tion of SAVF with Gianturco coils creates a permanent thrombosis. Coils reduce the flow and induce clotting by providing an increased surface for thrombocytic aggregation. The SAVF in our patient was successfully occluded

by eight giant Gianturco coils deployed through a catheter. Transcatheter arterial embolization is now emerging as a safe and effective alternative to surgery in the management of SAVF.

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Postpericardiotomy syndrome following temporary and permanent transvenous pacing

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Summary

The postpericardiotomy syndrome may occur as a complication of temporary and permanent pacing. Physicians involved in procedures which may be complicated by this condition therefore need to be aware of its diagnosis and management.

Keywords: postpericardiotomy syndrome; cardiac pacing

Postpericardiotomy syndrome is recognised as one of the commonest complications following cardiac surgery, with an incidence of between 10-50% being reported.¹ Its description following the insertion of a transvenous pacemaker, however, is relatively rare. We present a case of temporary and subsequent permanent transvenous pacing resulting in the postpericardiotomy syndrome.

Case report

A 68-year-old man was admitted with a history of presyncopal and syncopal symptoms. There was a previous history of atrial fibrillation, transient ischaemic attacks (for which he was anticoagulated with warfarin) and ischaemic heart disease. On examination, he had a heart rate of 35 beats/min, the electrocardiograph (ECG) showing slow atrial fibrillation. A temporary pacing wire was inserted via the right internal jugular vein and subsequently required repositioning on two occasions due to failure to capture. Two hours following repositioning he initially experienced left shoulder pain, later associated with intermittent neck and chest pains and a temperature of 37.8°C.

A VVI permanent pacemaker was inserted (via the left subclavian route) and temporary wire removed 5 days following admission. This was complicated by dull central chest pain following the procedure. A pneumothorax was excluded and a small posterior pericardial effusion was demonstrated on echocardiography. He continued to experience chest pain and an intermittent pyrexia. A swelling at the right side of his neck (site of temporary pacing) was shown by Doppler ultrasonography to be due to a thrombosis involving the internal jugular vein. The erythrocyte sedimentation rate (ESR) was elevated at 115 mm/h. He was discharged 11 days later following resolution of his symptoms and pyrexia, although the ESR remained elevated at 100 mm/h.

At re-admission, 3 weeks later, he gave a history of acute pleuritic chest discomfort and dyspnoea. On examination, he had a temperature of 38°C, a pericardial friction rub and reduced air entry at the left pulmonary base. Chest radiography revealed cardiomegaly and a small left pleural effusion. The white cell count (WCC) was $13 \times 10^9/l$ (neutrophilia) and cardiac enzymes normal. Serial blood cultures remained sterile. The ECG revealed ventricular pacing on a background of atrial fibrillation. At echocardiography, a 3.5 cm pericardial effusion was identified with mild mitral regurgitation and good left ventricular function. The ESR was 107 mm/h, C-reactive protein 251 mg/l (normal <10 mg/l), complement C3/C4 levels normal and autoantibodies (including antineutrophil cytoplasmic antibody and anticardiolipin IgG and IgM) negative. Right heart catheterization revealed moderate pulmonary hypertension (pulmonary artery pressure

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52/10 mmHg) with normal pulmonary and right ventricular angiography. Although no objective evidence for an infection was identified (negative cultures of sputum, urine and blood) an empirical course of amoxicillin/amoxicillin-clavulanic acid combination was administered for 9 days. Although intermittently pyrexial, this gradually subsided with symptomatic improvement. Serial echocardiography confirmed resolution of the pericardial effusion over a 4-week period associated with a decline in the levels of the inflammatory indices and WCC. A diagnosis of postpericardiotomy syndrome secondary to transvenous pacing was felt to be consistent with this presentation.

Discussion

The postpericardiotomy syndrome was originally reported following closed mitral valvotomy.² In the classical description, it occurs as fever and pleuropericarditis over a week following cardiac surgery which has involved pericardiotomy and cardiac manipulation. An identical syndrome has been reported following transvenous pacing,³ cardiac catheterization, blunt chest trauma and insertion of epicardial pacing wires.⁴ There is close similarity to Dressler's syndrome, which presents in the weeks/months following myocardial infarction.⁵ Both syndromes include endothelial injury and haemopericardium followed by a delayed response incorporating fever and pericarditis. Antimyocardial antibodies have been reported in both syndromes.

The aetiology for these syndromes is not entirely resolved although an autoimmune reaction has been postulated, based on the associated findings of antimyocardial antibodies. The possible involvement of a viral aetiology with the autoimmune process has also been proposed.⁶ An alternative hypothesis has suggested the importance of the leakage of blood into the pericardial space. A higher incidence of Dressler's syndrome when oral anticoagulation was in common use following myocardial infarction is suggested as corroborative evidence for this theory.⁷

It is presumed that a prerequisite for the development of this syndrome following transvenous pacing requires perforation of or damage to the right ventricular myocardium. The exposure to myocardial antigens would give rise to an autoimmune reaction with anti-heart antibodies and pleuropericarditis. Peri-

Learning points

- although postpericardiotomy syndrome most frequently occurs following cardiac surgery it may also, on rare occasions, complicate transvenous pacing
- of the cases of this syndrome reported following transvenous pacing approximately 50 % report the use of temporary wires
- postpericardiotomy syndrome occurs as fever and pleuropericarditis over one week following the initiating procedure

cardial tamponade complicating postpericardiotomy syndrome following permanent transvenous pacing, has been reported.⁸ Of the cases of this syndrome reported following transvenous pacing, approximately 50% reported the use of temporary wires, as in our case. Due to the nature of these wires and acknowledged difficulties associated with their placement, one would anticipate a higher risk of complications.⁹ It is also of interest that this patient was anticoagulated prior to and following the insertion of the transvenous pacing wires. It would be anticipated that any potential perforation would result in a higher likelihood of progressing to a significant pericardial effusion under these circumstances.

Major and minor criteria have been proposed in the diagnosis of the postpericardiotomy syndrome.¹⁰ The major criteria include the presence of a pericardial/pleural rub, chest pain or a temperature of over 38°C whilst the minor criteria include an elevated C-reactive protein, ESR or WCC, over one week following the initiating procedure. At least two major and one minor criterion has to be present in order to make the diagnosis. The value of the elevated titres of antiheart and anticardiolipin antibodies remains controversial. They have low sensitivity and only slightly higher specificity as markers for the postpericardiotomy syndrome.¹⁰ It is noteworthy that in our case the syndrome appeared to develop in two phases. The first phase, at the time of temporary wire repositioning, was marked by atypical pains and pyrexia, indicating initial myocardial perforation and haemopericardium. The second phase, 3 weeks later and marked by pleuropericarditis, was the classically described postpericardiotomy syndrome.

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Efficacy of statin therapy: possible effect of phenytoin

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Summary

Statins are currently the most widely prescribed lipid-lowering drugs. Individual statins are known to be metabolised by the CYP3A4 isoform of the cytochrome P450 system. The effect of CYP3A4 inducers such as phenytoin on the metabolism and efficacy of these agents is unknown. We report a patient with familial hypercholesterolaemia and epilepsy in whom the introduction and subsequent discontinuation of phenytoin were associated with marked changes in the lipid response to treatment with simvastatin and atorvastatin. The serum activity of γ -glutamyl transpeptidase may have acted as a marker of microsomal induction by phenytoin, since it rose markedly when phenytoin was introduced and returned to normal after it was discontinued.

Keywords: statins; phenytoin; drug interaction

Statins are widely used in the treatment of hyperlipidaemia. Various drug interactions have been noted, the most frequently cited involving digoxin and warfarin. In the case of simvastatin and pravastatin, the potential for interactions involving hepatic microsomal enzymes has been identified; both have been found to cause statistically significant changes in the pharmacokinetics of substrates for specific cytochrome P450 isoforms.¹ Similarly, the manufacturer's data sheet for Lescol® (fluvastatin) mentions the possibility of interaction with drugs metabolised by the CYP2C family of isoforms.²

Statins are themselves metabolised by the cytochrome P450 system (specifically the CYP3A4 isoform), raising the possibility that other drugs may influence their metabolism, and, by extension, their efficacy. The manufacturer's data sheet for Lipitor® (atorvastatin) cautions against the concurrent use of inhibitors of the CYP3A4 isoform, such as macrolide antibiotics and azole antifungals, based on experience with other statins.³ However, the effect of CYP3A4 inducers such as phenytoin or rifampicin on atorvastatin is unknown. We present strong circumstantial evidence that phenytoin may alter the efficacy of atorvastatin, and simvastatin, based on a patient with familial hypercholesterolaemia who was treated concurrently with phenytoin.

Case report

A 50-year-old woman was referred to the Lipid Clinic in 1995. She was taking simvastatin 10 mg; her total cholesterol was 9.4 mmol/l and triglycerides 1.87 mmol/l. She had never smoked. Her father had died at 45 years of age from a myocardial infarct; one brother had coronary artery bypass grafting at 35 years of age. The patient had gross thickening of both Achilles tendons and a diagnosis of familial hypercholesterolaemia was made. Epilepsy had been diagnosed 6 years previously for which the treatment was sodium valproate 200 mg tid.

On review 3 months later, the patient's anti-convulsant medication had been changed to phenytoin 325 mg. Her total cholesterol was now 15.99 mmol/l; she claimed to be complying fully with simvastatin 10 mg. Serum activity of γ -glutamyl transpeptidase (γ GT), which had previously been normal, was 175 U/l (reference range 5–50 U/l). Significant alcohol intake was denied, and there was no other evidence of this; mean red cell volume was 85 fl (80–100 fl).

Successive subsequent changes to her lipid-lowering therapy included increasing the dose of simvastatin step-wise to 40 mg, switching to

Figure Changes in total cholesterol and γ GT levels during statin treatment. The numbers on the x-axis refer to the statins received: 1=simvastatin 10 mg, 2=simvastatin 20 mg, 3=simvastatin 40 mg, 4=simvastatin 40 mg, 5=fluvastatin 40 mg, 6=atorvastatin 40 mg, 7=atorvastatin 80 mg, 8=atorvastatin 80 mg

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