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Product Demo

Anytown Cardiac Specialists, Inc.

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JAMES, ARTHUR	DOB: 01/01/1940	January 24, 2012
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INTRAVENOUS REGADENOSON MYOCARDIAL PERFUSION STUDY

(rest/pharmacologic stress SPECT with gated SPECT wall motion studies at rest and post-stress)

Ordering Physician: John Womack, MD, FACC

Clinical History: 72 year-old man with cardiac risk factors which include gender, age, known CAD, chronic renal failure, hyperlipidemia, hypertension, and obesity. The patient has a history of coronary artery bypass graft surgery, myocardial infarction, and percutaneous coronary intervention. Significant pre-test symptoms include dyspnea and syncope. His last Beta-blocker was administered 36 hours prior to the study. His height is 70 inches and weight is 278 lbs, with a BMI of 40 (BSA: 2.6 m²).

Indications for study: Known CAD (diagnostic and prognostic assessment), dyspnea, myocardial infarction, percutaneous coronary intervention, coronary artery bypass graft surgery, and syncope. **Pharmacologic indication:** Physician request.

REGADENOSON PHARMACOLOGIC STRESS

BASELINE ECG: Sinus rhythm at 60 bpm. PR: 0.180, QRS: 0.090, QT: 0.410, and Axis: +45. No arrhythmias. The baseline ECG revealed ST-segment depression in leads II, III, and AVF. T waves: biphasic in leads II, III, and AVF. QRS (Q waves): normal. Conduction: normal. INTERPRETATION: Abnormal ECG as described.

Regadenoson was infused over 10 seconds (total dose 0.4 mg) during which time the patient ambulated on the treadmill at 4.2 mph and 10% grade to a peak heart rate of 142 bpm (96% MPHR). BP increased from 110/74 to 188/78 at peak stress. STRESS ECG: Sinus tachycardia. No arrhythmias during stress or recovery. The stress ECG revealed 2.0 mm horizontal ST-segment depression in leads I, AVL, and V6. Conduction: normal. Testing was supervised and interpreted by John Womack, MD, FACC.

IMPRESSION:

1. Appropriate blood pressure response to intravenous regadenoson plus exercise.
2. Appropriate heart rate response to intravenous regadenoson plus exercise.
3. Patient reported general malaise.
4. Positive ECG for ischemia.
5. No arrhythmias during regadenoson infusion.

MYOCARDIAL PERFUSION IMAGING

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36 minutes following the intravenous administration of 9.60 mCi of ^{99m}Tc sestamibi, resting gated SPECT myocardial perfusion imaging was performed from the RAO to LPO positions, with the patient placed in the supine position. Subsequently, regadenoson was infused and 39.20 mCi of ^{99m}Tc sestamibi was injected intravenously. 65 minutes later, post-infusion gated SPECT myocardial perfusion imaging was performed from the RAO to LPO positions, with the patient placed in the supine and (non-gated) prone positions.

TABLE 1: Myocardial Perfusion Defects

Location	Type	Extent	Severity	CV Territory
anterolateral / inferolateral / lateral	reversible	large	severe	LCX

Summed stress score (SSS) = **15 (22%)**. Summed rest score (SRS) = **0**. Summed difference score (SDS) = **15**, a large amount of reversible perfusion abnormality (**22% of total myocardium is reversibly ischemic based on SDS = 15**).

The overall technical quality of the study is good.

IMPRESSION:

1. Severe degree of reversible perfusion abnormality in the basal to mid anterolateral, basal to mid inferolateral, and apical lateral segments, affecting a large amount of myocardium in the LCX territory.
2. No evidence of prior myocardial infarction.
3. Gated SPECT wall motion study at rest demonstrates severe global hypokinesis with EF = 30% and moderately enlarged ESV = 128 cc. Gated SPECT wall motion study at 65 minutes post-stress demonstrates similar wall motion with EF = 31% and moderately enlarged ESV = 132 cc. Overall functional imaging assessment: abnormal.
4. The probability of a hemodynamically significant coronary artery stenosis is considered to be high ($\geq 90\%$ probability). These findings are most consistent with a severe to critical stenosis in the LCX coronary circulation. The large amount of reversible perfusion abnormality combined with a severely reduced post-stress EF and moderately enlarged post-stress ESV predicts a high risk of cardiac mortality over the next 1-2 years. Clinical correlation is required.



John Womack, MD, FACC
(01/24/2012)

cc: Tom Smith, MD

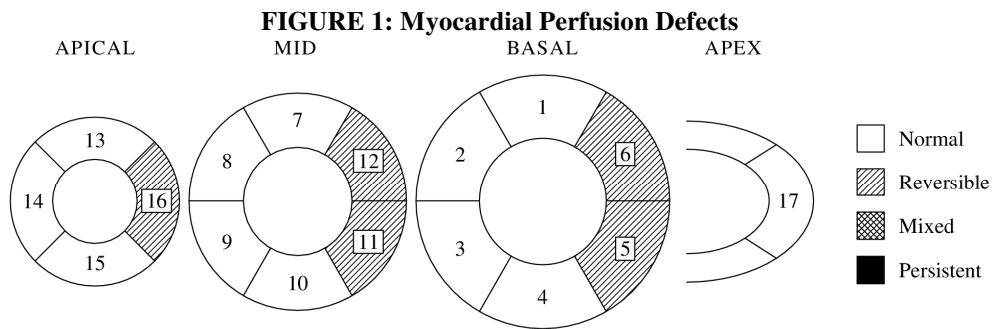


TABLE 2: Perfusion Scores (17-segment model)

SAX APICAL				SAX MID			SAX BASAL			APEX					
	#	S	R	#	S	R	#	S	R	APX	#	S	R		
ANT	13	0	0	ANT	7	0	0	ANT	1	0	0	APX	17	0	0
SEP	14	0	0	A-S	8	0	0	A-S	2	0	0				
INF	15	0	0	I-S	9	0	0	I-S	3	0	0				
LAT	16	3	0	INF	10	0	0	INF	4	0	0				
				I-L	11	3	0	I-L	5	3	0				
				A-L	12	3	0	A-L	6	3	0				

TABLE 3: Perfusion Score Legend

Score	Meaning
0	Normal
1	Mildly Reduced/Equivocal
2	Moderately Reduced
3	Severely Reduced
4	Absent Uptake

TABLE 4: Observed vs. Expected Volumes and EF

	Observed (STRESS)	Expected (STRESS)
EDV	190 cc	<= 191 cc (75 cc/m ²)
ESV	132 cc	<= 99 cc (39 cc/m ²)
EF	31%	>= 50%

NAME: JAMES ARTHUR
 DOB: 01/01/1940
 Study Date: 1/24/12
 MRN: _____
 Cardiologist/ Ordering MD: J. WOMACK
 Primary MD: T. SMITH
 CC TO: _____
 ID VERIFIED BY: JDW

I.V. Regadenoson

- Risk Factors**
- CAD, Known
 - CAD, Family History
 - Diabetes
 - ED
 - Hyperlipidemia
 - Hypertension
 - Metabolic Syndrome
 - Obesity
 - PAD
 - Renal Failure
 - Smoking, Current

- Cardiac History Study Indications**
- Abnormal ECG
 - Abnormal Stress Echo
 - Abnormal Treadmill
 - Arrhythmias, Atrial
 - Arrhythmias, Ventricular
 - Cardiomyopathy
 - CHF
 - CAD, Known
 - Prior MI
 - Prior PCI-Stent
 - Prior CABG
 - Viability Study

- Pre-Test Symptoms Study Indications**
- Chest Pain NOS
 - Angina, Typical
 - Angina, Atypical
 - Anginal Equivalent
 - Non-anginal Chest Pain
 - Dyspnea
 - Syncope

Last β -blocker: 36 hrs ago
 Height: 70 inches Gender: M F
 Weight: 278 lbs

- Special Conditions**
- Asthma
 - Inhalers
 - Defibrillator
 - Pacemaker

Other Indications

Pre-Op Eval

Pharm. Indication

DATA	STRESS	RECOVERY	Age: <u>72</u> ; MPHR is _____ bpm; 85% of MPHR is _____ bpm.
	BP <u>110/74</u>	BP <u>186/80</u>	Total dose: <u>0.4</u> mg (0.4 mg/5 mL)
	HR <u>62</u>	HR <u>140</u>	GIVEN AS A BOLUS OVER 10 SECONDS
0 min.	<u>139/76</u>	2 min. <u>162/78</u>	Isotope injected at <u>45</u> seconds @ _____ bpm
1 min.	<u>162/80</u>	4 min. <u>140/72</u>	The patient: <input checked="" type="checkbox"/> exercised at <u>4.2</u> mph and <u>10</u> % grade for <u>5</u> minutes
2 min.	<u>188/78</u>	6 min. <u>132/70</u>	<input type="checkbox"/> did not exercise
3 min.		BP PEAK STRESS: <u>188/78</u>	
4 min.		HR PEAK STRESS: <u>142</u>	
5 min.			

Baseline ECG
NSR rhythm at 60 bpm
 PR: .18 seconds QRS: .09 seconds
 QT: .41 seconds Axis: +45 degrees

normal
 Arrhythmias: _____
 ST: normal
 depressed in leads II, III, F Early Repol
 elevated in leads _____
 Non-Specific ST Abnormality

T waves: normal
 biphasic in leads II, III, F Flat _____
 inverted in leads _____ Tall _____
 Non-Specific T Abnormality

QRS: normal **Baseline ECG Interpretation**
 (A) Conduction Abnormalities: Normal ECG
 Abnormal ECG due to: _____
 (B) Q Waves: _____ Borderline ECG due to: _____

Test Terminated Due To:

Infusion Complete _____
 _____ _____

- IMPRESSION**
- Appropriate Paradoxical Increased
 Blunted Hypotensive **BP response**
 - Appropriate Exaggerated Increased
 Blunted **HR response**
 - Negative Equivocal **ECG for ischemia.**
 Positive Uninterpretable
 - No arrhythmias V. couplets
 PAC's PVC's V. tach. (____ beats)
 during after regadenoson infusion.

Stress ECG Rhythm S.T. Arrhythmia _____
 No ischemic ST-T changes
 ST segment depression up to 2 mm with:
 upsloping
 horizontal configuration in leads I, AVL, V6
 downsloping
 ST segment elevation of _____ mm in leads _____
 New Conduction ABNL: _____
 New T Wave ABNL: _____

5. Patient Noted:
- No symptoms Dyspnea
 - Chest pain/discomfort Headache
 - General malaise Lightheadedness
 - Nausea _____
6. Aminophylline _____ mg administered starting _____:_____ after isotope injection.
7. _____

Recovery ECG Comments: _____

J. Womack
 MD/PA/NP signature

TECHNOLOGIST WORKSHEET

Name: JAMES, ARTHUR DOB: 01 / 01 / 40

Study Date: 1 / 29 / 12
MM DD YYYY

Patient ID on Modality: 0804

Study Type: REG. MPI

Female patient bra/cup size: /

Breast Surgery: YES / NO

Location: LEFT / RIGHT

Patient's Height: 70 inches

Describe: _____

Weight: 278 lbs

Gender: Male Female

REST IMAGING

STRESS IMAGING

REST DOSE: 9.6 mCi

STRESS DOSE: 39.2 mCi

INJECTION TIME: 09 HH : 10 MM

INJECTION TIME: 10 HH : 30 MM

SCAN START TIME: 09 HH : 46 MM

SCAN START TIME: 11 HH : 35 MM

Pharmaceutical: Sestamibi
 Tetrofosmin
 Rubidium-82
 Thallium

Pharmaceutical: Sestamibi
 Tetrofosmin
 Rubidium-82
 Thallium

Rejected / Total Beats: 1 / 104

Rejected / Total Beats: 2 / 100

Basketball Motion: YES / NO

Basketball Motion: YES / NO

Upward Creep: YES / NO

Upward Creep: YES / NO

Acq. Gating Failure: YES / NO

Acq. Gating Failure: YES / NO

MoCo estimate from review of raw REST data:

MoCo estimate from review of raw STRESS data:

NONE MODERATE*
 MILD SEVERE*

NONE MODERATE*
 MILD SEVERE*

*** Note: Moderate or Severe cardiac motion requires IMMEDIATE repeat imaging.**

Stress prone imaging performed: YES / NO

Notes: _____

Attenuation correction: _____

Repeat imaging start times:

_____ HH : _____ MM REST / STRESS

_____ HH : _____ MM REST / STRESS

X TAS
Technologist initials

PERFUSION RESULTS

Name: JAMES, ARTHUR DOB: 01, 01, 40

Prone performed YES / NO

SSS: 15

SRS: 0

SDS: 15

TID ratio: 1.12

TID is abnormal

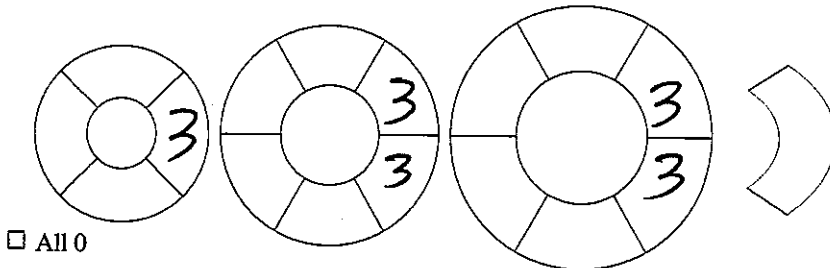
APICAL

MID

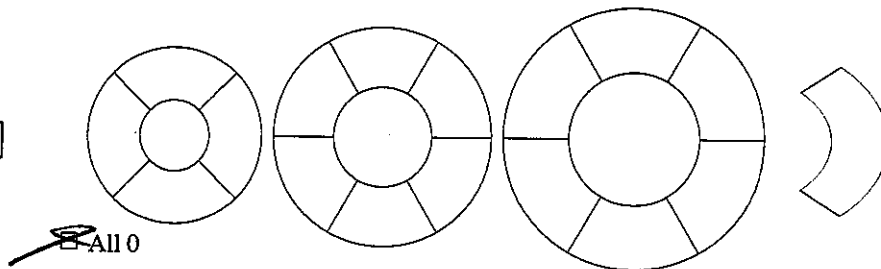
BASAL

APEX

STRESS



REST



Perfusion Results:

Normal

Abnormal

LVH

RVE

RVH

Attenuation { BREAST
 INFERIOR

	SEGMENTAL PERFUSION DEFECTS							TYPE	EXTENT	SEVERITY	CVT
A	BASAL	A	AS	IS	I	IL	AL	REVERSIBLE	SMALL	MILD	LAD
	MID	A	AS	IS	I	IL	AL	PERSISTENT	MEDIUM	MODERATE	DIAGONAL
	APICAL	A	S		I	L		MIXED	LARGE	SEVERE	LCX
	APEX				APEX						RCA/PDA
B	BASAL	A	AS	IS	I	IL	AL	REVERSIBLE	SMALL	MILD	LAD
	MID	A	AS	IS	I	IL	AL	PERSISTENT	MEDIUM	MODERATE	DIAGONAL
	APICAL	A	S		I	L		MIXED	LARGE	SEVERE	LCX
	APEX				APEX						RCA/PDA
C	BASAL	A	AS	IS	I	IL	AL	REVERSIBLE	SMALL	MILD	LAD
	MID	A	AS	IS	I	IL	AL	PERSISTENT	MEDIUM	MODERATE	DIAGONAL
	APICAL	A	S		I	L		MIXED	LARGE	SEVERE	LCX
	APEX				APEX						RCA/PDA
D	BASAL	A	AS	IS	I	IL	AL	REVERSIBLE	SMALL	MILD	LAD
	MID	A	AS	IS	I	IL	AL	PERSISTENT	MEDIUM	MODERATE	DIAGONAL
	APICAL	A	S		I	L		MIXED	LARGE	SEVERE	LCX
	APEX				APEX						RCA/PDA

FUNCTION RESULTS

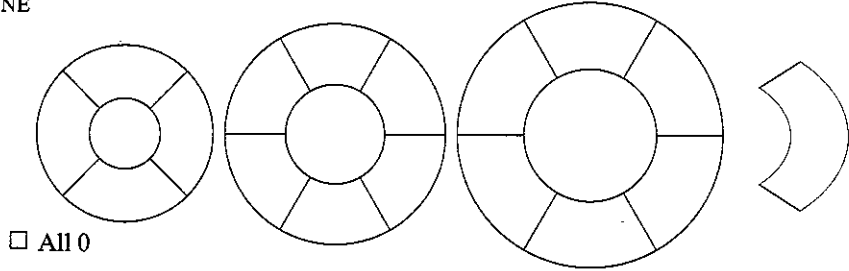
Name: JAMES ARTHUR DOB: 01,01,70

EDV: 190
 ESV: 132
 EF: 31

STRESS
 GATING NOT DONE

APICAL MID BASAL APEX

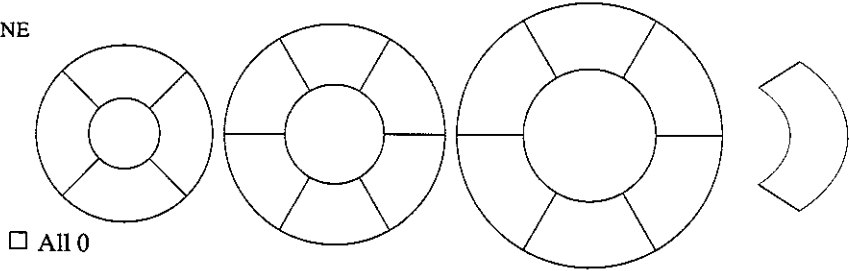
- Global Hypokinesia { MILD
- MODERATE
- SEVERE
- Stunning
- Dyssynchronous { CABG
- PACED
- LBBB



EDV: 184
 ESV: 128
 EF: 30

REST
 GATING NOT DONE

- Global Hypokinesia { MILD
- MODERATE
- SEVERE
- Dyssynchronous { CABG
- PACED
- LBBB



ISCHEMIC CARDIOMYOPATHY NON-ISCHEMIC CARDIOMYOPATHY

Current probability of a hemodynamically significant coronary artery stenosis:

- < 10%
- ≥ 90%
- ≥ 99%
- 60% - 89%
- ≥ 95%

PREDICTED STENOSES

	UNSPECIFIED	LAD
A	MILD to MODERATE	DIAGONAL
	MODERATE to SEVERE	LCX
	SEVERE to CRITICAL	RCA/PDA

	UNSPECIFIED	LAD
C	MILD to MODERATE	DIAGONAL
	MODERATE to SEVERE	LCX
	SEVERE to CRITICAL	RCA/PDA

	UNSPECIFIED	LAD
B	MILD to MODERATE	DIAGONAL
	MODERATE to SEVERE	LCX
	SEVERE to CRITICAL	RCA/PDA

	UNSPECIFIED	LAD
D	MILD to MODERATE	DIAGONAL
	MODERATE to SEVERE	LCX
	SEVERE to CRITICAL	RCA/PDA

OVERRIDE AUTOMATIC CALCULATIONS:

STRESS		REST	
ESV	EF	ESV	EF
NORMAL	NORMAL	NORMAL	NORMAL
ELEVATED	REDUCED	ELEVATED	REDUCED
MARKEDLY ELEVATED	SEVERELY REDUCED	MARKEDLY ELEVATED	SEVERELY REDUCED

Add to impression:

Risk of cardiac mortality within next 1 to 2 years:

- Very Low
- Intermediate
- Low
- High