



SPECT: fast cameras

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Anger cameras: limiting factors

1. Acquisition time
2. Limited resolution image
3. Artifacts (atenuation / movement)
4. **PATIENT'S RADIATION DOSE**

New systems

1. Different materials and geometry
2. Better collimator designs
3. Visual field optimization for the photon acquisition
4. New algorithms for image reconstruction



- ✓ **Higher sensibility (PHOTONS)**
- ✓ Higher quality and resolution
- ✓ Lower acquisition time and radiation dose
- ✓ Ergonomic designs

J Nucl Cardiol 2009;16:255–76



Digirad Cardius 3 XPO



CardiArc SPECT-HD

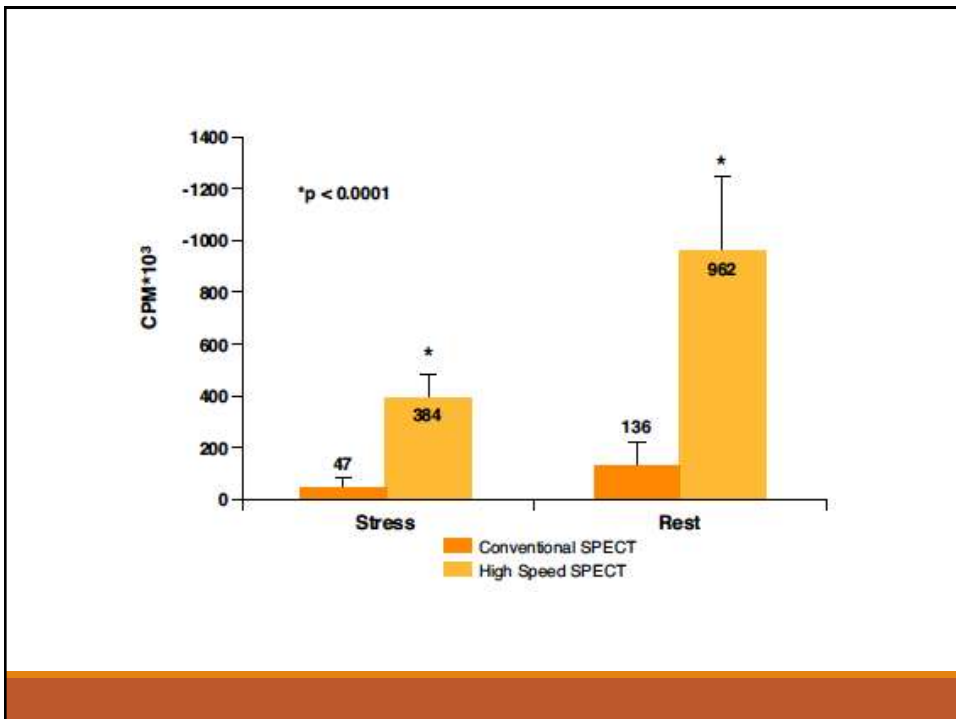
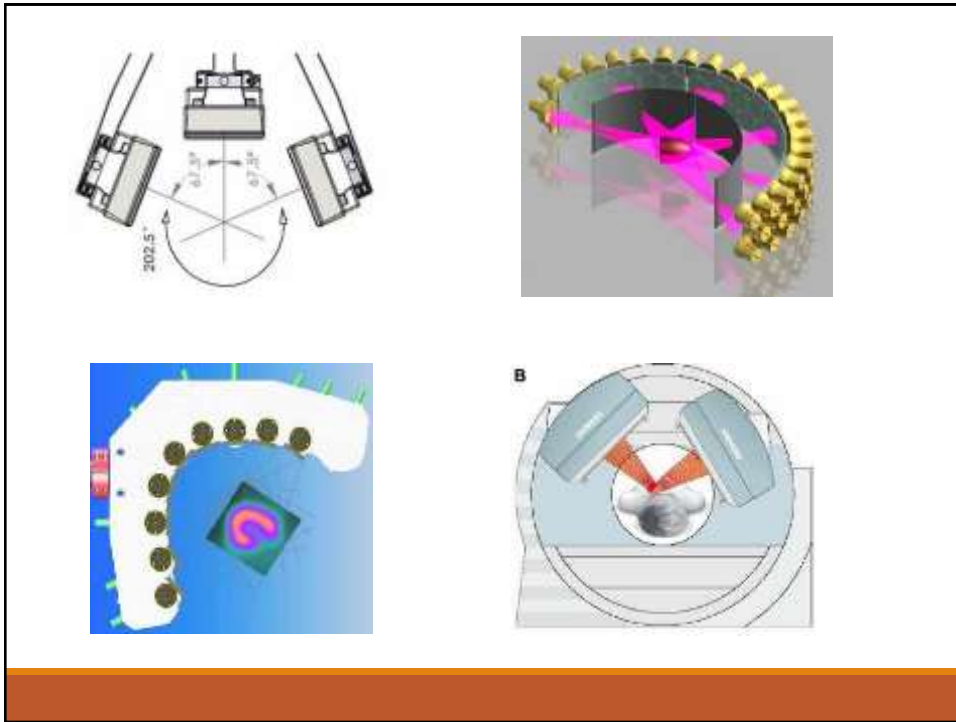


D-SPECT camera



IQ•SPECT

J Nucl Cardiol 2009;16:255–76
J Am Coll Cardiol Img 2008;1:156–63



High-Speed Myocardial Perfusion Imaging

Initial Clinical Comparison With Conventional Dual Detector Anger Camera Imaging

Tali Sharir, MD,* Simona Ben-Haim, MD, DSc,† Konstantine Merzon, MD,* Vitali Prochorov, MD,* Dalia Dickman PhD,‡ Shlomo Ben-Haim, MD, DSc,‡ Daniel S. Berman, MD§

Tel-Aviv and Caesarea, Israel; London, United Kingdom; and Los Angeles, California

J Am Coll Cardiol Img 2008;1:156–63

Cardiac Imaging

Multicenter Trial of High-Speed Versus Conventional Single-Photon Emission Computed Tomography Imaging

Quantitative Results of Myocardial Perfusion and Left Ventricular Function

Tali Sharir, MD,* Piotr J. Slomka, PhD,† Sean W. Hayes, MD,† Marcelo F. DiCarli, MD,‡ Jack A. Zúñiga, MD,§ William H. Martin, MD,|| Dalia Dickman, PhD,¶ Simona Ben-Haim, MD,¶ Daniel S. Berman, MD†

Tel Aviv, Israel; Los Angeles, California; Boston, Massachusetts; Miami, Florida; Nashville, Tennessee; Caesarea, Israel; and London, United Kingdom

J Am Coll Cardiol 2010;55:1965–74

Reduced administered activity, reduced acquisition time, and preserved image quality for the new CZT camera

Jenny Oddstig, PhD,^a Fredrik Hedeer, MD,^b Jonas Jögi, MD, PhD,^b Marcus Carlsson, MD, PhD,^b Cecilia Hindorf, PhD,^a and Henrik Engblom, MD, PhD^b

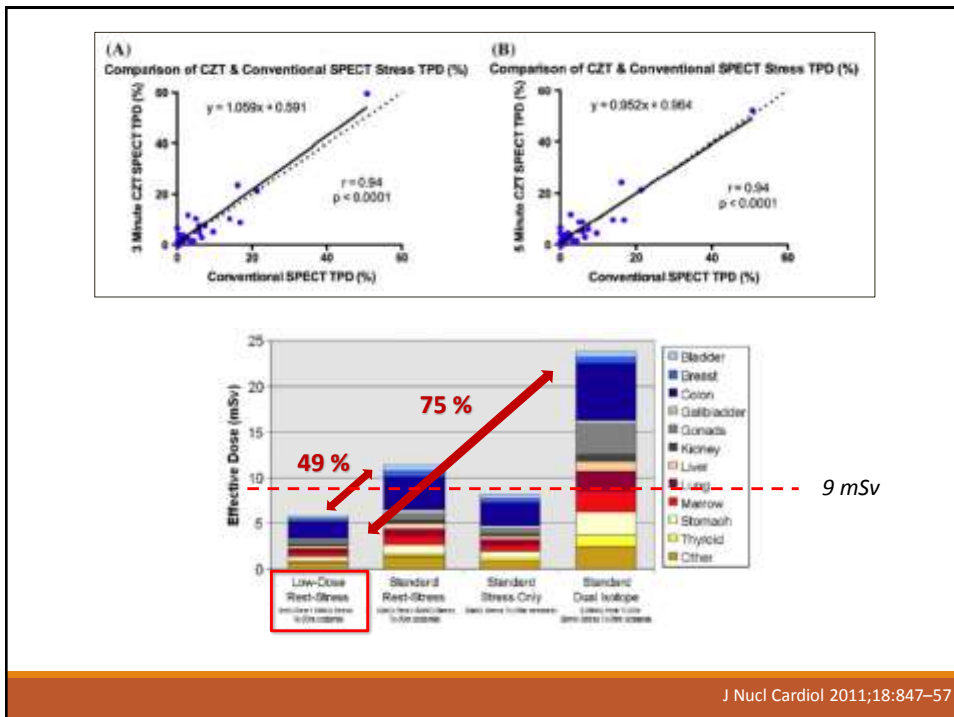
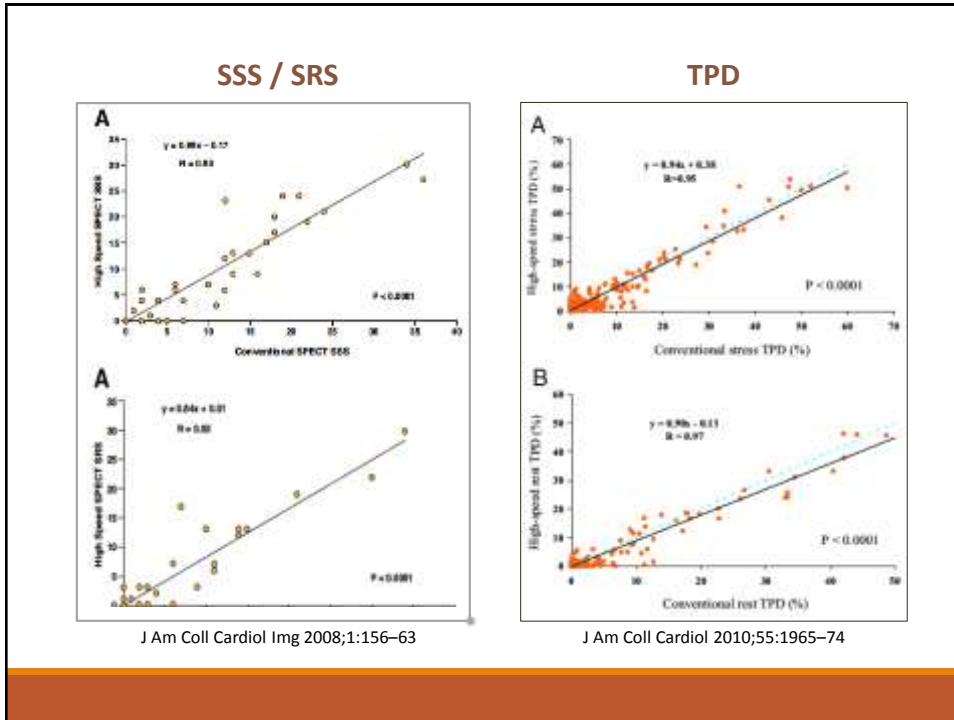
J Nucl Cardiol 2013;20:38–44

ORIGINAL ARTICLE

Reduced isotope dose and imaging time with a high-efficiency CZT SPECT camera

W. Lane Duvall, MD,^a Lori B. Croft, MD,^a Eric S. Ginsberg, MD,^b Andrew J. Einstein, MD, PhD,^c Krista A. Guma, CNMT,^a Titus George, CNMT,^a and Milena J. Henzlova, MD^a

J Nucl Cardiol 2011;18:847–57



Current Worldwide Nuclear Cardiology Practices and Radiation Exposure: Results from the 65 Country International Nuclear Cardiology Protocols Study (INCAPS)

Andrew J. Einstein, MD, PhD,
Columbia University Medical Center

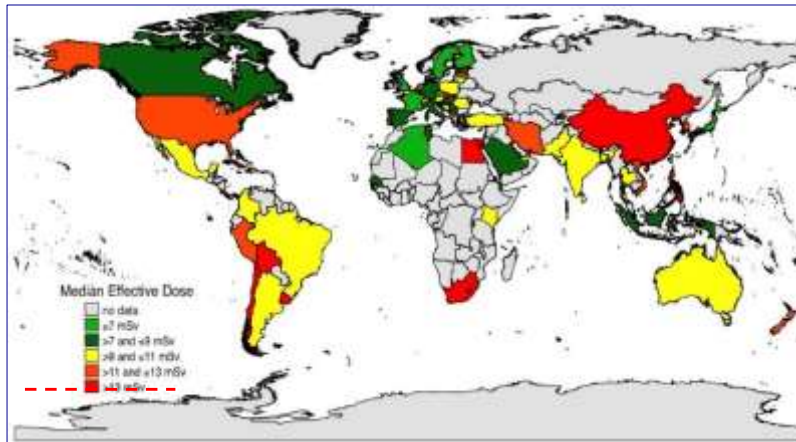


Table 5 – Relationship between laboratory best practice adherence and predicted patient effective dose of radiation. Results of final hierarchical regression model.

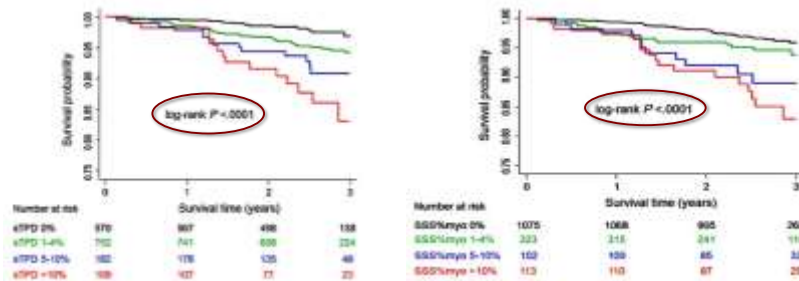
Best Practice/Factor	Reduction in Predicted Effective Dose [mSv]	95% Confidence Interval	Standard Error	p-value
Avoid Thallium Stress	2.91	1.76 – 4.05	0.58	<0.001
Avoid Dual Isotope	5.64	3.90 – 7.39	0.89	<0.001
Avoid Too Much Technetium	3.73	2.84 – 4.62	0.45	<0.001
Avoid Too Much Thallium	1.17	-2.89 – 5.23	2.07	0.57
Perform Stress Only Imaging	2.34	1.62 – 3.06	0.37	<0.001
Use Camera Based Dose Reduction Strategies	1.39	0.73 – 2.04	0.33	<0.001
Weight Based Dosing For Technetium	1.22	0.50 – 1.95	0.37	0.001
Avoid "Shine Through"	-0.87	-1.51 – -0.24	0.32	0.01
Age (years)	-0.004	-0.009 – 0.001	0.003	0.16
Female	0.29	0.17 – 0.41	0.06	<0.001
Weight (kg)	-0.03	-0.04 – -0.03	0.002	<0.001
Intercept (Predicted Effective Dose, mSv)	21.7	17.6 – 25.8	2.10	<0.001

ORIGINAL ARTICLE

Prognostic value of quantitative high-speed myocardial perfusion imaging

Ryo Nakazato, MD, PhD,^a Daniel S. Berman, MD,^{a,b} Heidi Gransar, MSc,^a Mark Hyun, CNMT,^a Romalisa Miranda-Peats, MPH,^a Faith C. Kite, CNMT,^a Sean W. Hayes, MD,^{a,b} Louise E. J. Thomson, MBChB,^{a,b} John D. Friedman, MD,^{a,b} Alan Rozanski, MD,^c and Piotr J. Slomka, PhD^{a,b}

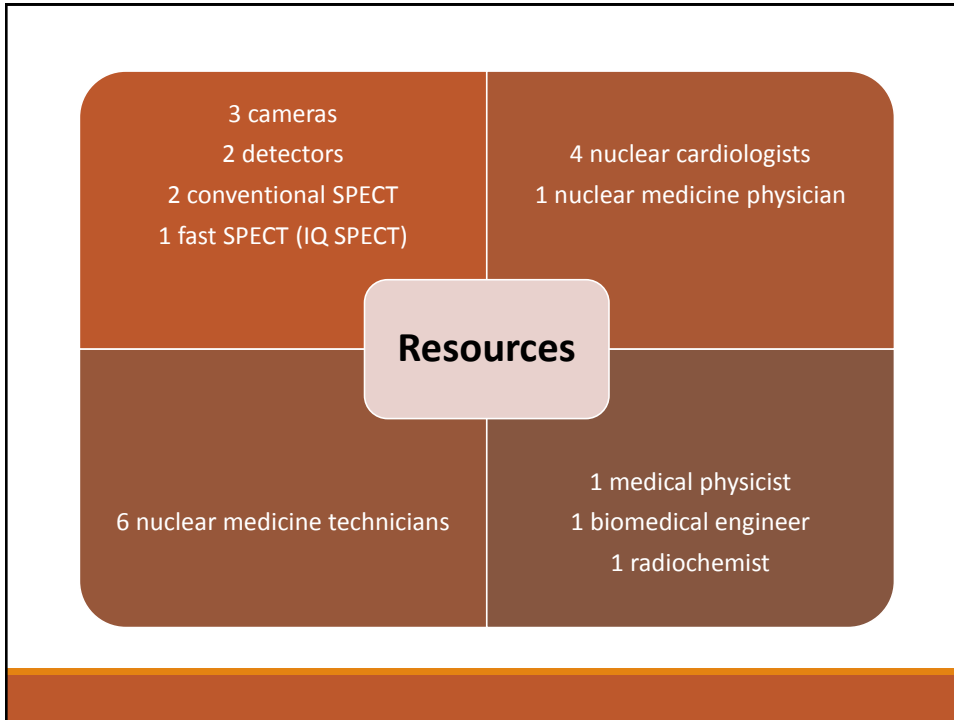
1,613 patients / fast cameras / 2.6 ± 0.5 years / MORTALITY



J Nucl Cardiol 2012;19:1113–23

NATIONAL HEART INSTITUTE
"IGNACIO CHÁVEZ"

NUCLEAR CARDIOLOGY





IQ SPECT

- SMARTZOOM collimators
- CARDIO-CENTERED acquisition
- Better reconstruction techniques



ACQUISITION PROTOCOLS

- 5 MIN STANDARD DOSE
- 8 min Half dose
- 16 mins Quarter dose

<http://www.healthcare.siemens.com/molecular-imaging/iq-spect-technology>

Clinical case 1

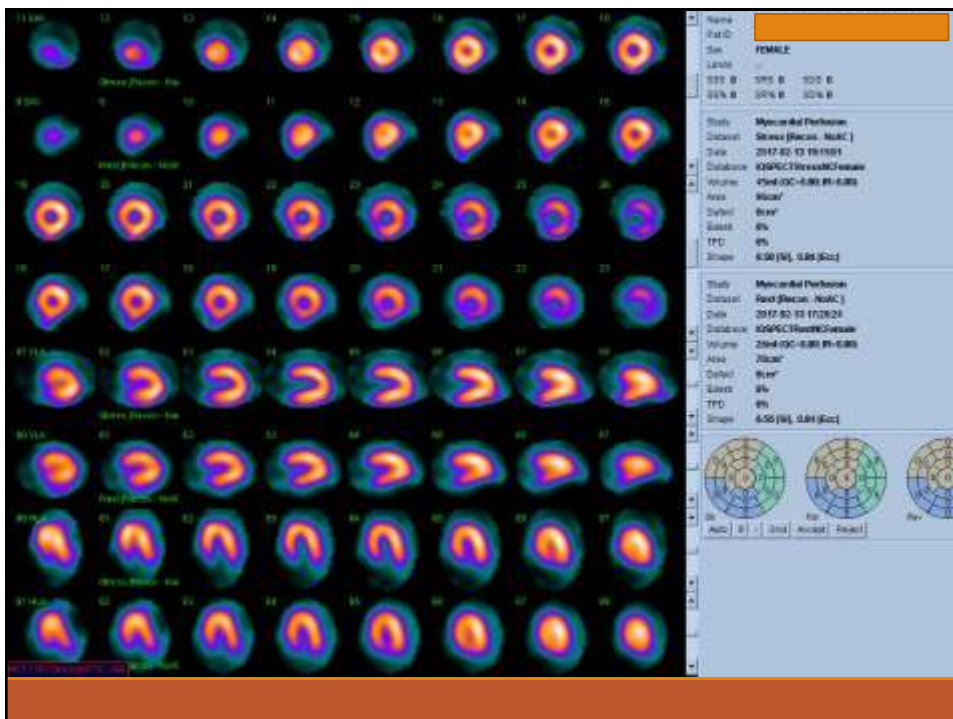
-AMNA
-45 years
-Feminine

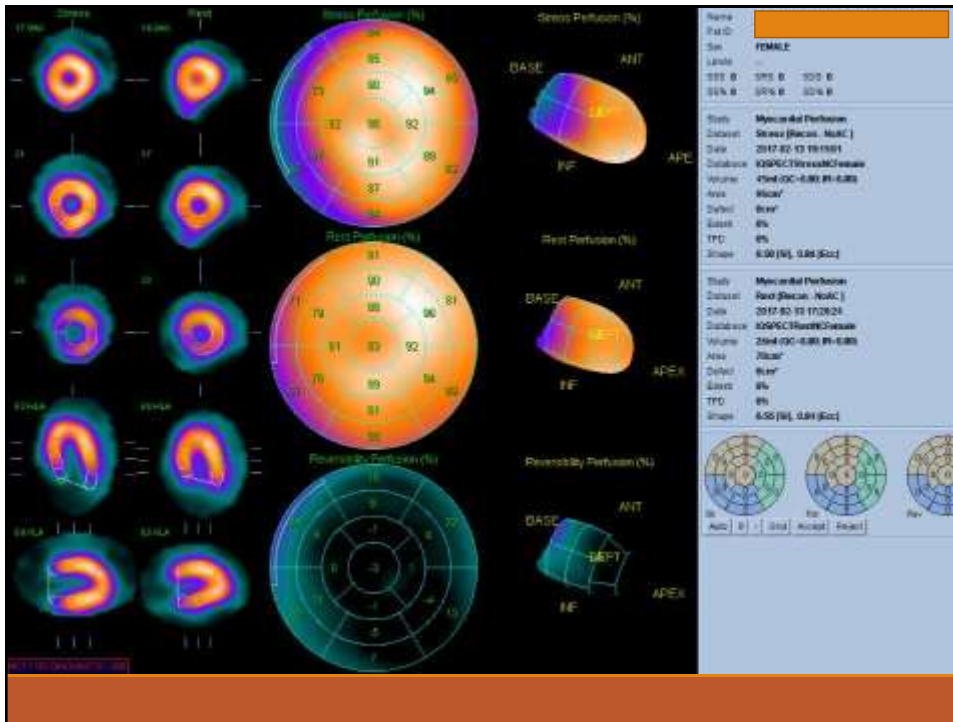
Background

-Smoker
-Type 2 diabetes mellitus
-Dyslipidemia

Clinical presentation

-Six months
-Chest pain, which increases with effort and diminishes with rest





Clinical case 2

-JMSR

-50 years

-Masculine

-BMI 23.6

Background

-Systemic Hypertension

-Smoker

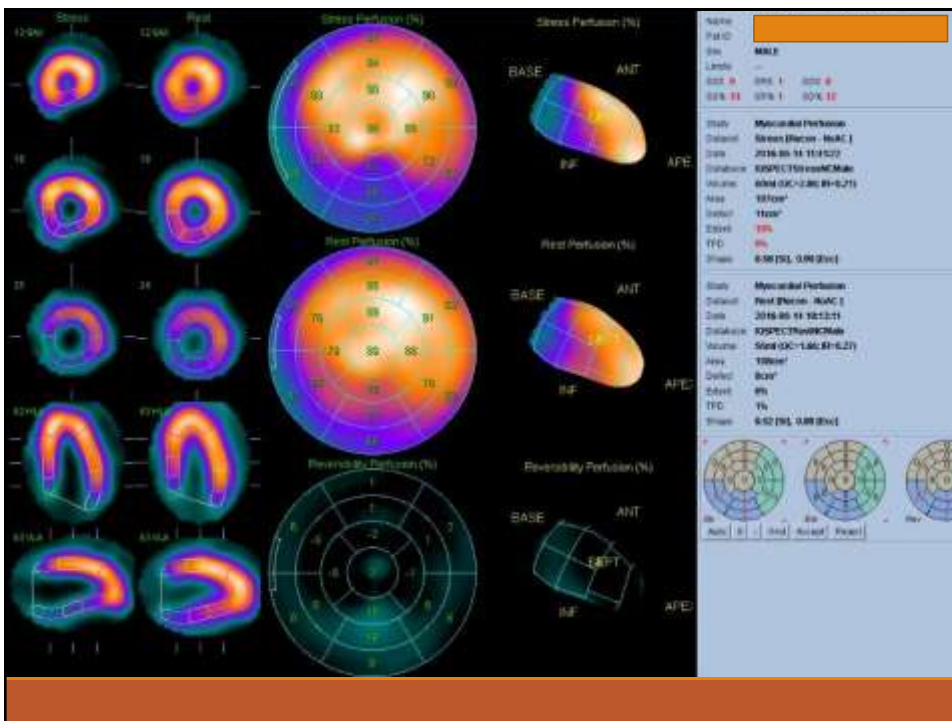
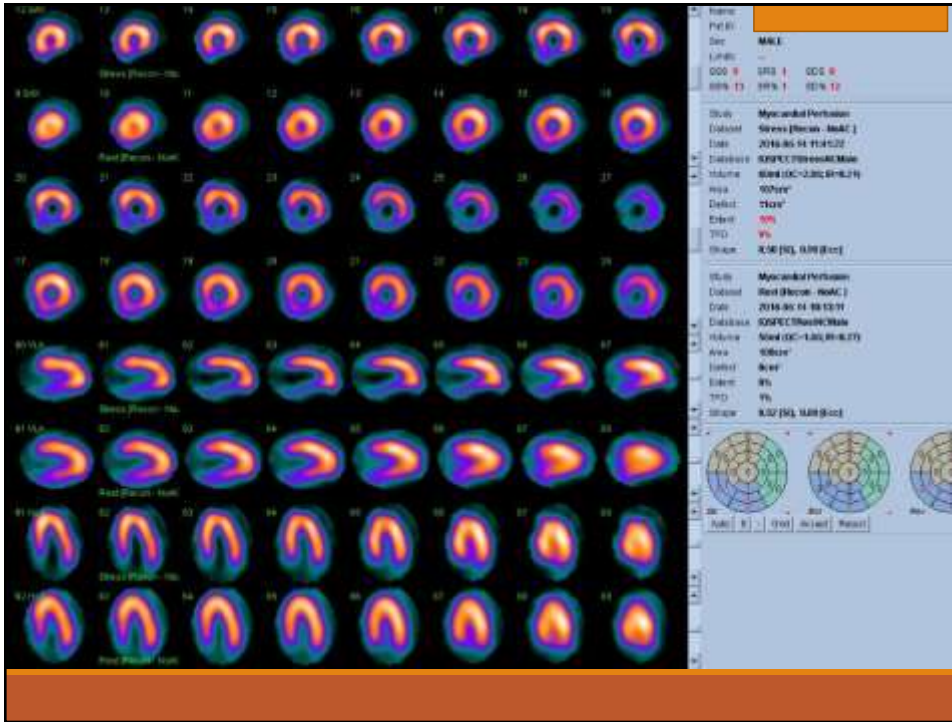
-Dyslipidemia

Clinical presentation

-Stable chronic angina

-NYHA functional Classification I

-Bezafibrate y metoprolol



Clinical case 3

-JAD

-69 years

-Masculine

-BMI 22.94

Background

-Hypertensión

-Type 2 diabetes mellitus

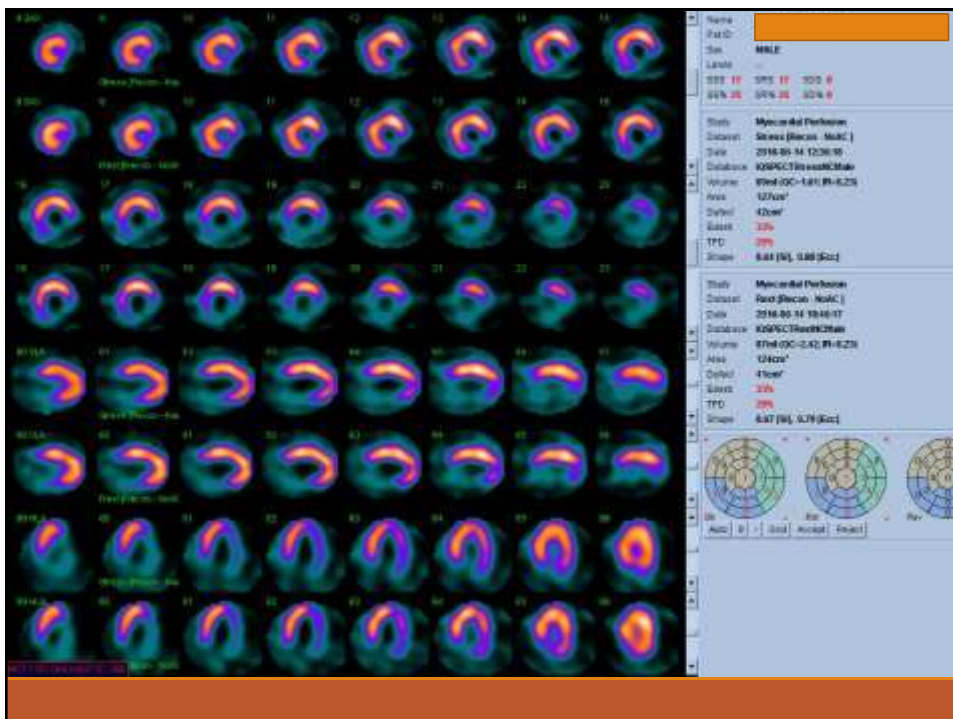
Clinical presentation

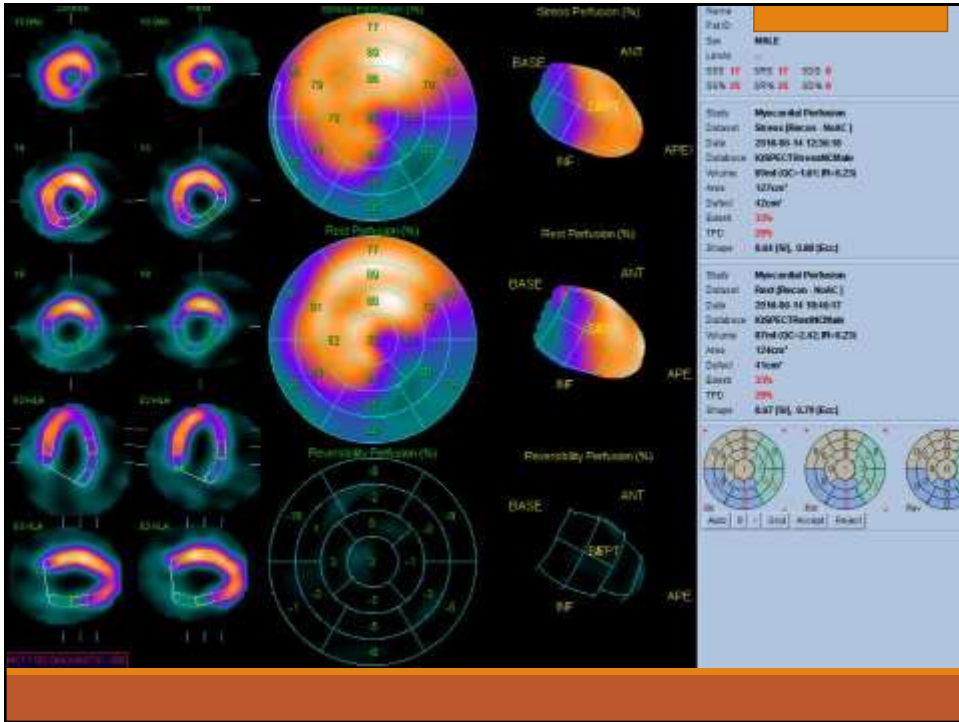
-Stable chronic angina

-One or two episodes per week

-NYHA functional Classification I

-ASA, losartan, metoprolol y atorvastatin





Myocardial Blood Flow



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Conclusions

- New technique
- Time of acquisition reduced
- Dose reduced
- Good quality
- Good sensitivity