

## CLINICAL VIGNETTE

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# Lymphedema due to Pacemaker in an Elderly Patient

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### *Case Report*

An 85-year-old male with Alzheimer's dementia, heart failure, sick sinus syndrome status post dual-chamber pacemaker, resected lung cancer and treated lymphoma presented for follow-up of his left upper extremity swelling and erythema. He was accompanied by his wife who provided the history. His wife noticed worsening left arm, forearm, and hand swelling in the last six months. He is on apixaban for atrial fibrillation. His electrophysiologist recently obtained CT chest venogram with contrast showed narrowing of both the left subclavian and left brachiocephalic veins due to coursing pacemaker wires with prominent collateral vessels in the left anterior chest wall. There was no lymphadenopathy, deep venous thrombosis (DVT), or evidence of tumor recurrence. One week ago, he went to the emergency room for worsening swelling of his left hand and purulent discharge. Ultrasound of the left upper extremity was negative for DVT. He was diagnosed with cellulitis and started on empiric cephalexin. The patient was recently seen by vascular surgery and, due to potential surgical risks, there was no plan for surgical intervention to fix the pacemaker wires as his pacemaker has been functioning well. He reports no chest pain or shortness of breath. His wife inquired about interventions to help with the patient's upper extremity edema.

### *Discussion*

Lymphedema is a common, debilitating, and distressing condition with various etiologies that results in insufficient lymph drainage. These etiologies can vary from malignancies, acute and chronic deep vein thromboses, compression or occlusion of blood vessels, prior surgery, and trauma. Lymphedema can be primary or secondary.<sup>1</sup> This patient's lymphedema is due to a secondary cause - subclavian vein stenosis from pacemaker leads. Compression or stenosis of the subclavian vein results in a constellation of symptoms that are characteristic of venous thoracic outlet syndrome, which includes upper extremity swelling, pain, cyanosis, and sensation of arm heaviness.<sup>2</sup> Duplex ultrasound is non-invasive and can be used during dynamic maneuvers to detect a subclavian vessel lesion.<sup>2</sup> However, CT and MRI venography are preferred, reliable, diagnostic tools for evaluating subclavian vein stenosis / occlusion and venous thoracic outlet syndrome.<sup>2</sup>

In a systematic review, most guidelines recommend an integrated medical and psychological assessment, as well as physical examination with a limb volume measurement of greater than 10% in the affected limb compared to the

unaffected, to confirm a diagnosis of lymphedema.<sup>1</sup> Recommended management involves complex decongestive therapy (CDT), followed by self-management using skincare, self-lymphatic drainage massage, exercise, and compression.<sup>1</sup> Studies suggest that the underlying etiology of lymphedema makes little difference to guideline recommendations regarding care.<sup>1</sup> In another systematic review that included eight randomized controlled trials and a clinical study, water-based exercise seemed to improve perception of pain and quality of life compared to the control group.<sup>3</sup> Water-based exercise can also improve shoulder range of motion, limb strength, and short-term reduction in volume of the lymphedematous limb.<sup>3</sup>

Although lymphedema and pacemaker implantation are common occurrences, lymphedema due to pacemaker lead-induced subclavian vein stenosis is rare. As the population ages, clinicians will see more elderly patients with pacemakers. Transvenous permanent pacemaker implantation is widely used for cardiac arrhythmias and associated with risks and complications. Complications include lead dislodgement, lead failure, infection, hematoma, heart failure, pericarditis, venous thrombosis, and subclavian vein stenosis / occlusion.<sup>4,5</sup> These complications may occur long after the implantation procedure.<sup>4,5</sup> In particular, venous complications are typically reported as a late problem, more than 1 month after pacemaker implantation, but may occur soon after implantation.<sup>4</sup>

Over time, a patient with a pacemaker may need a lead replacement, or reimplantation due to lead failure or device upgrade.<sup>6</sup> However, the presence of subclavian vein stenosis or occlusion can make reimplantation of a new pacemaker lead difficult.<sup>5,6</sup> Presence of pacemaker lead-induced subclavian vein stenosis can be managed conservatively or with surgical or endovascular reconstruction.<sup>5,6</sup> Endovascular intervention has lower bleeding risk compared to surgery.<sup>5</sup> Gomes et al 2021, reported venoplasty as a viable alternative to pacemaker lead extraction in a case series of high risk patients or patients who desired a less invasive approach. Zhong et al, reported successful treatment of patients with pacemaker-induced subclavian vein stenosis using transferable interventional coronary and radiological techniques.<sup>5</sup>

### *Conclusion*

Subclavian vein stenosis / obstruction should be included in the differential diagnosis of patients with pacemakers who present

with upper extremity lymphedema. CT or MR venography should be obtained for further evaluation. Elderly patients with lymphedema and comorbid medical conditions, should initially be treated with massage, physical therapy, and compression.

## REFERENCES

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