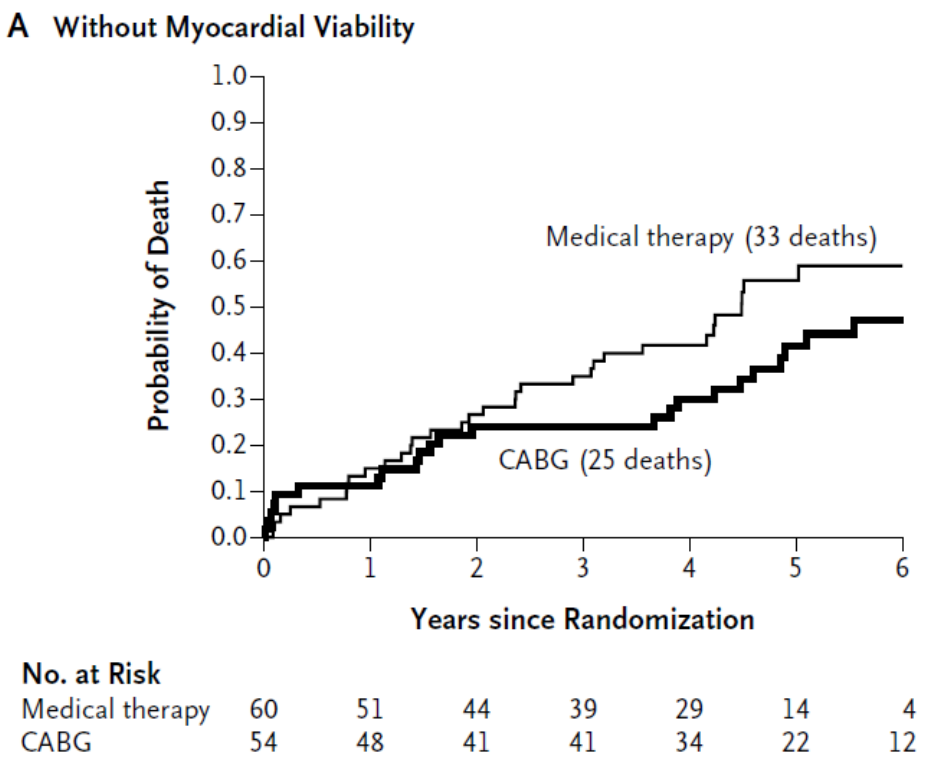


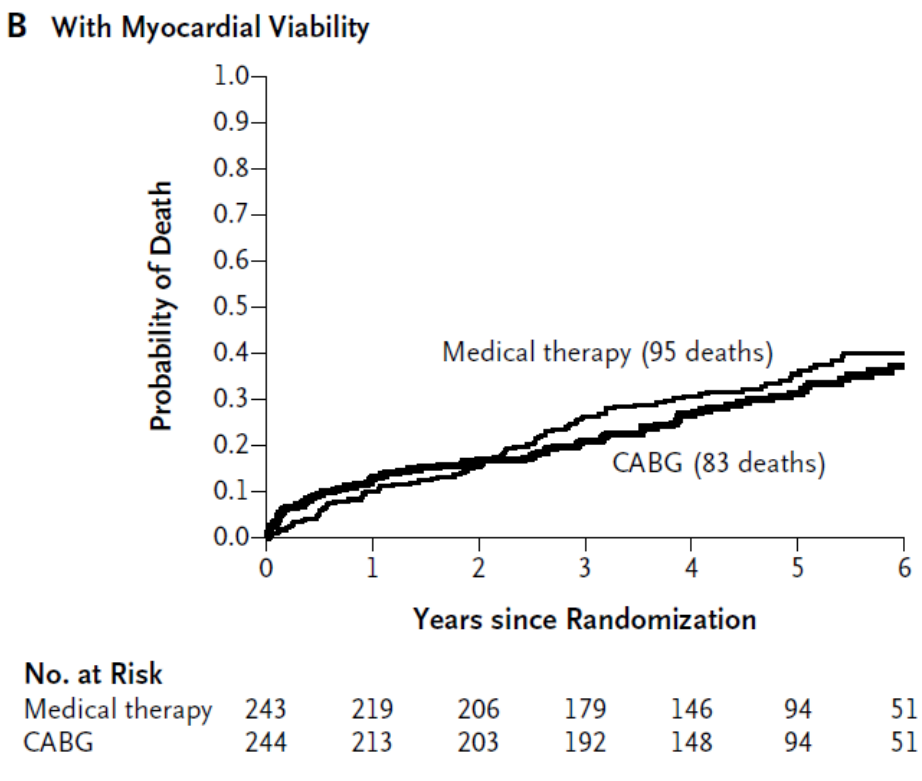


Kdo je kandidátem pro zobrazování viability ?

- Známá nebo vysoce pravděpodobná ICHS
- > NYHA II
- Střední-závažná dysfunkce levé komory (EF <40%)
- Bez signifikantní ischemie
- **+/- závažné komorbidity**
- Střední-rozsáhlý perfuzní defekt, nejednoznačný pro posouzení viability – ad FDG PET

STICH trial





Robert O. Bonow, et al. N ENGL J MED 364;17 NEJM.ORG APRIL 28, 2011

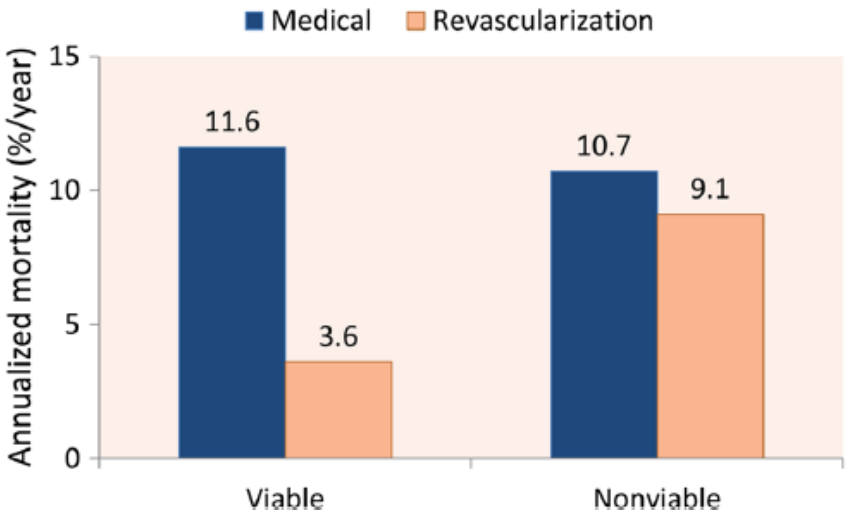
STICH vs. PARR-2 trials

	STICH	PARR-2
Number of patients	601	430
Mean age	59,5	63
Mean EF	26	26
Single-vessel disease	25%	10%
Viability method	MIBI+nitrates/Tl-201 (≥11/17) Dob ECHO CR (≥5/16)	Perf/FDG PET (>7% mismatch)
Assessed hibernation ?	No-SPECT; Yes-DE	Yes
% of pts w viability	81	22

Adapted from Meilniczuk, Beanlands. Circulation Cardiovascular Imaging 2012

Viabilita myokardu

- 28 retrospective viability studies, 3848 patients



Schinkel et al.
Curr Probl Cardiol 2007

Viabilita myokardu

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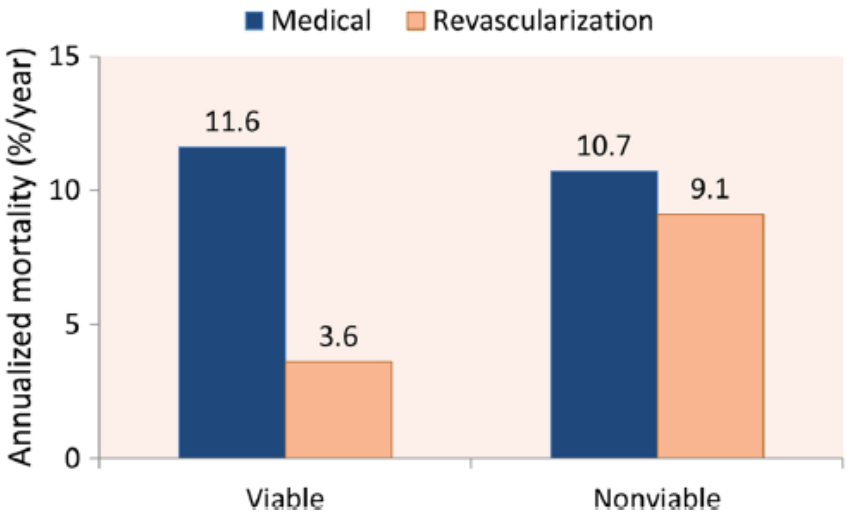

Schinkel et al.
Curr Probl Cardiol 2007

STICH trial: 10-year follow-up demonstrates improved survival amongst patients undergoing surgical revascularizat. when compared with medical therapy alone.

Gramze et al. Curr Opin Cardiol. 2016

Journal of Nuclear Cardiology®
March/April 2015

Myocardial viability as integral part of the diagnostic and therapeutic approach to ischemic heart failure

Imaging modality	Viability marker
Nuclear imaging	
SPECT using Tl-201	Perfusion, cell membrane integrity
SPECT using Tc-99m tracers	Perfusion, cell membrane integrity, intact mitochondria
PET (or SPECT) with FDG	Glucose utilization
Echocardiography	
Low-dose dobutamine infusion	Contractile reserve
MRI	
Low-dose dobutamine infusion	Contractile reserve
Intravenous contrast agents	Scar tissue

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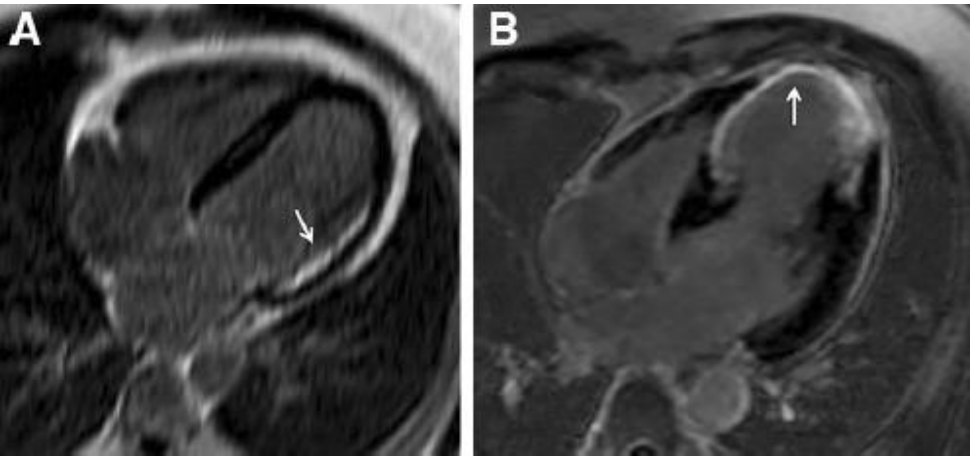
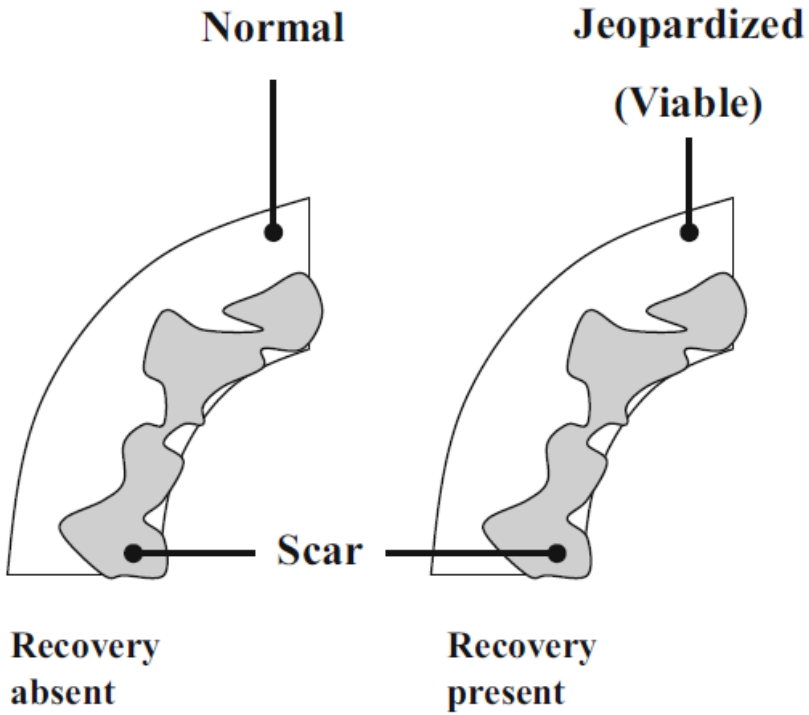
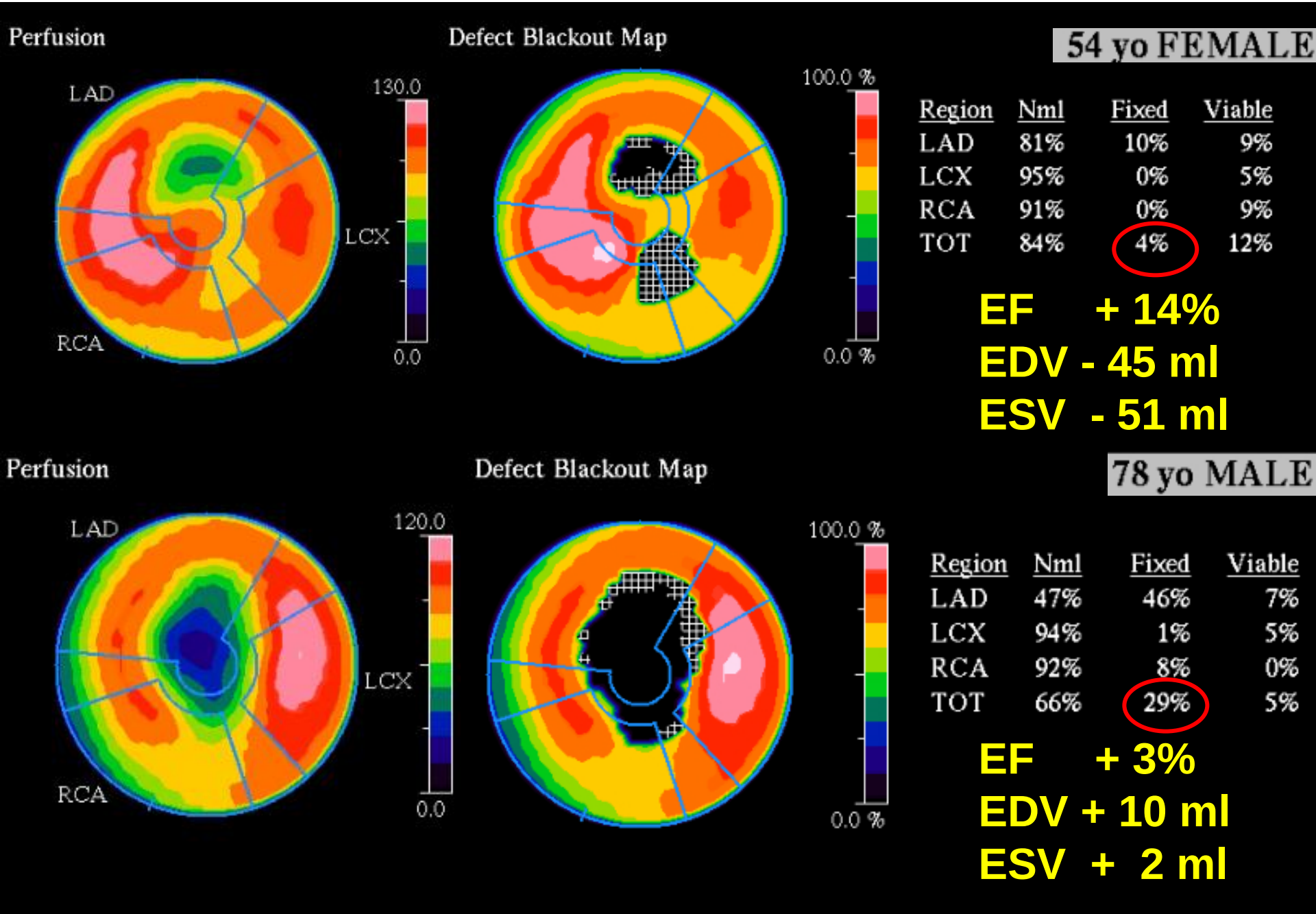
Netransmurální Transmurální



Zátěžový SPECT: ischemie + viabilita
Perf.SPECT/FDG: hibernující myokard



Kvantifikace rozsahu neviabilního myokardu

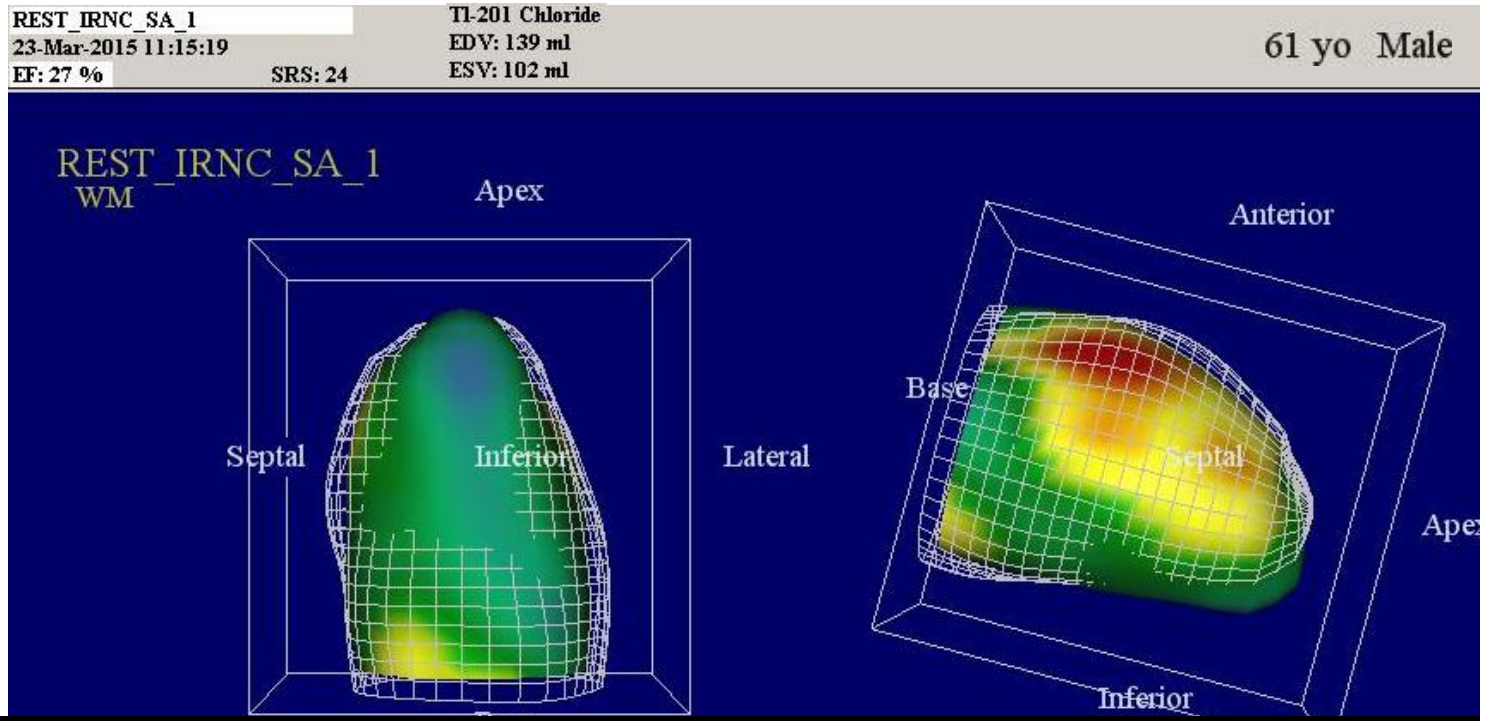


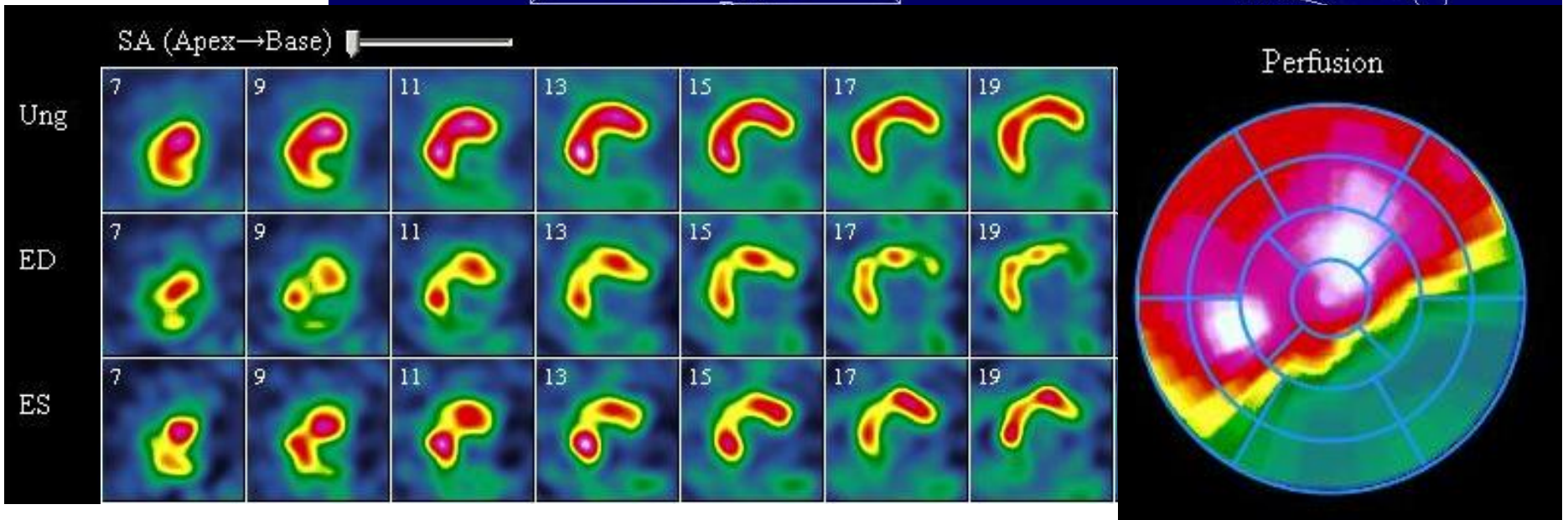
61letý muž. 3-VD, multi PCI, in-stent restenózy RMS a ACD

Tl-201

60 kg

30 MBq

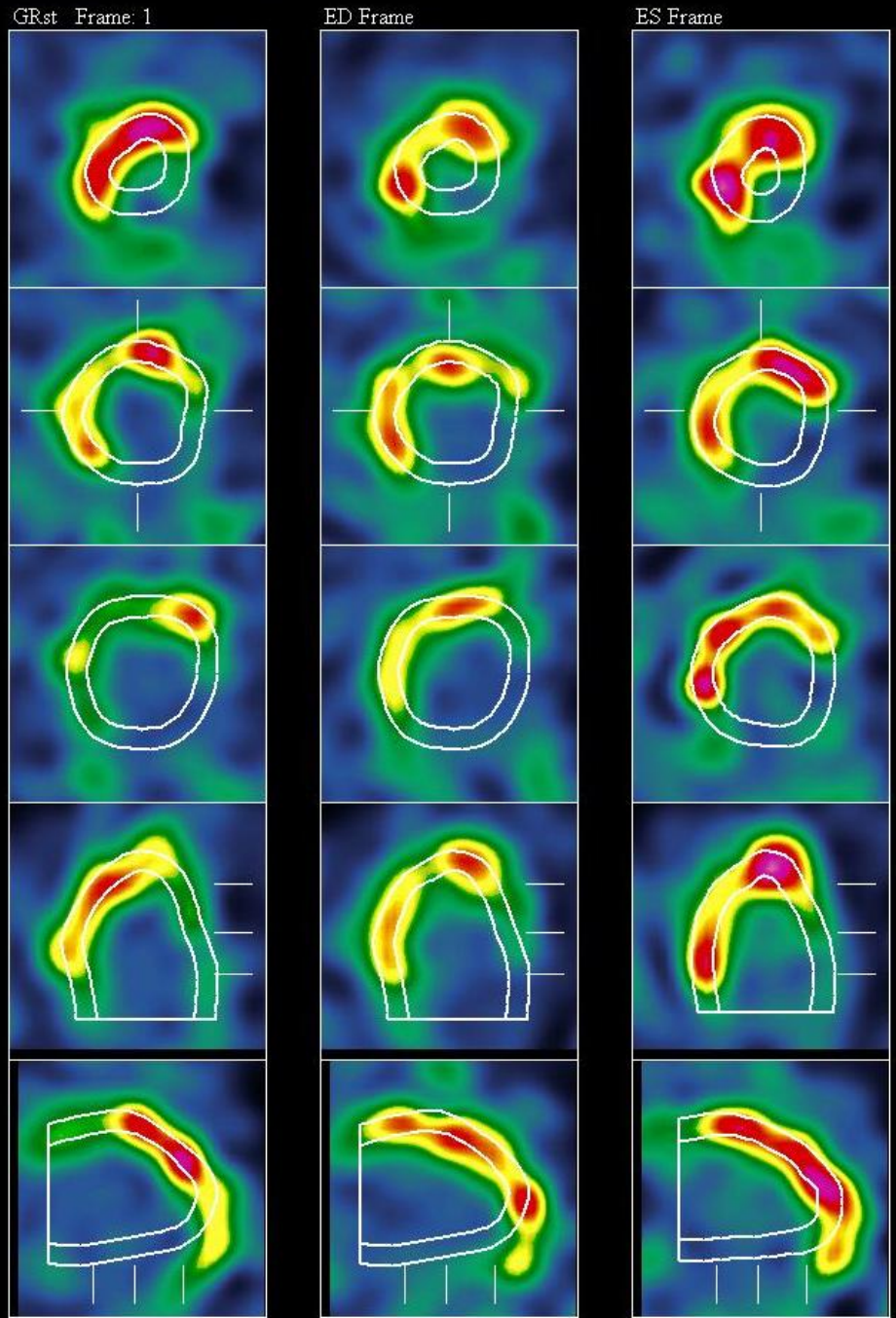


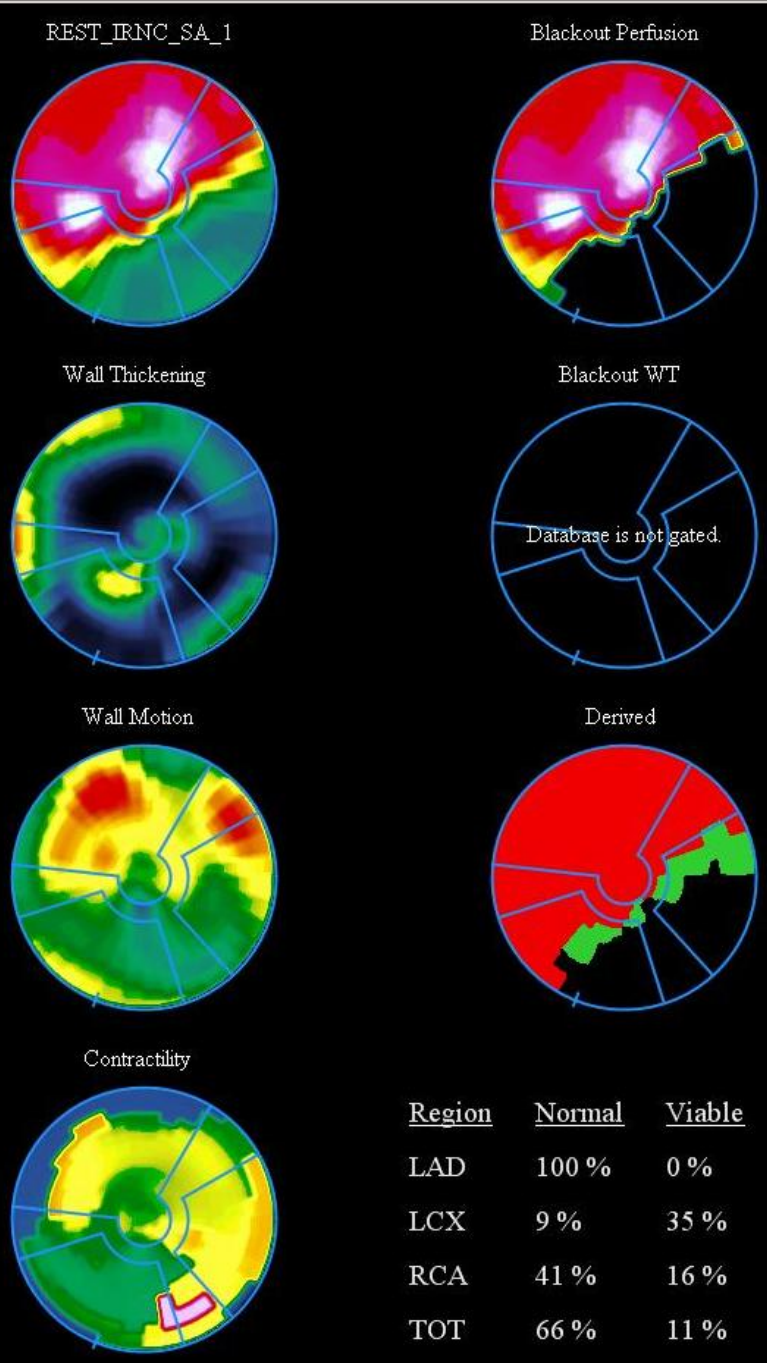


REST_IRNC_SA_1
23-Mar-2015 11:15:19
EF: 27 % SRS: 24

Tl-201 Chloride
EDV: 139 ml
ESV: 102 ml

61 yo Male





Region	Normal	Viable	Scar
LAD	100 %	0 %	0 %
LCX	9 %	35 %	56 %
RCA	41 %	16 %	43 %
TOT	66 %	11 %	23 %

REST_IRNC_SA_1
23-Mar-2015 11:15:19
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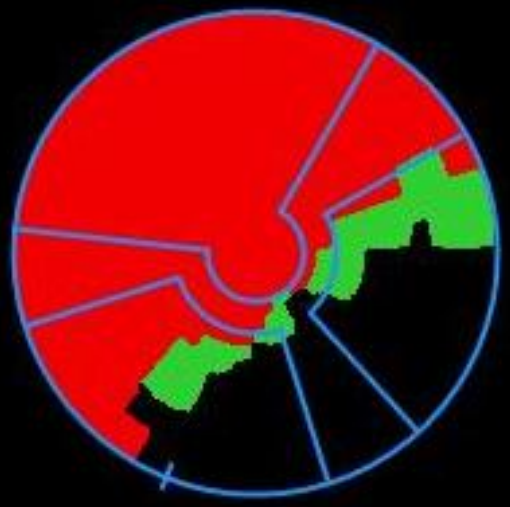
Derived



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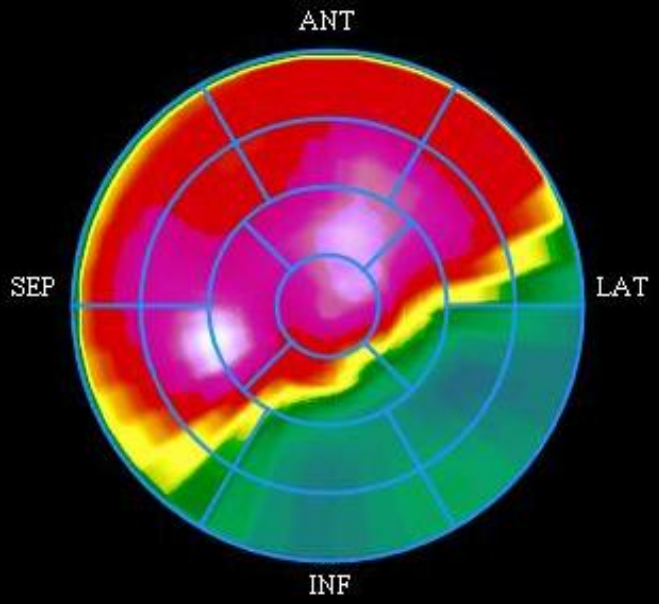
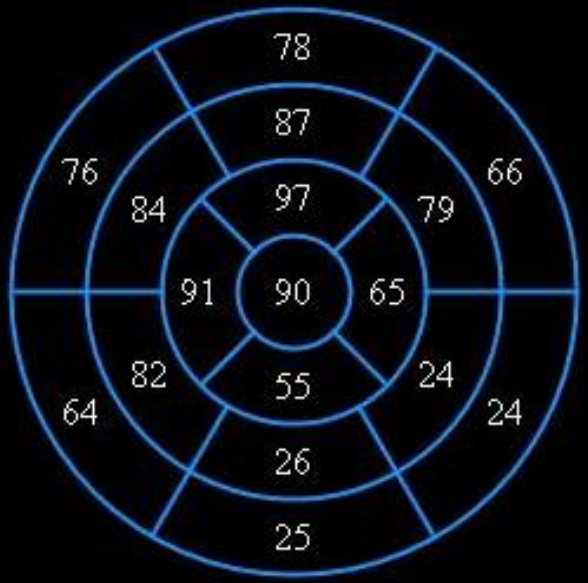


Regional Mean Statistics (%)



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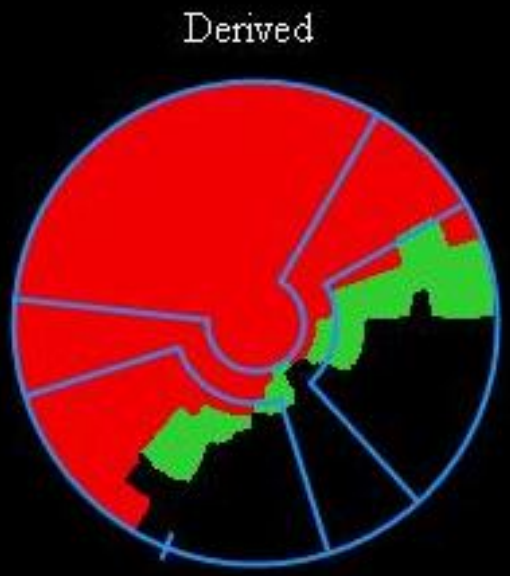

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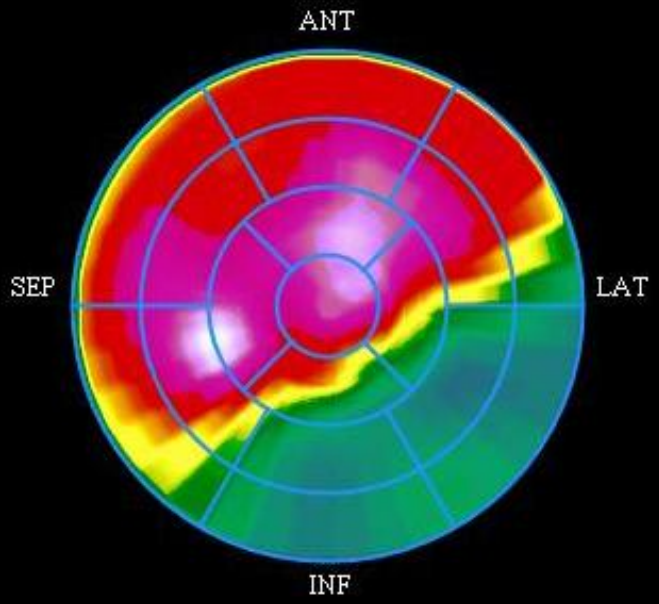
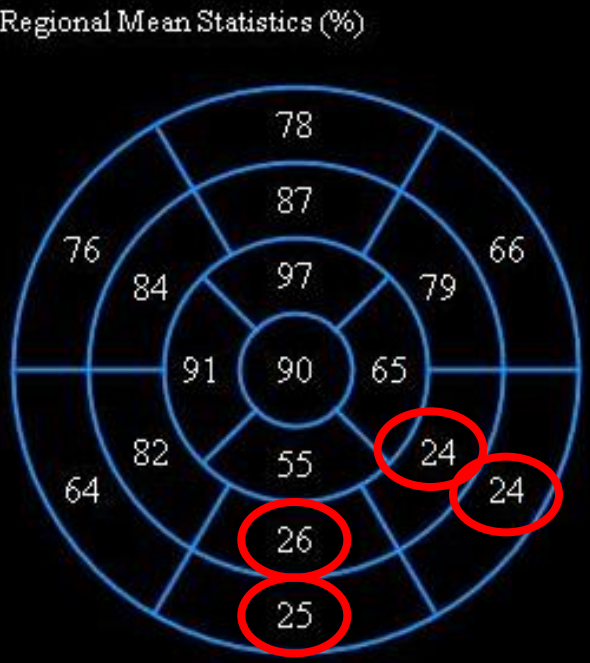
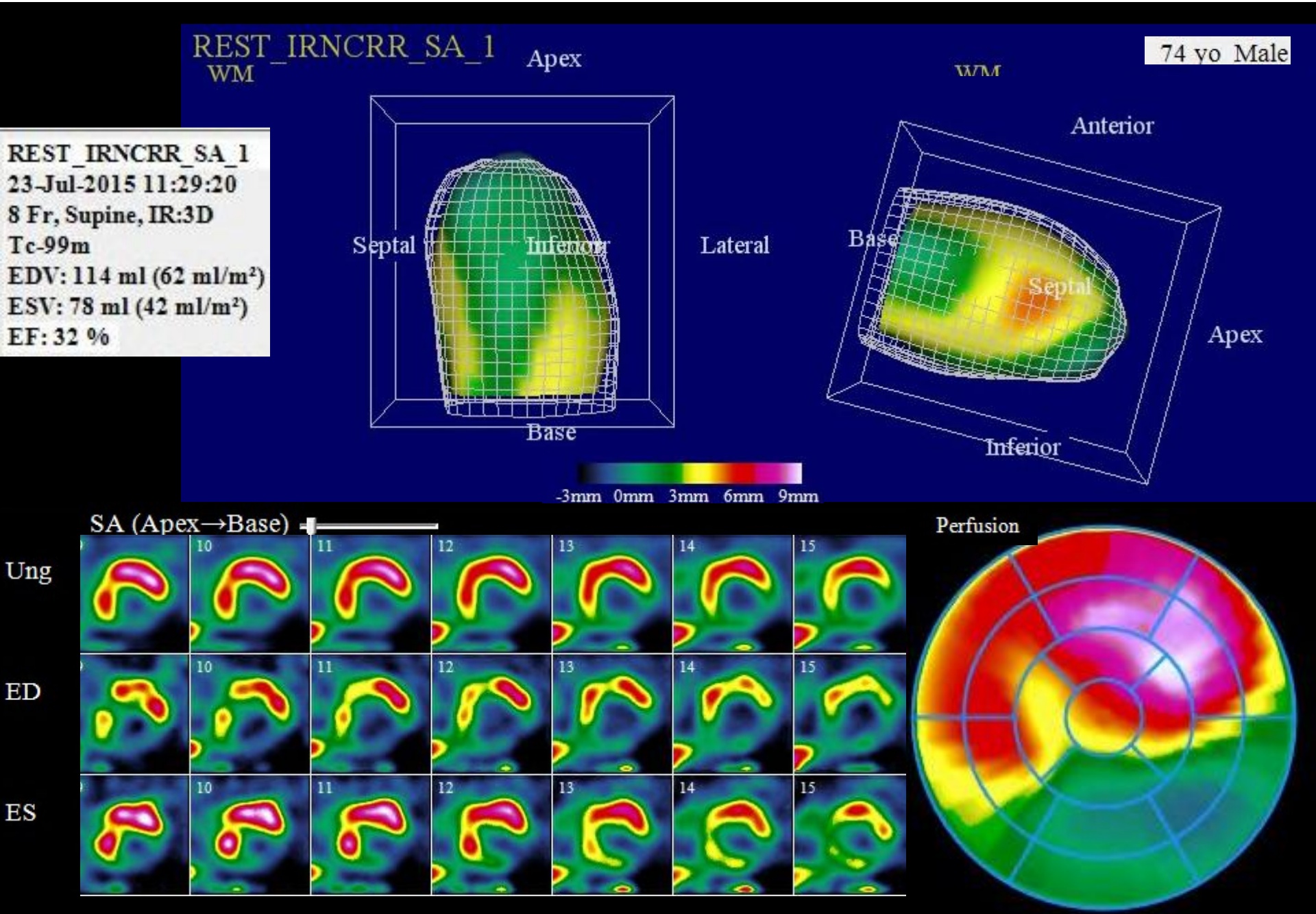


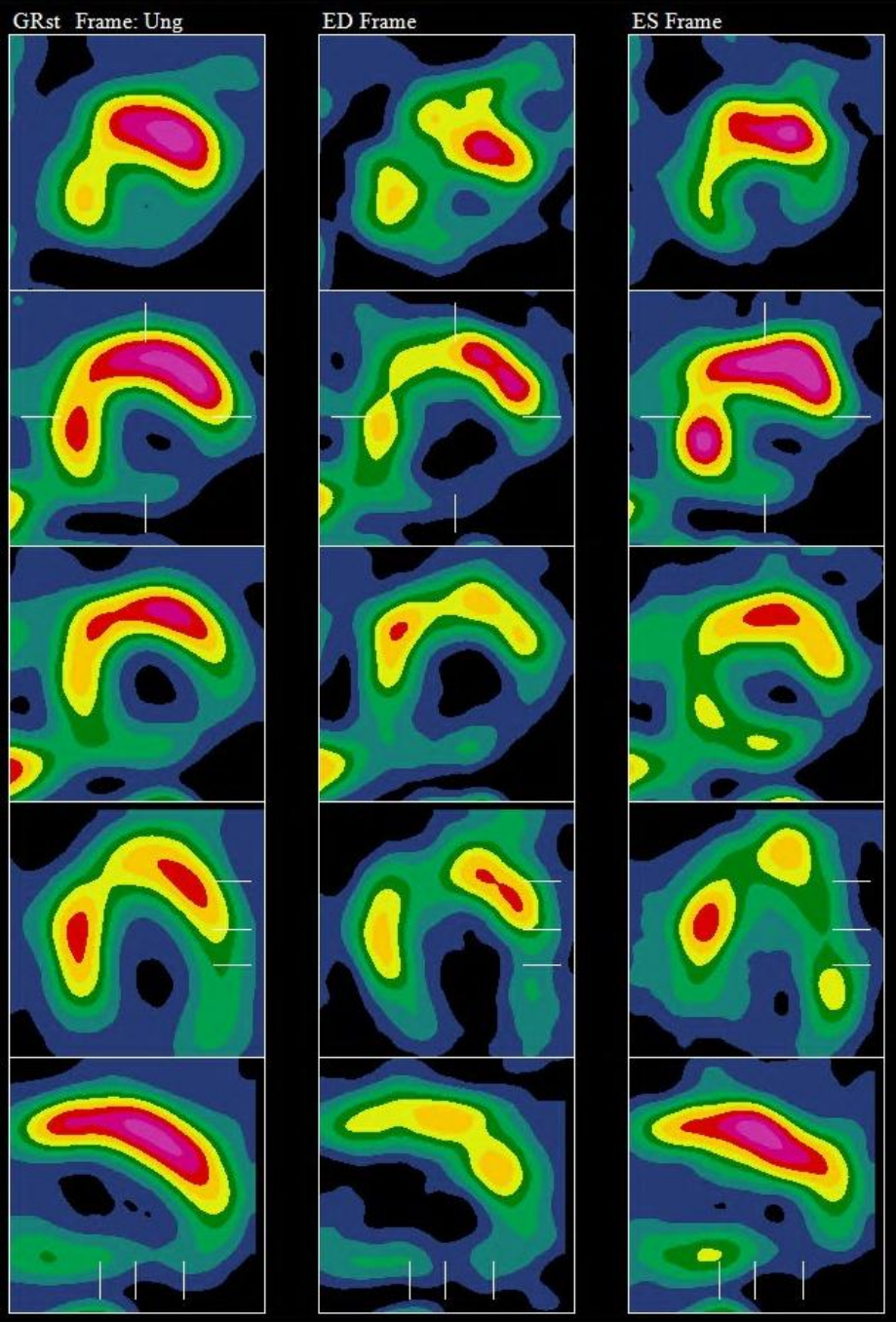


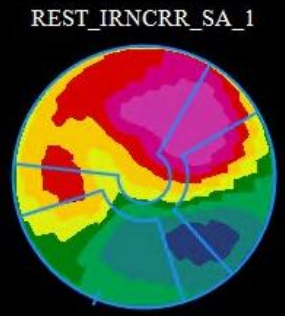
4 ze 17
segmentů
= 23,5%
z levé komory

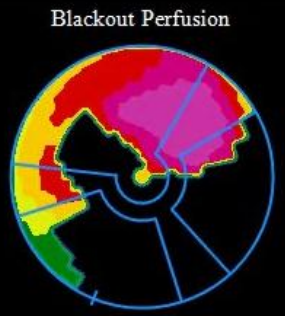
74letý muž. QIM spodní stěny, 3-VD, před CABG

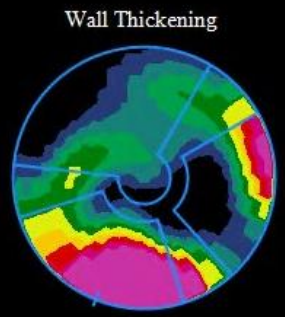


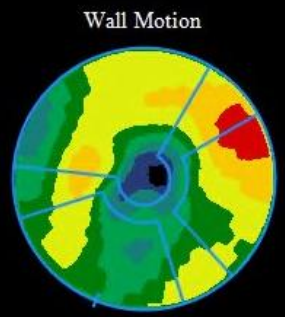
74 yo Male

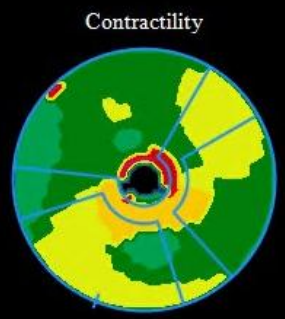












Region	Normal	Viable	Scar
LAD	67 %	33 %	0 %
LCX	20 %	41 %	39 %
RCA	18 %	48 %	34 %
TOT	44 %	36 %	20 %

74 yo Male

Derived

Region	Normal	Viable	Scar
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LCX	20 %	41 %	39 %
RCA	18 %	48 %	34 %
TOT	44 %	36 %	20 %

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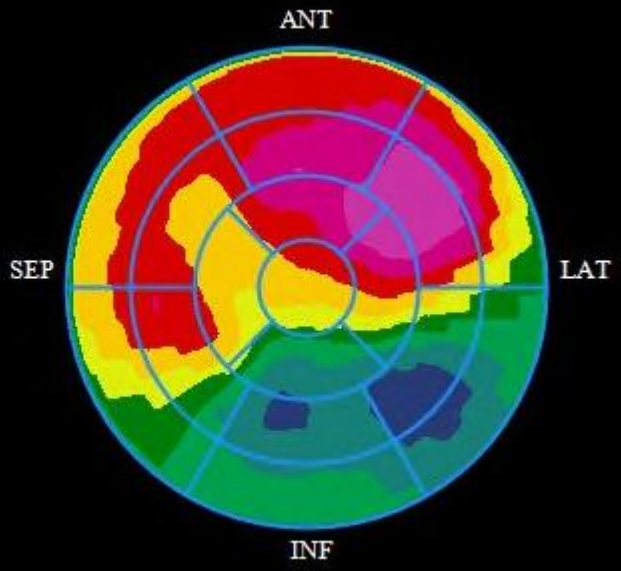
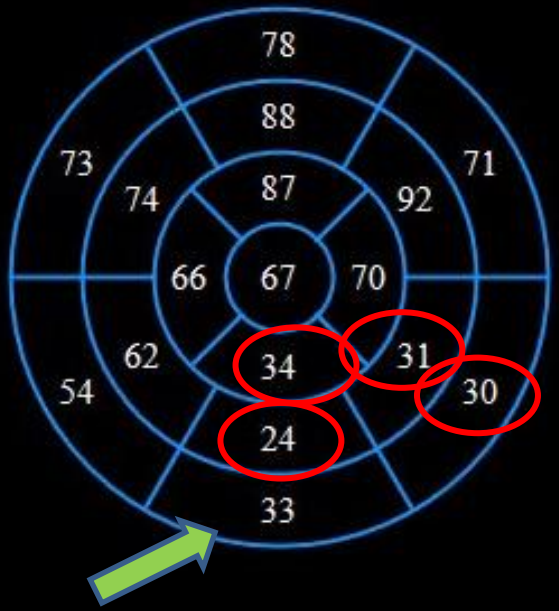
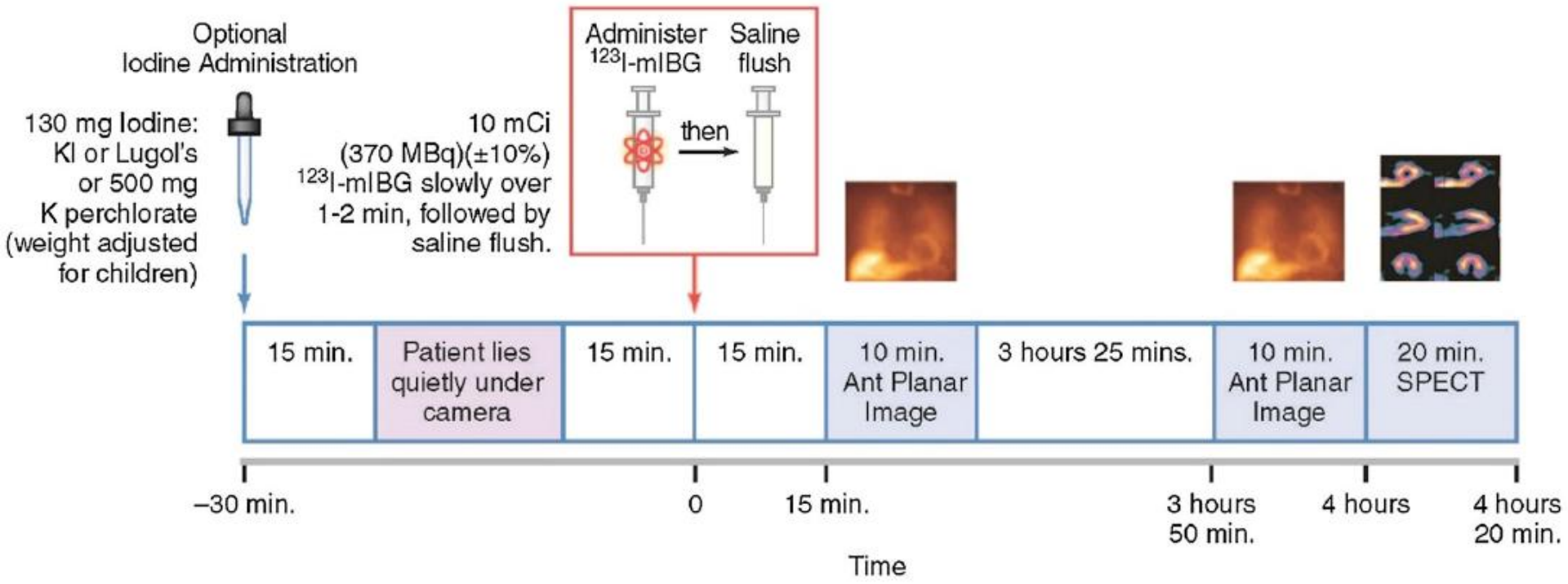


Regional Mean Statistics (%)

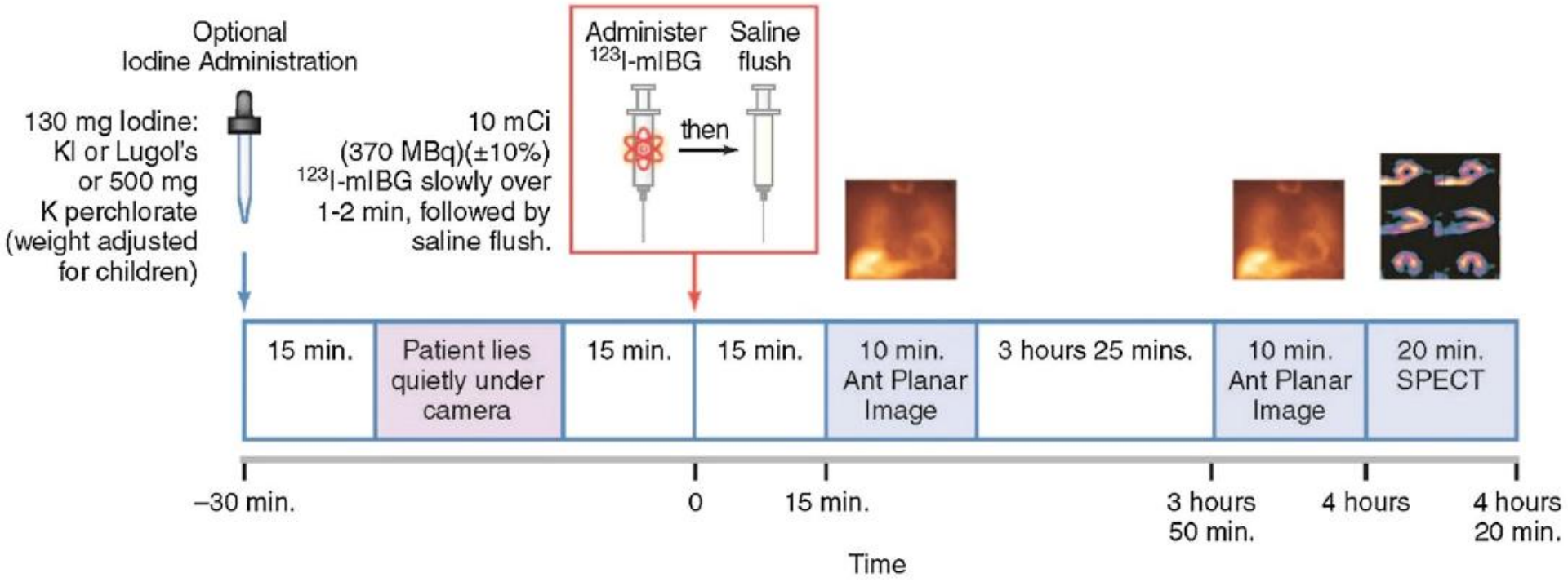


4 ze 17
segmentů
= 23,5 %
z levé komory

^{123}I-MIBG


Optional
Iodine Administration
130 mg Iodine:
KI or Lugol's
or 500 mg
K perchlorate
(weight adjusted
for children)
10 mCi
(370 MBq)(±10%)
123I-mIBG slowly over
1-2 min, followed by
saline flush.
Administer
123I-mIBG
then
Saline
flush
15 min.
Patient lies quietly under camera
15 min.
15 min.
10 min.
Ant Planar
Image
3 hours 25 mins.
10 min.
Ant Planar
Image
20 min.
SPECT
–30 min.
0
15 min.
3 hours
50 min.
4 hours
4 hours
20 min.
Time

^{123}I-MIBG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123I-mIBG slowly over
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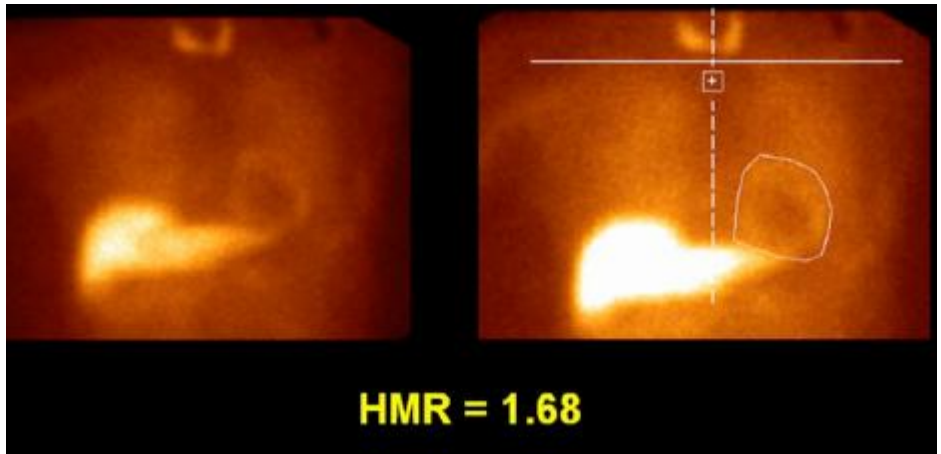
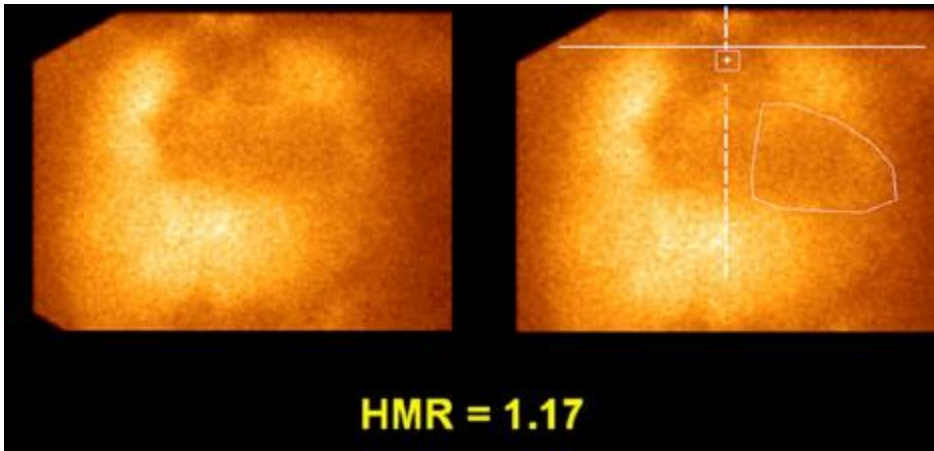
saline flush.
Administer
123I-mIBG
then
Saline
flush
15 min.
Patient lies quietly under camera
15 min.
15 min.
10 min. Ant Planar Image
3 hours 25 mins.
10 min. Ant Planar Image
20 min. SPECT
–30 min.
0
15 min.
3 hours 50 min.
4 hours
4 hours 20 min.
Time


HMR = 1.68


HMR = 1.17

^{123}I-MIBG SPECT for Evaluation of Patients with Heart Failure

Aukelien C. Dimitriu-Leen[1], Arthur J.H.A. Scholte[1], and Arnold F. Jacobson[2]

J Nucl Med. 2015

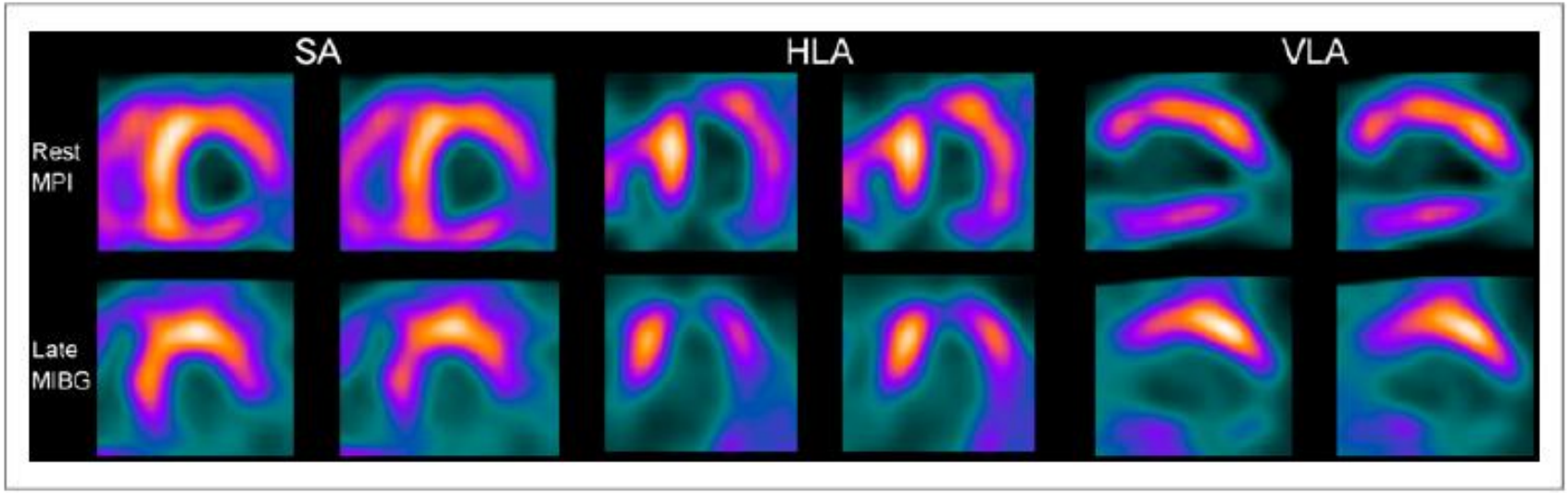
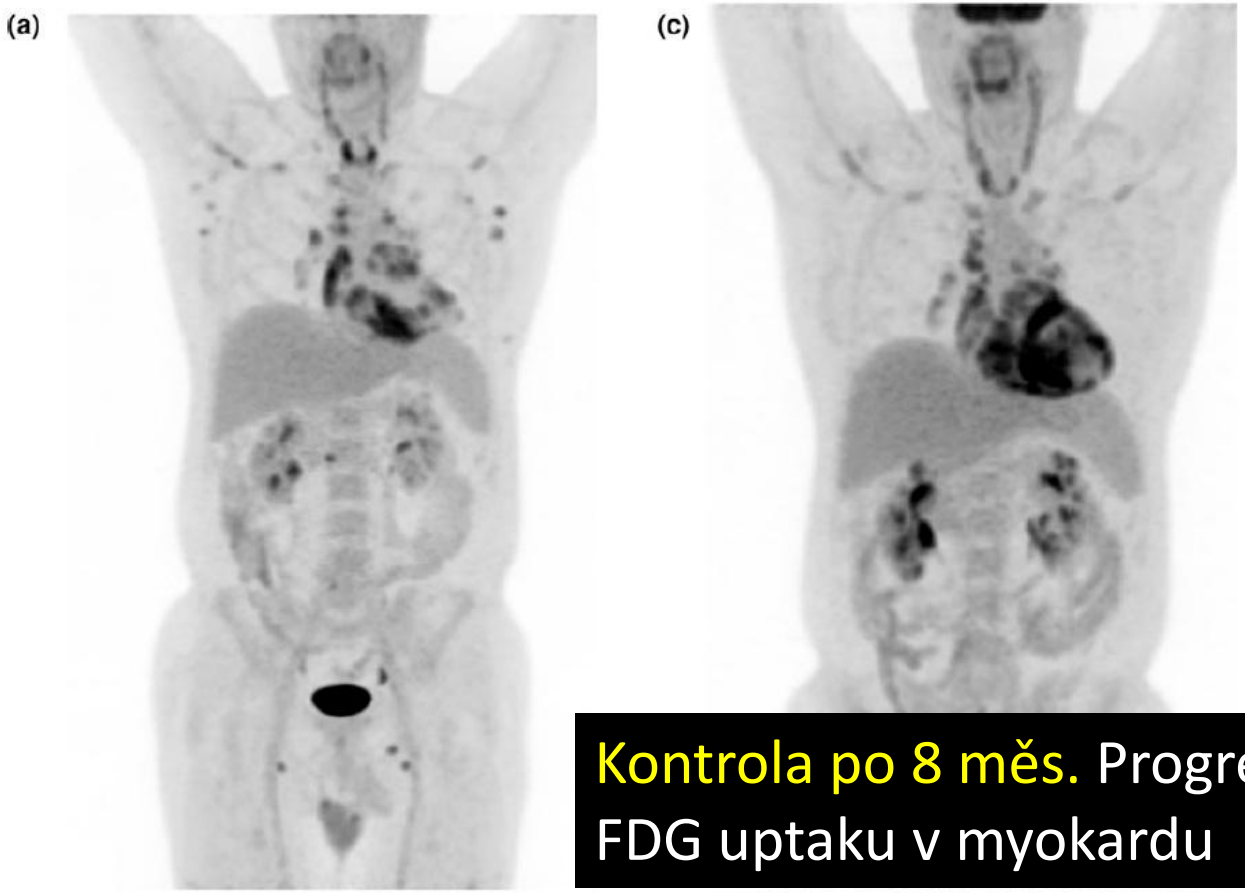


FIGURE 2. Innervation–perfusion mismatch between ^{123}I-MIBG SPECT and rest MPI with ^{99m}Tc-tetrofosmin. Rest MPI demonstrated large inferoposterolateral expanding apical defect in 63-y-old patient with ischemic cardiomyopathy. ^{123}I-MIBG SPECT demonstrated more extended inferolateral defect. HLA = horizontal axis; SA = short axis; VLA = vertical long axis.

Sarkoidóza srdce. Muž, 44let, PM pro AV blok III.

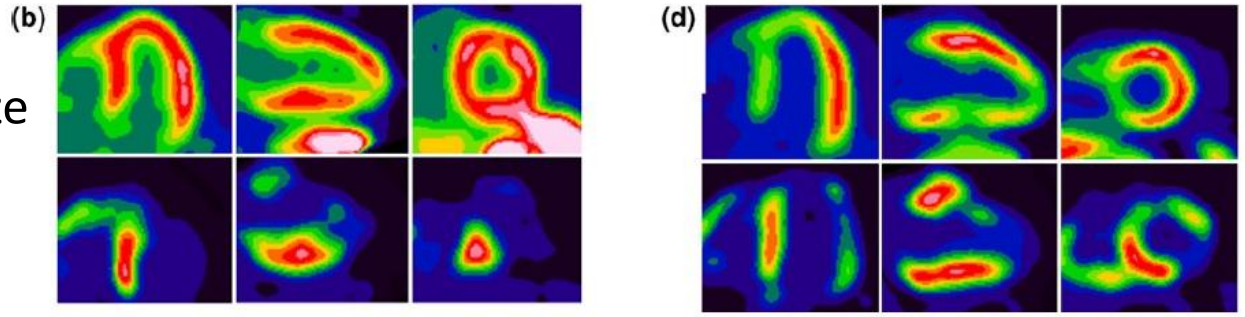
FDG



Kontrola po 8 měs. Progrese dušnosti a FDG uptaku v myokardu

Perfuze

FDG



Mc Ardle et al.
J Nucl Cardiol 2013

Amyloidóza

- hereditární
  transthyretinová (TTR)
  Tc-99m-DPD

- z lehkých řezězců (AL)
  F-18-florbetapir, florbetaben

Tc-DPD u TTR amyloidózy