

# A kind man with a big heart



**Dr Stephen Fenton**

Dr Stephen Fenton is a cardiologist in private practice with the Sydney Cardiology Group.

A middle-aged man presents with shortness of breath on exertion.

## PRESENTATION

A 68-year-old retired and now philanthropic businessman presents with a six-month history of increasing dyspnoea on exertion that has become worse over the past month.

He is generally well with a 10-year history of mild hypertension treated with medication and has mild hyperlipidaemia with recent LDL cholesterol of 2.9 mmol/L.

He experienced these symptoms while in the US recently and underwent a CT coronary angiogram and calcium score. This demonstrated a fairly low calcium score of 56 and showed some plaque in the proximal left anterior descending and distal right coronary arteries

but no significant flow limiting stenosis.

On examination, his BP is 140/80 mmHg. A systolic murmur is audible along the left sternal edge and there are no signs of cardiac failure.

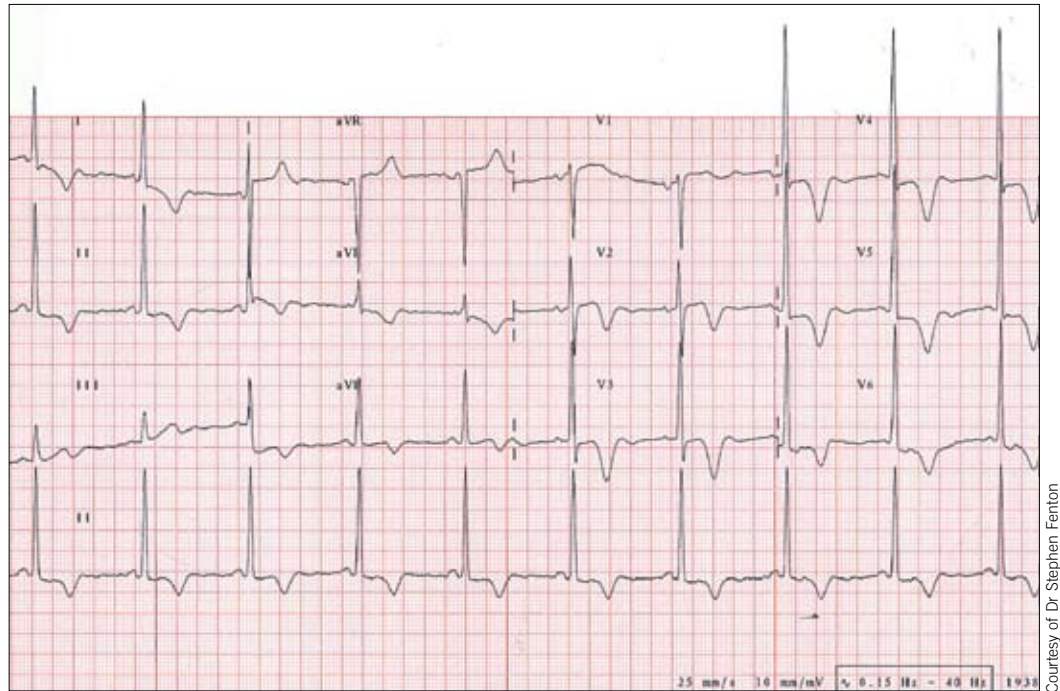
## Study this patient's ECG and answer the following questions:

### 1. Which condition(s) would you include in the differential diagnosis?

1. Hypertrophic cardiomyopathy
2. Moderate or severe aortic valve stenosis
3. Hypertensive heart disease with aortic valve sclerosis
4. Combination of mild aortic stenosis and hypertension
5. All of the above.

### 2. Which would be the next most useful investigation to establish the diagnosis?

1. MRI
2. Coronary angiography
3. Echocardiography
4. Stress echo
5. 24-hour ABP.



## DISCUSSION

This ECG shows severe left ventricular hypertrophy (LVH). The ECG is a very poor determinant of LVH because the position of the heart in the chest cavity and the thickness of the chest wall determine the attenuation or amplification of the QRS signal.

Young patients with thin chest walls invariably may have voltage LVH in the absence of true

LVH. Quotable (but possibly unreliable) criteria of true LVH include:

- R-wave in V5/V6 greater than 25 mm
- R-wave in V5/V6 plus an S-wave in V1/V2 greater than 35 mm
- R-wave in any lead greater than 20 mm
- R-wave in aVL greater than 13 mm.

The presence of ST depression and T-wave inversion (the "strain pattern") add a great deal of weight to the likelihood that voltage LVH is a true reflection but are likely to occur only at a late stage or in severe cases.

In the ECG above, the R-wave in V6 plus the S-wave in V1 is in excess of 45 mm, and the R-wave in V4 is well in excess of 30 mm. There is also significant widespread T-wave inversion and ST depression in the inferolateral leads. This represents severe LVH with strain pattern.

A systolic murmur is present and any of the diagnoses listed represents a possibility. The answer to question 1 is therefore no. 5.

An echocardiogram will establish the degree of LVH and is the next most appropriate test. The answer to question 2 is therefore no. 3.

Usual left ventricular wall thickness is less than 1.1 cm. In this patient, wall thickness was 2.3 cm and there was concentric LVH.

There was evidence of severe aortic valve stenosis and, although there is a history of mild hypertension, the dominant reason for the hypertrophy is undiagnosed and previously undetected severe calcific aortic stenosis.

The patient subsequently had coronary angiography which confirmed the CT findings that there was only minor coronary artery disease and then underwent successful aortic valve replacement.

Advertisement removed