Pyrexia and breathlessness in a patient with a cardiac pacemaker

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A 79-year-old woman was admitted with a one-week history of rigors. She also complained of poor appetite, lethargy and weight loss. Ten years previously, she had an abdomino-perineal resection for a Duke's B adenocarcinoma of the rectum. Four years previously, a fall had resulted in a left trimalleolar fracture which was treated by internal fixation. At that time second degree atrioventricular block was diagnosed and a permanent transvenous cardiac pacemaker was inserted.

During the current admission, she had no specific clinical signs but was observed to have rigors and a recurrent spiking pyrexia of up to 38°C. She had an elevated white cell count ($16.5 \times 10^9/l$) with a neutrophilia. Serum liver function tests and biochemistry were normal and blood and urine cultures were negative. Chest X-ray showed her pacemaker and a large loop of pacing wire within the right atrium. Electrocardiogram confirmed normal pacemaker function. The presence of multiple gallstones detected on ultrasound led to a presumptive diagnosis of cholangitis. She was treated with intravenous cefuroxime for one week, her rigors settled and she was discharged.

Three weeks later, she was readmitted with recurrent rigors and breathlessness. On this occasion she had a soft ejection systolic murmur audible at the left sternal edge and mild pitting ankle oedema.

Questions

- 1 What is the diagnosis?
- 2 What is the treatment choice?

Answers

QUESTION 1
Infected thrombus around a permanent cardiac pacing wire and multiple pulmonary emboli.

QUESTION 2
Treatment with an extensive course of antibiotics and anticoagulation failed. She was eventually successfully treated by replacement of the entire pacing system by cardiotomy with cardiopulmonary bypass.

Discussion

In this patient, six sets of blood cultures were negative. Transthoracic echocardiography revealed bright shadows in the right atrium. These were thought to be artifacts caused by the mobility of the pacing wire loop within the right atrium. A transoesophageal echocardiogram did not provide additional information. A tentative diagnosis of right-sided bacterial endocarditis was made. A ventilation-perfusion scan, performed to look for secondary pulmonary emboli, revealed multiple mismatched defects. She was treated with a six-week course of intravenous benzylpenicillin, flucloxacillin and gentamicin and was fully anticoagulated. Her temperature and rigors settled and her white cell count returned to normal. However, two days after stopping antibiotics, pyrexia and rigors recurred. Anticoagulation was discontinued and cardiotomy with cardiopulmonary bypass was performed. The pacing wire was found to have pierced a tricuspid valve leaflet. The portion of the wire within the right ventricle was surrounded by fibrin and thrombus (figure). The entire system was removed

Figure Thrombus and fibrin on the endocardial pacing wire

and an epicardial pacing wire inserted. Culture of the thrombus grew coagulase-negative staphylococcus. She made a good recovery and one year later she remained fit and well.

INFECTED PACING WIRE THROMBUS
About 5% of permanent cardiac pacemakers become infected. Although the majority are superficial wound infections,¹⁻³ bacterial endocarditis can also occur.^{4,5} Normally, a thin fibrin sheath forms around the intra-cardiac portion of the wire with the tip becoming embedded into the intimal layer of the myocardium.^{6,7} However, an atrial thrombus can form around the cardiac pacemaker wire.⁸ These atrial thrombi can become infected and give rise to infective pulmonary emboli.⁹ These complications usually present within six months of pacemaker insertion but can present insidiously, many years later with nonspecific symptoms.

INVESTIGATIONS
A diagnosis of an infected pacing wire thrombus can be difficult to confirm. Blood cultures, as in this case, are often negative.¹⁰ Echocardiography can be complicated by artefacts caused by the presence of the pacing wire within the heart. Pulmonary angiography has previously been reported to be useful in this situation but there is a risk of dislodging an intra-cardiac thrombus.⁸

TREATMENT
Antibiotic treatment often fails to eradicate the infection and anticoagulation does not remove the thrombus. There has been a previous report of the use of a thrombolytic agent (tissue plasminogen activator) with unsatisfactory results.⁹ Removal of the pacing wire can be difficult and, as in this case, may require cardiotomy with cardiopulmonary bypass. Removal of the pacing wire by traction can be hazardous and complications including avulsion of myocardial tissue have previously been reported.¹¹

Final diagnosis

Infected pacing wire thrombus with multiple pulmonary emboli.

Keywords: pacemaker, pulmonary emboli

Causes of pyrexia related to cardiac pacemakers
<ul style="list-style-type: none">● cellulitis at site of implantation● pacemaker 'pocket' infection● infected pacing wire thrombus● pulmonary embolism● bacterial endocarditis
Risk factors for cardiac pacemaker infections
<ul style="list-style-type: none">● co-existing sepsis● immunosuppression● manipulation of the pacemaker system
Learning points
<ul style="list-style-type: none">● pacing wires can become foci for thrombosis and infection years after insertion and present insidiously as a pyrexia of unknown origin● a long course of antibiotics and anticoagulation may be inadequate treatment● the entire pacemaker system may have to be removed

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Unilateral foot drop

Rahul Lath, Vedantam Rajshekhar

A 56-year-old man had presented with a right foot drop which developed over a one-month period, six months prior to admission in our department. There was no weakness of the left upper or lower limbs. He had three episodes of transient numbness over the right lower limb, one and a half years earlier which lasted for 10 minutes each. There was no history of low back ache or features of raised intracranial pressure. Bowel and bladder functions were normal. One month after the onset of the foot drop he was evaluated elsewhere and a diagnosis of L4 L5 intervertebral disc prolapse was made after a lumbar myelogram. He underwent a lumbar laminectomy and L4 L5 discectomy. Postoperatively there was no improvement and the weakness worsened. A postoperative magnetic resonance imaging (MRI) scan of the lumbar spine showed postoperative changes of the laminectomy and L4 L5 discectomy with no other pathology.

Physical examination revealed normal fundii and normal and symmetrical facial movements. There were no motor or sensory deficits in the upper limbs and left lower limb. There was grade 5/5 power in the muscles of the right hip and knee joints while the power in the right ankle dorsiflexors was grade 3/5 and right toes was grade 1/5. The tone was normal in all the limbs and there was no atrophy or fasciculations in the upper or lower limbs. There was impairment of the parieto-cortical sensations over the dorsal and plantar aspect of the right foot. The knee and ankle jerks were exaggerated on the right side but there was no clonus. Superficial abdominal reflexes were absent on the right and the right plantar response was extensor. He had a steppage gait with a foot drop on the right side. Straight leg raising test was negative.

Questions

- 1 Name four causes of a unilateral foot drop.

2 What is the most likely diagnosis in this patient?

3 What further investigation would you undertake in this patient?

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