The Journal of Laryngology & Otology (2010), ***124***, *916–918*.

doi:10.1017/S0022215110000046

Clinical Record

Internal jugular vein thrombosis secondary to a permanent cardiac pacemaker: an unusual case of lateral neck swelling

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Abstract

Objective: To describe an unusual case of lateral neck swelling in a patient with a permanent cardiac pacemaker.

Case report: We describe a patient who presented with a painful, lateral neck swelling due to an internal jugular vein thrombus. This thrombus originated from around pacemaker wires in the subclavian vein. This case is unusual, as the vast majority of thromboses in patients with cardiac pacemakers are found in the subclavian vein alone. We also review the literature on the relationship between cardiac pacemakers and internal jugular vein thrombosis, and on the management of the latter.

Conclusion: Our patient illustrates a rare cause of a painful, lateral neck swelling: an internal jugular vein thrombus secondary to a cardiac pacemaker. Clinicians should be wary of such pathology in similar patients, in order to ensure early treatment and avoidance of complications.

Key words: Internal Jugular Vein; Thrombosis; Cardiac Pacemaker; Neck

Introduction

A lateral neck mass is a common presenting complaint in adults, with numerous possible causes including metastatic squamous cell carcinoma, lymphoma, branchial cyst, haemangioma, sebaceous cyst, lipoma, carotid body tumour and parotid neoplasm.[1,2]

Below, we describe a case of a painful neck swelling and laryngo-pharyngeal oedema due to an internal jugular vein (IJV) thrombosis secondary to a cardiac pacemaker.

Case report

A 67-year-old woman presented to our ENT department with a left-sided, enlarging neck swelling of three days' duration. She had dysphagia due to worsening pain, but no dyspnoea. A few days before presentation, she had developed a sore throat and dysphonia.

Neck examination revealed a 4 × 2 cm, diffuse, tender swelling in the left anterior triangle.

On flexible nasoendoscopy, a diffuse, oedematous swelling of the lateral pharyngeal wall was noted, with oedema of the ipsilateral larynx.

The patient was pyrexial with an elevated C-reactive protein (392.3 mg/l).

An initial diagnosis of lymphadenitis or abscess was made, and intravenous antibiotics and steroids were commenced.

After 48 hours of treatment, there had been no significant change in symptoms or signs, so an ultrasound scan of the neck (Figure 1) and a computed tomography (CT) scan with contrast (Figure 2) were performed.

The ultrasound scan (Figure 1) demonstrated a thrombus in the IJV. On the CT scan, the left innominate vein failed to opacify around the pacemaker wires after left antecubital contrast injection. The patient had had a dual chamber cardiac pacemaker inserted into the subclavian vein via a left infraclavicular approach two years previously, as treatment for heart block. The thrombosis originated around the pacemaker wires and completely occluded the left innominate vein, up to the insertion of the pacemaker in the first part of the left subclavian vein. Collaterals had developed from the first part of the subclavian vein across the mediastinum into the superior vena cava, which was of normal calibre. The left axillary vein was not involved, nor were the contralateral subclavian or internal jugular veins.

Results for antithrombin III, protein S, protein C, activated partial thromboplastin time and international normalised ratio testing were all normal.

Intravenous heparin was initiated, resulting in resolution of the neck lump within five days and improvement in the patient's symptoms, allowing her to eat and drink without discomfort.

The patient was commenced on long term warfarin. Six months later, she had experienced no further sequelae.

Discussion

Internal jugular vein thrombosis has previously been described as a cause of lateral neck swelling.[3–6] No study to date has identified what proportion of neck swellings are due to this pathology, presumably due to its low incidence. Internal jugular vein thrombosis has been associated with jugular venous catheters,[7] surgery,[8] intravenous drug abuse,[9] neoplasms of the head and neck,[10] infection,[11] parotitis,[6] and hypercoagulable states;[12] it may also occur spontaneously. Alternatively, it may be identified following investigation of its associated complications[13] or during investigation of subclavian vein thrombosis.[7] The current report draws attention to the rare possibility of a chronic

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Accepted for publication: 6 November 2009. First published online 16 February 2010.

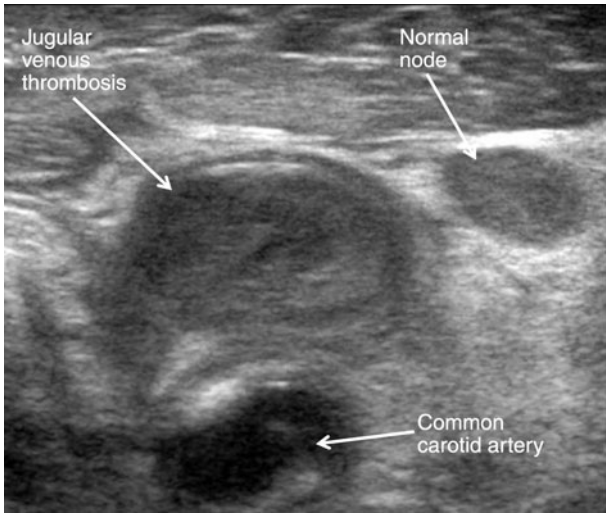

FIG. 1
Ultrasound scan of the left side of the neck, demonstrating the thrombus.

subclavian vein thrombus developing around pacemaker wires and then propagating into the IJV and presenting acutely as a lateral neck swelling, without the complications or clinical evidence associated with a subclavian vein thrombosis.

After searching the Pubmed database, we believe only two other reports have described an IJV thrombosis causing a neck swelling following catheterisation of the subclavian vein for cardiac pacing.

Fitzgerald and Leckie[4] described a case of IJV thrombosis presenting as a tender neck mass contralateral to the site of cardiac pacemaker placement. This patient was treated with thrombolytics and anticoagulation. In contrast, our patient's symptoms resolved fully with only anticoagulation and antibiotics.

Girard *et al.*[5] described the occurrence of a cerebral venous sinus thrombosis after partial occlusion of the right IJV by a clot originating in the right subclavian vein. This led to a reduction in consciousness. In contrast, our patient had full occlusion of the left IJV, without any evidence of cerebral venous sinus thrombosis, and maintained full consciousness.

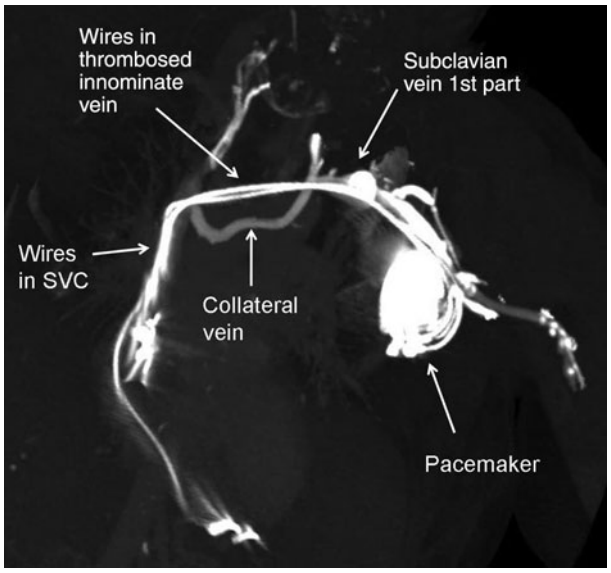

FIG. 2
Coronal computed tomography scan with intravenous contrast, demonstrating the pacemaker, thrombosed innominate vein and collateral vein. SVC = Superior Vena Cava

Our patient's CT scan with contrast (Figure 2) demonstrated a functioning venous collateral system; this prevented earlier presentation with arm oedema, the usual complaint associated with subclavian vein thrombosis. Such a compensatory mechanism has previously been described following cardiac pacemaker placement.[14]

A derangement of any one element of Virchow's triad of hypercoagulability, haemodynamic changes (such as stasis or turbulence) and endothelial injury can promote thrombosis. Lemierre syndrome comprises an infected IJV thrombus due to extension of oropharyngeal infection.[15] Thrombosis due to such infection is probably due to systemic hypercoaguability, venous stasis caused by inflammatory occlusion of the vessel, and endothelial damage by micro-organisms. Certainly, our patient had originally developed a sore throat. However, it is conceivable that endothelial damage could have occurred in this patient due to the long-standing presence of pacemaker wires, which themselves could have acted as a nidus for thrombus formation.[16]

Transvenous cardiac pacemakers are the preferred method of cardiac pacing, due to their relative ease of insertion and relatively low incidence of complications.[17] Previous studies have reported that 1.2 per cent of cardiac pacemaker insertions are complicated by some degree of symptomatic subclavian vein occlusion.[18] This incidence rises to between 44[18] and 79 per cent[16] when one takes into consideration subclinical thromboses evident only on radiological imaging.

It is important to recognise and treat IJV thrombosis early, in order to prevent such complications as pulmonary embolism (encountered in 0.5 per cent of patients with solely IJV thrombosis),[13] intracranial thrombosis,[5] septic emboli and loss of vision.[19] Such complications, although serious, are surprisingly rare and did not occur in our patient.

- **This paper describes an unusual case of lateral neck swelling due to an internal jugular vein thrombus originating from a thrombus around cardiac pacemaker wires in the subclavian vein**
- **Internal jugular vein thrombosis has been associated with jugular venous catheters, surgery, intravenous drug abuse, neoplasms of the head and neck, infection, parotitis, and hypercoagulable states; it may also occur spontaneously**
- **The patient was treated with heparin and commenced on long term warfarin**
- **Clinicians should be wary of this rare cause of lateral neck swelling in patients with a cardiac pacemaker, in order to expedite the necessary investigations and treatment and help prevent potentially serious complications**

First line treatment for upper extremity venous thrombosis is anticoagulation, initially with heparin and subsequently with long term warfarinisation.[13,20,21] Depending on the degree of occlusion, the patient's symptoms, the veins involved and the cause of the thrombosis, alternate treatment options are available, such as thrombolysis[4] and superior vena cava filters.[13] Our patient's symptoms resolved with heparinisation alone, and she was subsequently placed on long term warfarin.

https://doi.org/10.1017/S0022215110000046 Published online by Cambridge University Press

When considering the differential diagnosis of a neck swelling, commoner causes than IJV thrombosis should be considered. However, as this report demonstrates, the clinician should be aware of this pathology in a patient with a cardiac pacemaker who presents with a lateral neck swelling. This will expedite the necessary investigations and treatment, and help prevent potentially serious complications.

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Mr J Pickles takes responsibility for the integrity of the content of the paper.
Competing interests: None declared