A woman with ventricular thrombotic emboli

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GP emergency management articles use cases to illustrate the emergency management of patients presenting in general practice with cardiac problems. They are inspired by, but not based on, real patient situations.

Kim is 73 years old and is well known to you at your practice. She has well-controlled hypertension, normal glucose tolerance, normal results on lipid studies and no other major medical problems. She takes enalapril 5 mg daily. She comes to see you because she has been feeling 'dizzy' for the past two days.

What questions should you ask Kim?

Answer: *It is important to understand what Kim means by 'dizzy'. Is she feeling faint, as in 'passing out', or off balance, or 'fuzzy', or does she have an altered sensation in the head? Has she almost fallen over or does she need to hold on to things for balance? Was the onset sudden or gradual? If sudden, what was she doing at the time? Is the feeling constant or does it occur only when she moves? Does it change with position?*

Does she have any new hearing problem, tinnitus, visual disturbance, spinning or vertigo, nausea or vomiting? Has she had a recent viral illness or are her sinuses congested? Has she noticed any fever, palpitations or headache?

Kim says the onset was sudden, while she was preparing dinner two nights before. She suddenly felt unstable and unable to continue using a knife effectively. She did not feel faint. She decided to lie down and noticed that she tended to fall slightly to the right when she walked. Her husband finished preparing the meal; she did not feel hungry but was not nauseated. The next day she thought she was back to normal until she got up; the symptoms were the same and have not changed since. There is no headache but she feels strange in the head, as if it is filled with cotton wool.

Her husband took her blood pressure, which was 154/95 mmHg, a bit higher than usual, and they thought that might be the cause. She also recently noticed some strange forceful heart beats, but they disappeared after a minute or so. She thinks she has been more fatigued than usual in the past few months. There have been no other symptoms.

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When she was not better after a second night's sleep she decided to come to see you.

You examine Kim. What signs are you particularly interested in?

Answer: *How does Kim look? Did she walk into the consultation normally? Does she seem co-ordinated? Is she leaning to one side? Is there nystagmus, facial droop, pronator drift, weakness of her limbs, dysdiadochokinesis, past-pointing or tremor? Can she move her neck freely without symptoms worsening severely? Can she stand with her legs together, with and without her eyes closed? Can she walk a straight line toe to heel?*

Is her pulse regular and normal, are there any heart murmurs, raised jugulovenous pressure or shift in apex beat? Is her blood pressure normal, both sitting and standing?

Kim needs a full neurological and cardiovascular examination, but the signs mentioned are those most likely to be abnormal, given the history.

Kim has an irregularly irregular pulse with an average rate of about 85 beats per minute; there are runs of normal regular beats between irregular beats. Her blood pressure is stable sitting and standing, at 150/95 mmHg. She has no pronator drift or signs of muscle weakness but does have some past-pointing and dysdiadochokinesis on the right side (she is left handed). She falls slightly to the right when standing but only needs to be stabilised by you when she shuts her eyes. She cannot walk well heel to toe and tends to fall to the right. There is no nystagmus and no other significant findings.

What do you tell Kim at this point?

Answer: *You tell Kim she needs further urgent investigation as it is likely she has had a disturbance to the blood supply of the part of the brain that governs balance. This is probably a small stroke, as the symptoms have lasted over 24 hours. It might instead be a transient ischaemic attack (TIA), commonly known as a 'mini stroke', but with a TIA, symptoms would usually have disappeared over 24 hours. With a stroke, symptoms may improve but usually do not resolve completely with time. A stroke can be detected on certain brain scans. You also tell Kim you are concerned she may have this problem because of an irregular heart beat; sometimes this allows clots to form around the heart valves, and bits of these clots can flick off and block tiny blood vessels in the brain.*

She needs to have urgent testing to confirm or exclude these possibilities and to guide further management. If your suspicions are correct certain medications can reduce the chance of another stroke in the future.

What initial investigations should be carried out?

Answer: *Kim needs a CT or MRI brain scan (an MRI scan would be ideal but usually takes several days to book). As she cannot legally drive until her condition is investigated and stabilised, she will need to go by taxi or be driven for this investigation.*

She also needs to have an urgent ECG (you may be able to do this now for her) and blood tests: a full blood count to exclude anaemia, liver function tests and measurement of serum levels of electrolytes, urea, creatinine, corrected calcium, magnesium, blood glucose, C-reactive protein, fasting cholesterol (if not measured recently) and thyroid stimulating hormone.

What other investigations should Kim have over the next few days?

Answer: *Kim should also undergo transthoracic echocardiography. If the CT scan suggests the stroke is embolic, transoesophageal echocardiography may be needed as it is more sensitive for detecting cardiac thrombus.*

In addition, Kim should have a carotid Doppler ultrasound examination and ideally an MRI scan of the brain, which is more sensitive than a CT scan. A CT or MRI angiogram is preferable to a plain CT or MRI scan to further image blood vessels, but this takes more time to perform and may be arranged later as it is also dependent on the patient having normal renal function. It would be best to ask the cardiologist who reviews the echocardiogram whether he or she minds arranging the MRI brain scan as GP-referred adult patients are not currently eligible for a Medicare rebate for this investigation. The cardiologist may wish to review Kim urgently depending on the ECG and echocardiography results.

Kim returns to see you later in the day after a CT brain scan. This shows a recent small infarction in the right cerebellar hemisphere and another recent small subcortical infarction in the parietal lobe, which appears asymptomatic. Blood vessels appear normal for her age and no other abnormality is seen. You recorded an ECG during the initial consultation and noted several multifocal ventricular ectopic beats and early left ventricular hypertrophy. These findings are confirmed by the ECG report. Results of the blood tests when later returned are normal.

What does the CT scan suggest and what do you make of the ECG result?

Answer: *The CT scan suggests a diagnosis of embolic stroke, rather than a local vascular cause for the neurological deficit. The ECG alone is not enough to exclude the possibility of intermittent atrial fibrillation. Because the CT scan supports an embolic phenomenon, Kim should have 24-hour Holter monitoring arranged urgently.*

Kim is able to undergo echocardiography early the next day. What, if any, management do you suggest for her in the meantime?

Answer: *It would be wise at this stage to speak with the cardiologist and a neurologist about the results of the CT brain scan and your concerns about the possibility of emboli. If there is no concern about Kim having active bleeding (haemorrhoids, nose bleeds, gastric ulcers) and she feels she can avoid falling and injuring herself, she could be commenced on daily enoxaparin by subcutaneous injection (1.5 mg/kg) until results of echocardiography and 24-hour Holter monitoring are available. The alternative, clopidrogel 75 mg daily, is more*

suitable for ischaemic cerebrovascular events than for embolic events. There is no indication for warfarin at this time as it takes at least several days to achieve anticoagulation and, depending on results of further investigations, might be unnecessary.

As Kim's condition has been stable for two days, hospitalisation is not necessary but is an option if Kim feels unsafe at home because of her balance problem.

Outcome

Kim undergoes transthoracic echocardiography and sees the cardiologist the next day. The echocardiogram suggests she has dilated cardiomyopathy with an ejection fraction of 39% and mural clot formation in the left ventricle. This clot is likely to be the source of emboli to the brain. Carotid Doppler ultrasound results are normal, and 24-hour Holter monitoring shows only multiple multifocal ventricular ectopic beats. Kim refuses transoesophageal echocardiography.

Kim is commenced on warfarin, bisoprolol 2.5 mg daily and simvastatin 20 mg daily, with enalapril reduced to 2.5 mg daily. The cardiomyopathy is presumed to be idiopathic. You refer Kim to the neurologist. The possibility of physiotherapy for balance training and an occupational therapy home review are discussed with her. She remains under the cardiologist's care. **CT**

Further reading

National Stroke Foundation. Clinical guidelines for stroke and TIA management. A quick guide for general practice. Melbourne: NSF; 2010. Available online at: http://strokefoundation.com.au/site/media/NSF_concise_guidelines_gp_2010.pdf (accessed October 2013).

Key points

- **All acute neurological deficits must be taken seriously and patients educated to seek urgent medical advice for them.**
- **If the patient is not hospitalised, urgent investigation, referral and treatment need to be arranged.**
- **Transient ischaemic attacks in particular are often inadequately investigated, as their transient nature means patients may not realise their significance.**
- **Cardiovascular causes should be considered and investigated in all patients with acute neurological deficits of unknown cause.**