Complete nasal obstruction secondary to pacemaker insertion

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ABSTRACT

We present the case of a 71-year-old man who presented to the ear, nose and throat department with complete nasal obstruction and facial plethora on bending forward. Clinical examination was positive for Pemberton's sign. Computed tomography and ultrasonography demonstrated bilateral brachiocephalic vein thrombosis secondary to pacemaker insertion. This case highlights a novel complication of pacemaker insertion.

KEYWORDS

Nasal obstruction – Brachiocephalic vein thrombosis – Pacemaker

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Case history

A 71-year-old man presented to our ear, nose and throat (ENT) department with a 10-month history of complete nasal obstruction and facial plethora on bending forward, particularly while gardening. Two years prior to his symptoms commencing, he underwent insertion of a permanent dual lead pacemaker for persistent bradycardia. There was no other relevant past history of note.

Endoscopic examination of the nasal cavity on sitting upright demonstrated a good bilateral nasal airway. However, complete nasal obstruction due to inferior turbinate engorgement, significant facial plethora, and neck and chest vein distension were all elicited by performing both Pemberton's procedure (extension of both arms above the head) and by bending the patient over for at least two minutes. The remaining ENT examination was unremarkable. Allergy testing was negative. Chest x-ray and electrocardiography were normal. Ultrasonography of the neck confirmed patent jugular and subclavian veins with a proximal occlusion. Computed tomography angiography of the neck and chest was performed, which demonstrated bilateral brachiocephalic vein thrombosis around the inserted pacing wires (Fig 1).

The patient was referred to the vascular multidisciplinary team, who concluded that endovascular repair of bilaterally thrombosed brachiocephalic veins was not possible. Consequently, the patient was treated conservatively with anticoagulation therapy. After three months of treatment, his presenting symptoms were slowly improving.

Discussion

In the UK, 621 pacemakers are inserted for every one million population for the treatment of various cardiac arrhythmias.¹ One to three leads are inserted into the cardiac chambers, enabling the pacemaker to replace a defective sinus node by detecting intrinsic heart rhythms and responding through transmission of electrical impulses to the myocardium, leading to muscle contraction. These leads are most commonly inserted through either the subclavian or cephalic veins, and passed into the muscle of the right ventricle and atrium.^{1,2}

Complications of pacemaker insertion occur in 4–5% of cases, and can include pneumothorax, pericarditis, infection, pacemaker syndrome, air embolism and haematoma. Thrombosis of the brachiocephalic vein is a rare but recognised complication of pacemaker implantation. Patients becoming overtly symptomatic as a result have been analysed in a pooled report but nasal symptoms have never been reported.³

The brachiocephalic vein is formed at the junction between the internal jugular and subclavian veins. The left is longer than the right and both join to form the superior vena cava.² Thrombosis or stenosis of the brachiocephalic veins present similarly to superior vena cava syndrome. The most common symptoms include facial swelling, upper extremity swelling, dyspnoea, cough and dilated thoracic collateral vessels.⁴

We report a case of bilateral brachiocephalic vein thrombosis as a complication of pacemaker insertion, presenting

Figure 1 Axial computed tomography with contrast of the mediastinum demonstrating bilateral brachiocephalic thrombosis: left-sided thrombosed brachiocephalic vein (yellow arrow) (A), left-sided collateral flow via the left hemiazygous vein (red arrow) resulting from left brachiocephalic occlusion (B) and filling defect in the right brachiocephalic vein (blue arrow) resulting in the development of multiple collateral vessels (green arrows) (C)

with complete nasal obstruction on bending forward or raising the arms. The swelling in the nasal cavity was identified as severely engorged inferior turbinates.

The inferior turbinates contain a subepithelial layer comprising a large vascular network of vessels and

pseudoerectile tissue, giving the turbinate the ability to vary the luminal capacity of the nasal cavity, which functions to humidify and warm inspired air in preparation for the lower airways. The venous drainage from the turbinates passes into the proximal vessels of the common facial vein, the pterygoid plexus and directly into the cavernous sinus. These veins converge to become the internal jugular vein.² The occluded brachiocephalic veins would have led to severe venous congestion of the head and neck, including the inferior turbinates, which would have been exaggerated through postural changes, particularly by bending forward or raising the arms (Pemberton's sign).

Pemberton's sign is a useful test in any patient presenting with symptoms of venous congestion. The test consists of asking a patient to raise both arms above the head; if this causes progressive facial plethora and swelling, it is positive and suggests a degree of superior vena cava syndrome or proximal upper extremity deep vein thrombosis.⁵ This may eventually cause dyspnoea if the arms are held in position for long enough. In the ENT clinic, the most common cause of a positive Pemberton's sign is a retrosternally compressive thyroid goitre. In the case presented here, this test was performed after normal ENT examination and led to the eventual diagnosis. When ENT examination is normal in a patient presenting with postural related nasal symptoms, Pemberton's sign may be useful in identifying undiagnosed thoracic inlet pathology.

Conclusions

We describe the first case of a patient presenting with complete nasal obstruction secondary to bilateral brachiocephalic vein thrombosis as a complication of pacemaker insertion. Nasal obstruction is a common presentation in the ENT clinic. In the absence of any positive ENT findings, consideration must be made of any chest or thoracic inlet pathology.

References

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