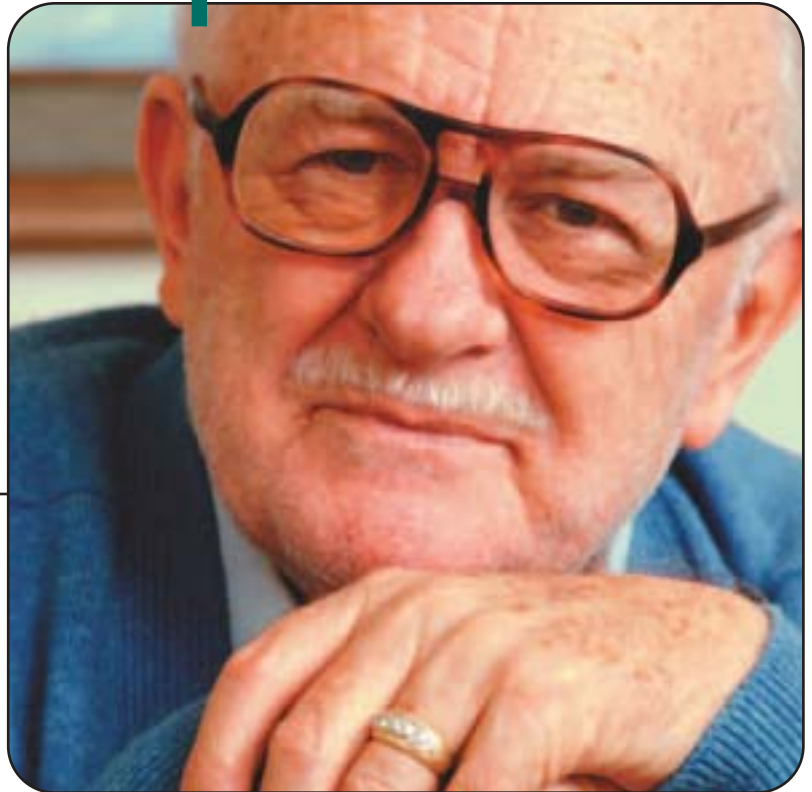


Chest pain

in the ER

All that
glitters
is not gold

By Eric Horlick, MD, FRCPC



A 76-year-old male presented to the emergency room complaining of a six-week history of exertional chest pain. He had a past medical history significant for adult onset diabetes and hyperlipidemia. Medications included coated acetylsalicylic acid, simvastatin 20 mg po qd, and metformin 500 mg po tid.

The patient complained of typical retrosternal heaviness with radiation to the neck. The heaviness began after walking about two blocks on flat ground or after walking up one flight of stairs. The pain was relieved with rest.

He reported an increase in shortness of breath on exertion that had occurred throughout the preceding six months. He said he hadn't been wheezing or coughing and attributed the changes in his breathing to his advancing age. He had not been suffering from palpitations, syncope, paroxysmal nocturnal dyspnea or orthopnea. The patient had not seen his general practitioner in over a year.

On physical exam, he appeared to be his stated age but was notably pale, without dyspnea at rest. His blood pressure was 130/60, his pulse was 85 beats per minute, his respirations were 12 per minute and his oxygen saturation was 94% in room air. His neck veins were not distended at 45 degrees. The carotid impulse was diminished in volume and was delayed. The

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apex was not visible, but was sustained on palpation. On auscultation, the patient was noted to have a normal first heart sound and a barely audible second heart

sound. A fourth heart sound was heard at the apex. There was a harsh III/VI systolic murmur that was loudest over the second right intercostal space. It had a crescendo decrescendo pattern and persisted long into systole, ending just before the soft second heart sound.

Table1

Grading Aortic Stenosis

SEVERITY	PEAK GRADIENT mmhg	MEAN GRADIENT mmhg	AVA CM2	AVA INDEX CM2/M2
Mild	<40	<25	>1.5	>0.9
Moderate	40 to 79	25 to 49	>1 to 1.5	0.6 to 0.9
Severe	>80	>50	<1	<0.6

The gradients are measured either by echocardiography or by invasive hemodynamic techniques. (AS aortic stenosis, AVA aortic valve area). The AVA index is helpful in assessing the significance of the AVA in patients of different body sizes.

Table2

Indications for Aortic Valve Replacement in Aortic Stenosis

<i>Recommendation Evidence</i>	<i>Grade of</i>
1.Symptomatic patients with severe aortic stenosis	I
2.Patients with severe aortic stenosis undergoing coronary artery bypass grafting (CABG)	I
3.Patients with severe aortic stenosis undergoing surgery on the aorta or other heart valves.	I
4.Patients with moderate aortic stenosis undergoing CABG or surgery on the aorta or other heart valves.	IIa
5.Asymptomatic patients with severe aortic stenosis and:	
• Left ventricular systolic dysfunction	IIa
• Abnormal response to exercise (e.g., hypotension)	IIa
• Ventricular tachycardia	IIb
• Marked or excessive LV hypertrophy (>15mm)	IIb
• Valve area <0.6cm2	IIb
6.Prevention of sudden death in asymptomatic patients with none of the findings listed under number 5.	III

CABG Coronary artery bypass grafting. Adapted from Bonow RO, Carabello B, de Leon AC Jr., et al: ACC/AHA guidelines for the management of patients with valvular heart disease: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Management of Patients With Heart Disease), J AM Coll Cardiol. 1998. 32:1; 486-588.

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There was no diastolic murmur. His chest was clear and there was no wheezing. His abdomen was benign and his stool was positive for occult blood. There was no peripheral edema.

Laboratory examination was significant for a hemoglobin of 82 g/dl with microcytic and hypochromic indices and an elevated red cell distribution width. Serum biochemistry was within normal limits. Two serial troponins were normal. His chest X-ray showed a borderline cardio pericardial silhouette and his lungs were clear. Serial electrocardiograms showed sinus rhythm at 80 beats per minute with left atrial enlargement, and left ventricular hypertrophy with a strain pattern which did not evolve over the following 18 hours.

Questions

1. What is the likely diagnosis that can explain his symptoms?
2. Why is he anemic?
3. What test would confirm the diagnosis?

Answers and Discussion

This patient's chest pain is typical of angina which, by definition, is retrosternal, aggravated with exertion and relieved with rest and nitroglycerin. The history is too long to label this unstable angina which, by definition, must have its onset less than one month prior to presentation.

The reason for the patient's accelerated angina is suggested by his systolic murmur and anemia. His systolic

WHAT'S YOUR DIAGNOSIS?

murmur is typical for aortic stenosis, a common valvular abnormality seen in elderly patients. It affects about 2% of adults over the age of 60. It is distinguished from the much more frequent aortic sclerosis, a precursor lesion, which occurs in about 30% of patients in this age group. Physical examination is extremely helpful in distinguishing the two conditions. Severe valvular obstruction is suggested by a reduced and delayed carotid upstroke (pulsus parvus and tardus). This can be deceptively absent in elderly patients with calcified aortas. Other features suggestive of severe obstruction are a long murmur in systole ending just before the second heart sound over the aortic area (second right intercostal space) and a diminished, or absent, second heart sound in this location. The cardiac apex is usually sustained on palpation which, by definition, occurs if the apex can be felt after the carotid upstroke.

The patient's anemia, with indices consistent with iron deficiency anemia, is most likely secondary to angiodysplasia of the colon, an occasional association. The mechanism is unclear but it may represent neovascularization of chronically ischemic colon tissue.

The screenshot shows a web browser window with the address bar displaying www.stacommunications.com. The browser's toolbar includes icons for Back, Forward, Reload, Home, Search, MU, Images, Print, Security, Shop, and Stop. The main content area features a large blue banner with the text "WE'RE ON-LINE". Below the banner are four medical journal covers: "The Canadian Journal of CME (Continuing Medical Education)", "The Canadian Journal of Diagnosis", "le clinicien", and "Cardiology". At the bottom of the page, the website URL www.stacommunications.com is displayed in a large, stylized font. The browser's status bar at the bottom shows various system icons.

Echocardiogram

The patient underwent an echocardiogram, which confirmed severe aortic stenosis. (Table 1). A coronary angiogram was normal. The patient was referred for aortic valve replacement.

There is emerging evidence that aortic stenosis is not simply degenerative but that it represents an active disease process with risk factors and pathogenesis similar to those of atherosclerosis. Osteoblast-like cells have been found in diseased valve tissue as well as proteins which modulate calcification and osteoblast activity. Echocardiography is indicated for all patients with late systolic murmurs or greater than grade 3/6 midsystolic murmurs. Patients with systolic murmurs associated with abnormal findings on cardiac palpation, and abnormal electrocardiogram or chest Xray, also should undergo echocardiographic examination.

Aortic stenosis can be safely followed, even when graded severe by echo, as long as there are no associated symptoms. Sudden death in asymptomatic patients is exceedingly rare. When exertional angina, syncope or congestive heart failure occur, the average survival is five years, three years, and two years respectively. Patients must be carefully questioned about symptoms, especially about vague complaints, such as "slowing down." They must be educated to inform their physicians about symptoms which occur between regular office visits. The presence of symptoms indicates that a decision regarding valve replacement is required. About 50% of patients with severe aortic stenosis and angina have normal coronaries. Angina is caused by increased left ventricular wall stress during exercise. Coronary angiography is suggested pre-operatively in patients with risk factors for coronary artery disease and in those whose diagnosis is unclear by non invasive means (*e.g.*, poor quality echocardiographic windows). The American College of Cardiology Indications for Aortic Valve Replacement are listed in Table 2.