Fitness to drive in a patient with aortic stenosis

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GP Emergency Management articles use real cases to illustrate the emergency management of patients presenting in general practice with cardiac problems.

Margaret has been well known to you for years. She is an obese, independent 83-year-old woman who lives alone. Four years ago you performed a cardiac echocardiogram that showed she had moderate aortic stenosis. This was performed because she had an episode of mild congestive cardiac failure secondary to severe iron-deficiency anaemia. The anaemia was possibly due to gastrointestinal bleeding; it has not recurred and Margaret has refused all investigations since. She has severe renal failure (estimated glomerular filtration rate, 25 to 30 mL/min/1.73 m^2) secondary to longstanding hypertension and she also has diet-controlled diabetes. For many years she has had a left bundle branch block on her ECG (Figure) but there is no other cardiac history.

Margaret is currently taking candesartan plus hydrochlorothiazide 16 mg/day, amlodipine 5 mg/day, ferrous sulfate one tablet twice a week, vitamin D 2000 IU/day and vitamin B12 injections every three months.

Margaret asks you to assess her fitness to drive for a routine renewal of her driving licence. You notice her ankles are swollen and her breathing is more laboured than normal. She denies any recent chest pain or shortness of breath. Due to her obesity, it is not possible to feel hepatomegaly.

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What are the common causes of recent onset of congestive cardiac failure that may present in this way?

Answer: A common cause of recent onset of congestive cardiac failure is fluid retention or overload. This may occur from excessive drinking, an unaccustomed high-salt diet, worsening renal (or liver) failure or a change in or omission of medications related to fluid balance. Causes affecting the pumping of the heart include arrhythmias (especially atrial fibrillation), ischaemia (new or worsening angina or a recent acute myocardial infarction), worsening valvular regurgitation or stenosis, and bacterial endocarditis. Other causes of congestive cardiac failure include anaemia, thyroid disease and conditions affecting the lungs such as recurrent pulmonary emboli or severe chest infections. It may also be the natural progression of her longstanding hypertension and obesity.

You examine Margaret and she appears afebrile, not clinically anaemic, her blood pressure is lower than normal for her at 130/80 mmHg and her pulse is low but regular at 78 beats per minute. Her jugulovenous pressure is raised at 2 cm and her apex displaced to the left. There is a harsh, higher pitched systolic murmur (most obvious mid-to-late-systole) that is maximal at the apex and radiates to the carotids, and another lower pitched, pan-systolic murmur best heard at the lower left sternal edge and apex, radiating to the axilla. Margaret has pitting oedema to her low calves but no tenderness or calf swelling otherwise. Her respirations are regular but increased at 22 breaths per minute sitting and she has decreased air entry and a few fine crackles bibasally.

What diagnoses does the clinical examination suggest?

Answer: The likely diagnoses are aortic stenosis, mitral regurgitation and congestive cardiac failure. The murmur of aortic stenosis is classically described as occurring at the upper right sternal edge but often radiates to the carotids in the neck and to the apex, where it may be heard maximally. It is higher pitched and harsh, usually with a crescendo-decrescendo timecourse, and often accompanied by a systolic ejection click. If the stenosis is severe, the peak of the murmur's loudness may occur later in systole. The presence of the second, pan-systolic murmur suggests that the mitral valve is not coping with the chronic back pressure from the aortic stenosis and is now incompetent.

Margaret is looking very unhappy now, because she does not like investigations. Which tests would you urgently request?

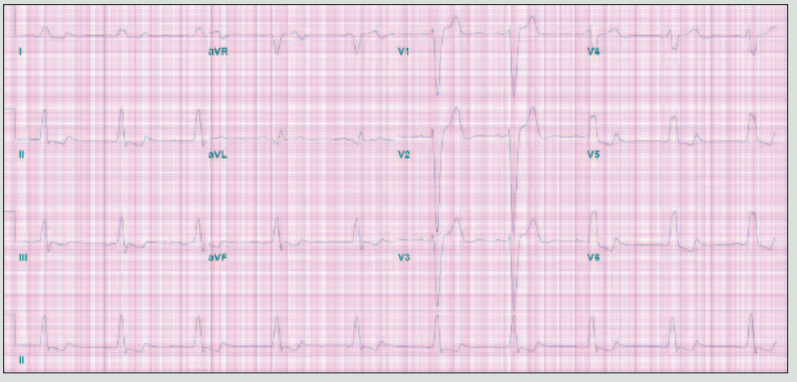

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Figure. ECG showing left bundle branch block.

Answer: A full blood count, iron studies, liver function tests (congestion of the liver), and measurement of electrolytes, urea and creatinine, thyroid-stimulating hormone, blood glucose and haemoglobin A_{1C} levels. She also needs an ECG and chest x-ray. Ideally she should also have an urgent cardiac echocardiogram (this may be arranged privately through a cardiologist, depending on the patient's location). It is also worth testing her midstream urine for infection by urinalysis in the surgery, so that treatment can be started immediately if needed. Urinary infections may cause acute renal deterioration and thus may contribute to fluid retention. If the sample is a clean catch specimen (Margaret had showered that day, midstream urination), it should be formally examined by the pathologist. Otherwise it should be repeated (ideally the first urination of the morning, midstream after a shower) and an albumin to creatinine ratio performed.

Margaret wants to leave now and have the investigations later; she is late for lunch with a friend. Do you let her go? What follow-up arrangements should be made?
Answer: There are several issues here. First, Margaret must not drive until her cardiac condition is diagnosed and stabilised. Second, because Margaret lives alone and has recent onset cardiac failure there is urgency to ensure this does not worsen. It may be possible to investigate her condition urgently in general practice. Third, it would be appropriate to organise for Margaret to go straight to hospital for stabilisation and investigation. The admitting officer should be notified of Margaret's condition through both a phone call to discuss her case and also a letter either to go with Margaret or be faxed to the Emergency Department.

If Margaret is not going to hospital, you should discuss her case with the cardiologist you are arranging the echocardiogram with to ensure prompt attention and follow up afterwards. She should have a chest x-ray before the echocardiogram if possible, because this will provide the cardiologist with extra information.

If the investigations are organised through the GP they must be flagged as urgent. It is vital that Margaret is contactable at all times and that she understands that she may need to go to hospital today, depending on the results. If she develops worsening shortness of breath, faintness or chest pain she must ring 000 for help. It would be wise for her to have someone stay with her today. She should be strongly discouraged from delaying investigations.

Is there anything you should add or change regarding Margaret's medications?
Answer: Normally a nitrate patch or nitrolingual spray would be suggested for the treatment of congestive cardiac failure while the patient is being investigated. However, these medications are contraindicated in cases of aortic stenosis because they may produce profound hypotension. Frusemide 40 mg orally stat could be safely given while the results are pending, although Margaret is likely to need a larger dose given her renal impairment. A much higher dose of intravenous frusemide would be needed, however, if she were in acute pulmonary oedema with signs of severe respiratory distress, but this is not the case. She is already known to have severe renal impairment, and so safely changing medical management without having access to investigation results is not possible. Use of vasodilators such as ACE inhibitors, the angiotensin receptor blocker candesartan and the calcium antagonist amlodipine are relatively contraindicated in patients with severe aortic stenosis.

Outcome

Margaret has, as expected, severe aortic stenosis, complicated by left ventricular hypertrophy, mild systolic impairment of the left ventricle and moderate mitral regurgitation. She has no iron deficiency but is mildly anaemic due to now end-stage kidney disease. Margaret's renal failure is currently the barrier to surgical treatment of her valvular disease and the symptoms of cardiac failure are currently only just medically controlled.

An angiogram was performed and showed no significant coronary artery stenosis requiring revascularisation. She may be a candidate for a transcatheter aortic valve implantation, but would require specialist assessment to guide this. However, the renal physician is concerned about any surgery at present because her kidney function has deteriorated further. Margaret has decided herself it is time to give up her driving licence and at this point she doesn't think it is likely she will have the operation. **CT**

Key points

- **It is unwise to make changes to medications in unstable patients in general practice without having access to current investigations and results. Hospital is the best option if the patient requires treatment.**
- **Nitrates and vasodilators such as calcium antagonists and ACE inhibitors are relatively contraindicated in patients with severe aortic stenosis because they may produce profound hypotension.**
- **If patients are fully informed about their condition, their request for no invasive management should be respected.**