

nucware.com, LLC
Product Demo

Anytown Cardiac Specialists, Inc.

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WILLIAMS, JOE	DOB: 10/16/1951	January 24, 2012
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EXERCISE MYOCARDIAL PERFUSION STUDY

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

Ordering Physician: Jim Wilson, MD, FACC

Clinical History: 60 year-old man with cardiac risk factors which include gender, age, diabetes mellitus, hyperlipidemia, and hypertension. The patient has a history of congestive heart failure. Significant pre-test symptoms include atypical angina. His pre-test probability of CAD (based on the Diamond & Forrester calculation) is approximately 67% (intermediate). His last Beta-blocker was administered 48 hours prior to the study. His height is 72 inches and weight is 224 lbs, with a BMI of 30 (BSA: 2.3 m²).

Indications for study: Atypical angina and congestive heart failure.

TREADMILL STRESS TEST

BASELINE ECG: Sinus rhythm at 64 bpm. PR: 0.140, QRS: 0.090, QT: 0.400, and Axis: +50. No arrhythmias. ST: normal. T waves: normal. QRS (Q waves): normal. Conduction: normal. INTERPRETATION: Normal ECG.

The patient exercised 9 minutes on the Bruce protocol to a peak heart rate of 162 bpm (101% MPRH). BP increased from 110/70 to 200/86 at peak stress. ^{99m}Tc sestamibi was administered at 07:30 into stress at a heart rate of 150 bpm (94% MPRH). The exercise was terminated due to dyspnea and fatigue. STRESS ECG: Sinus tachycardia. No arrhythmias during stress or recovery. No ischemic ST-T changes. Conduction: normal. Testing was supervised and interpreted by Jim Wilson, MD, FACC.

IMPRESSION:

1. Good exercise capacity for age.
2. No chest pain with exercise. Patient reported dyspnea and fatigue.
3. Negative ECG for ischemia.
4. No arrhythmias during exercise.
5. Peak double product achieved = 32,400 (peak HR x peak systolic BP), a very high cardiac workload. METS estimate: 9.5.
6. Duke Treadmill Score = +9, a low-risk result. Heart rate recovery: normal.

MYOCARDIAL PERFUSION IMAGING

PO Box 91654 * Albuquerque, NM 87199
TOLL-FREE TEL/FAX: (855)-NUCWARE

35 minutes following the intravenous administration of 6.90 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, treadmill stress testing was performed and 34.20 mCi of ^{99m}Tc sestamibi was injected intravenously. 20 minutes later, post-exercise 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
inferior	reversible	medium	moderate	RCA/PDA

Summed stress score (SSS) = **6 (9%)**. Summed rest score (SRS) = **0**. Summed difference score (SDS) = **6**, a moderate amount of reversible ischemia (**9% of total myocardium is reversibly ischemic based on SDS = 6**).

The overall technical quality of the study is good.

IMPRESSION:

1. Moderate degree of reversible ischemia in the basal to apical inferior segments, affecting a medium amount of myocardium in the RCA/PDA territory.
2. No evidence of prior myocardial infarction.
3. Gated SPECT wall motion study at rest demonstrates normal wall motion with EF = 68% and normal ESV = 45 cc. Gated SPECT wall motion study at 20 minutes post-stress demonstrates similar wall motion with EF = 66% and normal ESV = 50 cc.
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 stenosis in the RCA/PDA coronary circulation. The moderate amount of reversible ischemia combined with a normal post-stress EF and normal post-stress ESV predicts a low risk of cardiac mortality over the next 1-2 years. Clinical correlation is required.



John Womack, MD, FACC

Jim Wilson, MD, FACC

(01/25/2012)

cc: John Doe, MD

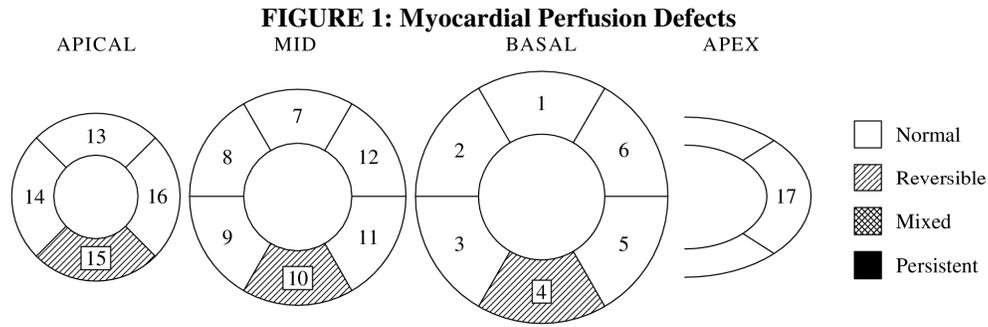


TABLE 2: Perfusion Scores (17-segment model)

SAX APICAL				SAX MID				SAX BASAL				APEX			
	#	S	R		#	S	R		#	S	R		#	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	2	0	I-S	9	0	0	I-S	3	0	0				
LAT	16	0	0	INF	10	2	0	INF	4	2	0				
				I-L	11	0	0	I-L	5	0	0				
				A-L	12	0	0	A-L	6	0	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	145 cc	<= 172 cc (75 cc/m ²)
ESV	50 cc	<= 90 cc (39 cc/m ²)
EF	66%	>= 50%

NAME: WILLIAMS, JOE
 DOB: 10 / 16 / 1951
 Study Date: 1/24/12
 MRN: _____
 Cardiologist/
 Ordering MD: JIM WILSON
 Primary MD: JOHN DOE
 CC TO: _____
 ID VERIFIED BY: JDW

Exercise

Risk Factors

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

Special Conditions

- Asthma
- Inhalers
- Defibrillator
- Pacemaker

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

Other Indications

- Pre-Op Eval
-
-

Last β -blocker: 48 hrs ago
 Height: 72 inches Gender: M F
 Weight: 224 lbs

DATA	STRESS	RECOVERY	Age: <u>60</u> ; MPHR is _____ bpm; 85% of MPHR is _____ bpm.
	BP	HR	
0 min.	<u>110/70</u>	<u>65</u>	immed. <u>190/84</u> <u>150</u>
3 min.	<u>140/74</u>	<u>110</u>	2 min. <u>170/80</u> <u>110</u>
6 min.	<u>174/80</u>	<u>134</u>	4 min. <u>140/74</u> <u>105</u>
9 min.	<u>200/86</u>	<u>162</u>	6 min. _____
12 min.	_____	_____	BP PEAK EXERCISE: <u>200/86</u>
15 min.	_____	_____	HR PEAK EXERCISE: <u>162</u>

Total exercise time: 09:00
 Protocol: BRUCE NAUGHTON
 MOD. BRUCE MANUAL
 ELLESTAD RAMP

Isotope injected at 07:30 @ 150 bpm

Baseline ECG

NSR rhythm at 64 bpm
 PR: .19 seconds QRS: .09 seconds
 QT: .40 seconds Axis: +50 degrees
 normal
 Arrhythmias: _____
 ST: normal
 depressed in leads _____ Early Repol
 elevated in leads _____
 Non-Specific ST Abnormality
 T waves: normal
 biphasic in leads _____ Flat _____
 inverted in leads _____ Tall _____
 Non-Specific T Abnormality
 QRS: normal **Baseline ECG Interpretation**
 Ⓐ Conduction Abnormalities: Normal ECG
 Abnormal ECG due to: _____
 Ⓑ Q Waves: _____ Borderline ECG due to: _____

Test Terminated Due To:

- Fatigue
- ECG Changes (Ischemic)
- Angina, Non-Limiting
- Angina, Limiting
- Anginal Equivalent
- Atypical Chest Pain
- Dyspnea
- Arrhythmias: _____
- Hypertension
- Hypotension
- Claudication
- Pre-Syncope
- Reaching Target HR
- Patient Request
- End of Protocol

IMPRESSION

1. Poor Good Above Average
 Fair Excellent exercise capacity for age.
2. No chest pain Atypical chest pain
 Non-limiting angina Dyspnea with exercise.
 Limiting angina Anginal Equivalent
3. Negative Equivocal Uninterpretable ECG for ischemia.
4. No arrhythmias V. couplets
 PAC's PVC's V. tach. (____ beats)
 during after exercise.
5. Compute Peak Double Product and METs
 Compute Duke Treadmill Score and include in report.
 Compute Heart Rate Recovery
6. _____

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

Recovery ECG Comments: _____

Jim Wilson
 MD/PA/NP signature

TECHNOLOGIST WORKSHEET

Name: WILLIAMS, JOE

DOB: 10/16/51

Study Date: 01/24/12
MM DD YYYY

Patient ID on Modality: _____

Study Type: EX. MPI

Female patient bra/cup size: _____/_____

Breast Surgery: YES / NO

Patient's Height: 72 inches

Location: LEFT / RIGHT

Weight: 224 lbs

Describe: _____

Gender: Male Female

REST IMAGING

REST DOSE: 6.9 mCi

STRESS DOSE: 37.2 mCi

INJECTION TIME: 08 HH : 10 MM

INJECTION TIME: 10 HH : 00 MM

SCAN START TIME: 08 HH : 45 MM

SCAN START TIME: 10 HH : 20 MM

Pharmaceutical: Sestamibi
 Tetrofosmin
 Rubidium-82
 Thallium

Pharmaceutical: Sestamibi
 Tetrofosmin
 Rubidium-82
 Thallium

Rejected / Total Beats: 0 / _____

Rejected / Total Beats: 6 / _____

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:

NONE MODERATE*
 MILD SEVERE*

MoCo estimate from review of raw STRESS data:

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 _____
Technologist initials

PERFUSION RESULTS

Name: WILLIAMS, JOE DOB: 10 / 16 / 51

Prone performed: YES / NO

SSS: 6

SRS: 0

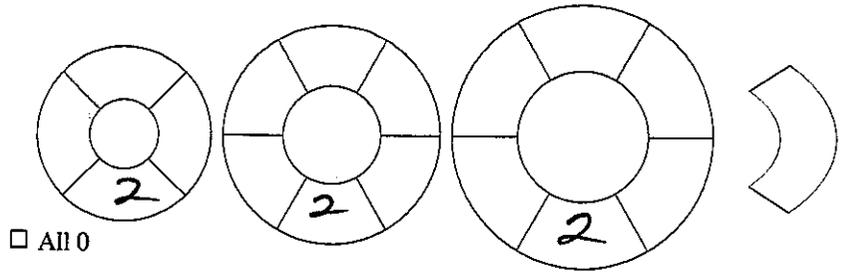
SDS: 6

TID ratio: 1.04

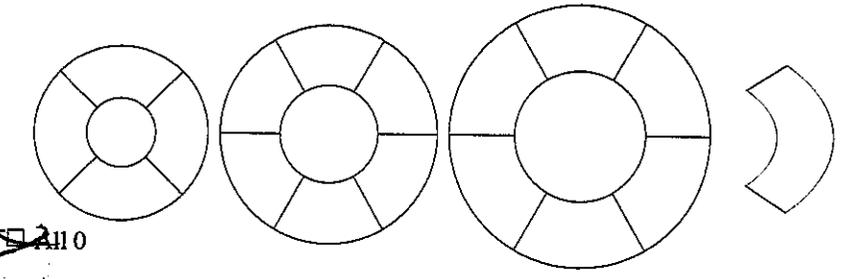
TID is abnormal

APICAL MID BASAL APEX

STRESS



REST



Perfusion Results:
 Normal
 Abnormal

LVH

RVE

RVH

Attenuation

BREAST

INFERIOR

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

	BASAL	A	AS	IS	I	IL AL	REVERSIBLE PERSISTENT MIXED	SMALL MEDIUM LARGE	MILD MODERATE SEVERE	LAD
	MID	A	AS	IS	I	IL AL				DIAGONAL
B	APICAL	A	S			L				LCX
	APEX			APEX						RCA/PDA

	BASAL	A	AS	IS	I	IL AL	REVERSIBLE PERSISTENT MIXED	SMALL MEDIUM LARGE	MILD MODERATE SEVERE	LAD
	MID	A	AS	IS	I	IL AL				DIAGONAL
C	APICAL	A	S			L				LCX
	APEX			APEX						RCA/PDA

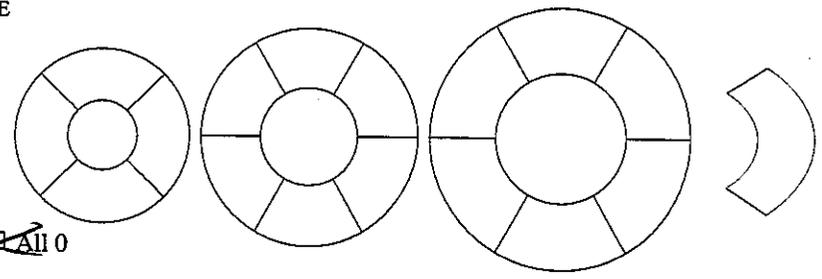
	BASAL	A	AS	IS	I	IL AL	REVERSIBLE PERSISTENT MIXED	SMALL MEDIUM LARGE	MILD MODERATE SEVERE	LAD
	MID	A	AS	IS	I	IL AL				DIAGONAL
D	APICAL	A	S			L				LCX
	APEX			APEX						RCA/PDA

FUNCTION RESULTS

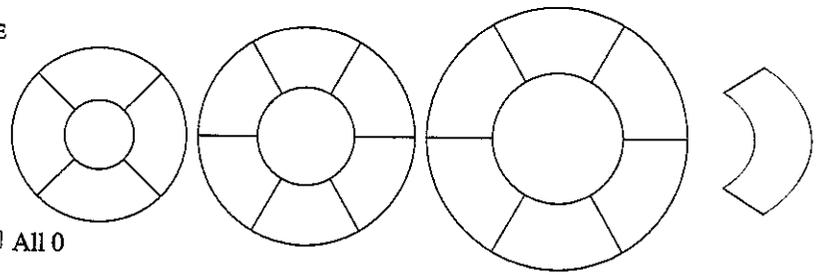
Name: WILLIAMS, JOE DOB: 10, 16 51

EDV: 145 **STRESS**
 ESV: 50 GATING NOT DONE
 EF: 66
 Global Hypokinesis { MILD
 MODERATE
 SEVERE
 Stunning
 Dyssynchronous { CABG
 PACED
 LBBB

APICAL MID BASAL APEX



EDV: 140 **REST**
 GATING NOT DONE
 ESV: 45
 EF: 68
 Global Hypokinesis { 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

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