

MERIDIAN

HEART & VASCULAR CLINIC

100 Medical Plaza, Suite 400

Vertex City, VC 94102

Tel: (555) 019-2831 Fax: (555) 019-2832

CARDIOLOGY REPORT

Report ID: MR-2026-9842

Date: August 2, 2026

Status: FINAL

color MedNavy

1 Patient Demographics & Clinical History

Patient Information	Clinical Metadata
Name: Arthur Pendelton DOB: October 14, 1972 Age / Sex: 53 / Male MRN: 892-415-X Phone: (555) 234-5678	Referring MD: Dr. Thomas Synapse Reading MD: Dr. Evelyn Vance, FACC Date of Exam: August 1, 2026 Date of Report: August 2, 2026 Facility: Meridian Main Clinic

1.1 Clinical Indications & History

Patient is a 53-year-old male with a history of hypertension, hyperlipidemia, and mild type 2 diabetes mellitus who presents for evaluation following recent episodes of atypical exertional chest discomfort and progressive dyspnea on exertion over the past three months. The chest discomfort is described as a substernal pressure sensation that resolves within 5–10 minutes of rest. The patient denies orthopnea, paroxysmal nocturnal dyspnea, syncope, or palpitation. The primary purpose of this diagnostic workup is to evaluate for inducible myocardial ischemia and assess baseline cardiovascular structure and function.

2 Electrocardiogram (ECG) Analysis

Baseline 12-lead electrocardiogram was obtained prior to the stress test according to established standards [1]. The ECG demonstrates a normal sinus rhythm with a resting heart rate of 68 beats per minute. The electrical axis is normal, and there are no signs of acute ischemia or prior infarction.

Table 1: Resting 12-Lead ECG Parameters

Parameter	Value	Reference Range	Clinical Interpretation
Heart Rate (HR)	68 bpm	60 – 100 bpm	Normal sinus rhythm
PR Interval	156 ms	120 – 200 ms	Normal AV conduction
QRS Duration	92 ms	80 – 120 ms	Normal intraventricular conduction
QT / QTc Interval	410 / 425 ms	≤ 450 ms (Male)	Normal myocardial repolarization
P-R-T Axes	45° / 60° / 50°	–30° to 90°	Normal axes
ST-Segment	Flat	Isoelectric	No acute ST elevation or depression

2.1 Representative ECG Waveform Trace

The figure below shows a representative lead II cardiac cycle from the baseline recording, highlighting the standard P, QRS, and T wave segments.

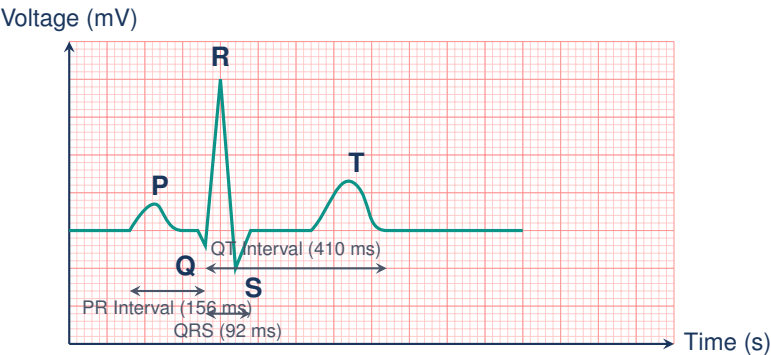


Figure 1: Representative Lead II ECG waveform from baseline registration. Grid boxes represent 0.04 s (horizontal) and 0.1 mV (vertical).

3 Transthoracic Echocardiogram (TTE) Report

A comprehensive resting 2D/Doppler transthoracic echocardiogram was performed to evaluate baseline left ventricular (LV) function, chamber dimensions, wall thickness, and valvular function in accordance with ASE/EACVI guidelines [2].

3.1 Echocardiographic Measurements

Table 2: Key Echocardiographic Dimensions and Function			
Chamber / Measurement	Observed Value	Reference Range	Interpretation
LV End-Diastolic Diameter (LVEDD)	5.1 cm	4.2 – 5.9 cm	Normal LV cavity size
LV End-Systolic Diameter (LVESD)	3.2 cm	2.5 – 4.0 cm	Normal LV systolic volume
Interventricular Septum (IVS)	1.1 cm	0.6 – 1.0 cm	Borderline concentric thickening
LV Posterior Wall Thickness (LVPW)	1.0 cm	0.6 – 1.0 cm	Normal posterior wall thickness
Left Ventricular Ejection Fraction (LVEF)	62 %	55 – 70 %	Normal global systolic function
Left Atrial (LA) Diameter	3.8 cm	3.0 – 4.0 cm	Normal LA cavity size
LA Volume Index (LAVi)	28 mL/m ²	≤ 34 mL/m ²	Normal LA volume
Aortic Root Diameter	3.4 cm	2.0 – 3.7 cm	Normal aortic root size
Peak Tricuspid Regurgitant (TR) Velocity	2.3 m/s	< 2.8 m/s	Normal pulmonary pressures

3.2 Structural and Valvular Assessment

Left Ventricle: The left ventricle is normal in size. Wall thickness is at the upper limit of normal, consistent with mild concentric remodeling, likely secondary to patient’s history of systemic hypertension. There are no regional wall motion abnormalities at rest. Global systolic function is preserved with an estimated ejection fraction (LVEF) of 62% by biplane method of disks. Diastolic parameters suggest mild impairment of relaxation (Grade I diastolic dysfunction) with an E/A ratio of 0.82 and deceleration time of 220 ms.

Right Ventricle: The right ventricle is normal in size and demonstrates normal systolic function. Tricuspid annular plane systolic excursion (TAPSE) is 2.2 cm. No evidence of right ventricular hypertrophy or pressure overload is observed.

Atria: Left and right atria are normal in volume. The interatrial septum appears intact by color Doppler.

- Valvular Function:**
- **Aortic Valve:** Trileaflet, thin, and pliable. There is no stenosis; peak velocity is 1.2 m/s. Trace aortic regurgitation is noted.
 - **Mitral Valve:** Structurally normal leaflets. Normal inflow velocity. Trace mitral regurgitation is observed. No mitral stenosis.
 - **Tricuspid Valve:** Normal leaflets. Trace tricuspid regurgitation is present, allowing estimation of right ventricular systolic pressure (RVSP) of approximately 26 mmHg (assuming right atrial pressure of 5 mmHg), indicating no pulmonary hypertension.
 - **Pulmonic Valve:** Normal leaflets. Trace pulmonic insufficiency.

Pericardium: No pericardial effusion or thickening is identified.

4 Treadmill Stress Test (Bruce Protocol)

The patient underwent a symptom-limited graded exercise stress test using the standard Bruce Protocol to evaluate for inducible ischemia and chronotropic response following clinical guidelines [3].

4.1 Stress Test Performance Summary

Table 3: Exercise Stress Test Stage Parameters

Stage	Time (min)	Speed (mph)	Grade (%)	METs	HR (bpm)	BP (mmHg)
Rest	0:00	—	—	1.0	68	128/82
Stage 1	3:00	1.7	10.0	4.6	95	138/84
Stage 2	6:00	2.5	12.0	7.0	125	148/86
Stage 3	9:00	3.4	14.0	10.1	152	158/88
Stage 4 (Peak)	10:30	4.2	16.0	12.9	165	166/90
Recovery 1	11:30	1.7 (Walk)	0.0	2.0	135	150/86
Recovery 3	13:30	—	—	1.0	100	136/82
Recovery 5	15:30	—	—	1.0	78	130/80

4.2 Heart Rate Response Curve

The plot below illustrates the patient's heart rate trajectory during exercise and recovery compared to the age-predicted maximal heart rate (APMHR) and the target 85% submaximal threshold.

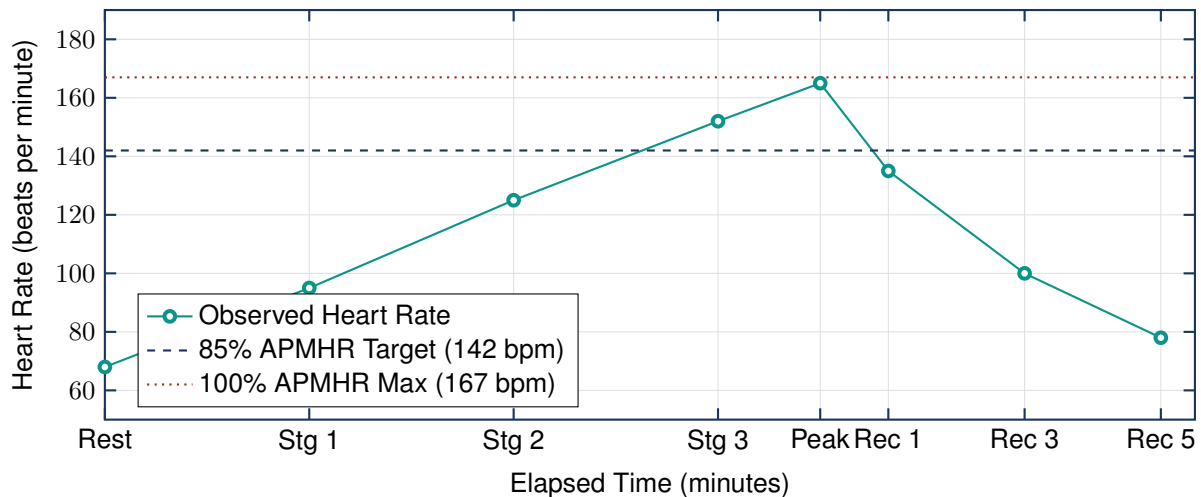


Figure 2: Heart Rate profile during exercise and recovery phases.

4.3 Exercise Test Assessment

- **Exercise Capacity:** The patient completed 10 minutes and 30 seconds of exercise, terminating during Stage 4. Total workload achieved was 12.9 METs, indicating an **excellent** functional aerobic capacity for his age.
- **Hemodynamic Response:** Resting blood pressure was 128/82 mmHg, rising to a peak exercise blood pressure of 166/90 mmHg. Heart rate increased from a resting value of 68 bpm to a peak of 165 bpm, representing 99% of his age-predicted maximal heart rate (APMHR = 167 bpm). Chronotropic index was normal. Blood pressure and heart rate recovery profiles were normal, with heart rate dropping by 30 bpm at 1 minute of recovery.
- **Symptomatology:** The test was terminated due to general fatigue and mild shortness of breath. No chest pain, pressure, or other anginal equivalents were reported during or after the test.
- **Electrocardiographic Response:** No significant baseline-corrected ST-segment deviations or T-wave changes were observed in any lead during exercise or recovery. No cardiac arrhythmias or ectopy were detected.

5 Clinical Summary & Recommendations

Key Diagnostic Findings

- **Left Ventricular Function:** Preserved systolic function (LVEF 62%) with no regional wall motion abnormalities at rest. Grade I diastolic dysfunction (impaired relaxation).
- **Stress Test Result:** Negative for inducible myocardial ischemia up to a peak workload of 12.9 METs (99% APMHR). Excellent exercise capacity.
- **Valvular Assessment:** Trace mitral, aortic, and tricuspid regurgitation. No hemodynamically significant stenosis or regurgitation.
- **ECG Metrics:** Normal sinus rhythm at rest and during peak exercise. No ischemic ST-T changes or arrhythmias.

5.1 Detailed Medical Assessment

The comprehensive cardiovascular workup reveals no objective evidence of inducible myocardial ischemia. The patient demonstrated an excellent exercise tolerance on the treadmill, reaching 12.9 METs, with a normal hemodynamic response. The lack of ST-segment changes or anginal symptoms during exercise suggests that the atypical chest

discomfort described is unlikely to be secondary to obstructive epicardial coronary artery disease (CAD). Reductions in cardiovascular risk profile are recommended nonetheless, given the patient's baseline risk factors.

Echocardiogram demonstrates normal LV size and systolic function, but notes borderline concentric thickening of the interventricular septum and Grade I diastolic dysfunction. These structural and filling alterations are characteristic of hypertensive heart disease and emphasize the importance of stringent blood pressure control.

5.2 Recommendations

1. **Cardiovascular Risk Modification:** Continue optimization of medical management for hypertension and hyperlipidemia. Target blood pressure should be < 130/80 mmHg.
2. **Lifestyle Interventions:** Promote a heart-healthy diet (e.g., Mediterranean diet) and encourage a structured aerobic exercise regimen of at least 150 minutes per week, which is safe given the negative stress test.
3. **Symptom Monitoring:** The patient may be reassured that his symptoms do not indicate high-risk ischemic disease at this time. However, if symptoms worsen, change in character, or become typical of angina, further evaluation with coronary CT angiography (CCTA) or myocardial perfusion imaging (MPI) may be warranted.

Dr. Evelyn Vance, FACC

Consulting Cardiologist
Department of Cardiology

Dr. Thomas Synapse

Referring Physician
Vertex Primary Care

References

- [1] Paul Kligfield, Leonard S Gettes, J Thomas Bailey, Ramon Childers, Ronald J Deal, G William Hancock, Gerard van Herpen, Jose Jalife, Alan Kadtish, David Mirvis, et al. Standardization and interpretation of the electrocardiogram: part i: the electrocardiogram and its technology. *Circulation*, 115(10):1306–1324, 2007.
- [2] Roberto M Lang, Luigi P Badano, Victor Mor-Avi, Jonathan Afilalo, Armstrong Armstrong, Laura Ernande, Frank A Flachskampf, Elyse Foster, Steven A Goldstein, Tatiana Ledran, et al. Recommendations for cardiac chamber quantification by echocardiography in adults: an update from the american society of echocardiography and the european association of cardiovascular imaging. *Journal of the American Society of Echocardiography*, 28(1):1–39, 2015.
- [3] Raymond J Gibbons, Gary J Balady, J Timothy Bricker, Bernard R Chaitman, Gerald F Fletcher, Victor F Froelicher, Marian C Limacher, M Donald McKirnan, Jacques A Melin, G Brandon Mitchell, et al. Acc/aha 2002 guideline update for exercise testing: summary article. *Journal of the American College of Cardiology*, 40(8):1531–1540, 2002.