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Foreign body granuloma from retained temporary epicardial pacing wire disguised as a painful, nonhealing cutaneous nodule

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Abstract

A 76-year-old woman with a significant cardiac surgery and breast cancer history presented to the dermatology clinic with a three-year history of an enlarging, tender, nonhealing cutaneous nodule on her upper abdomen. A shave biopsy was attempted given concern for nonmelanoma skin cancer or cutaneous metastasis. The biopsy was halted after a white wire was visualized. Retrospective computed tomography (CT) imaging review revealed a hyperdense linear structure becoming superficial at the location of the nodule seen on examination. Discussion with a cardiothoracic surgeon revealed this wire was likely a retained temporary epicardial pacing wire that was placed at the time of the patient's cardiac surgery three years prior. The decision was made to excise the lesion to fully remove the wire. Given intraoperative resistance with traction, the wire was partially removed by cutting it flush to the skin's surface. The patient healed appropriately with complete resolution of her symptoms. This case is unique because the wire was fully visualized on the CT scan, and it was unable to be fully removed.

wire retracts into the deeper subcutaneous tissue without further complication. However, in some instances, the retained TEPW can become superficial resulting in a foreign body granuloma.¹⁻⁵

Case Synopsis

A 76-year-old woman with a past medical history of breast cancer (status post mastectomy and radiation therapy) and mitral and tricuspid valve regurgitation (status post open-heart surgery for mitral valve replacement and tricuspid valve repair) presented to the dermatology clinic for a painful, nonhealing nodule of the upper abdomen. She reported a three-year history of an enlarging "pimple" that progressively became more painful. On examination, the patient had an erythematous nodule with surrounding erythema, overlying crust, and minimal purulent drainage ([Figure 1A-D](#)).

The differential diagnosis included nonmelanoma skin cancer, cutaneous metastasis/Sister Mary Joseph nodule, pyoderma gangrenosum, and furuncle. A shave biopsy was attempted but was halted when a white wire was visualized at the base of the biopsy. Upon discussion with a cardiothoracic surgeon, it was determined that this wire was a retained TEPW, which was placed at the time of the patient's open-heart surgery three years prior. A radiopaque linear structure was retrospectively identified on abdominal computed tomography (CT) imaging obtained one-month post-open-heart surgery, corresponding to the location of the cutaneous nodule seen on examination ([Figure 2A-B](#)). The cardiothoracic surgeon performed an elliptical excision of the cutaneous nodule down to the subcutaneous fat. Resistance was met when external traction was applied to the wire. Thus, the pacing wire was cut flush to the skin surface, removing a piece of wire approximately 4cm in size ([Figure 2C-D](#)) and the site was closed primarily. The patient healed well after partial wire removal without further complications.

Introduction

Temporary epicardial pacing wires (TEPW) are routinely placed during cardiac surgery to help manage postoperative arrhythmias. The wires are typically removed with gentle traction a few days post-operatively once normal cardiac rhythm has been reestablished. In the setting of difficult wire removal or risks related to anticoagulation, the wires are cut flush to the skin surface to prevent hemorrhage and tissue damage. In most cases, the

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Figure 1. **A)** Erythematous nodule with surrounding erythema and overlying crust on the upper abdomen at initial dermatology encounter. **B)** Magnified view of erythematous nodule prior to attempted biopsy. **C)** Erythematous nodule on the upper abdomen at follow-up visit. Midline sternotomy scar was visualized along with prominent telangiectasias of the left upper chest, consistent with radiation-induced skin changes in the setting of breast cancer. **D)** Magnified view of erythematous nodule with central crust and purulent drainage at follow-up visit.



Figure 2. **A)** One-month post-cardiac surgery abdominal CT scan revealed a hyperdense linear structure in the upper abdomen, representing the retained temporary epicardial pacing wire (yellow arrow). **B)** The yellow arrow shows the retained temporary epicardial pacing wire becoming superficial to the abdominal wall, corresponding to the location of the cutaneous nodule noted on examination. **C)** Cutting of the pacing wire flush to the skin surface with external traction applied to the wire. **D)** The 4cm piece of retained pacing wire removed at the location of the cutaneous nodule.

Case Discussion

Our case is similar to other cases with a three-year timeline to healthcare presentation for nodule evaluation.¹⁻⁵ However, this case is unique because imaging played an important role in diagnosis. Abdominal CT scan clearly showed a hyperdense linear structure becoming superficial to the skin surface (Figure 2A-B) at the location of the nodule seen on examination, making a retained TEPW the most likely diagnosis. In other reported cases of retained TEPWs, the foreign body was not seen on imaging or imaging was not utilized.^{1,2} This case is also unique because the TEPW could not be fully removed with surgery owing to significant resistance upon traction. In most reported cases of retained TEPWs, the wires were fully removed with repeat surgery without complication.¹⁻⁴ Despite the inability to completely remove the wire in this case, removing the most superficial portion led to complete resolution of the cutaneous nodule and no further symptoms. Therefore, in cases of difficult TEPW removal, partial removal enlisting a cardiac surgeon should not be

ruled out as a possible solution to the patient's symptoms.

Conclusion

Dermatologists play an important role in recognizing the cutaneous complications of retained TEPWs, including foreign body granulomas, cutaneous erosions, sinus tracts and fistulas, and local infections. It is important to review prior imaging and consider retained TEPWs in the differential diagnosis for nonhealing cutaneous nodules on the upper abdomen, especially if adjacent to a sternotomy scar in patients with a history of cardiac surgery.

Potential conflicts of interest

The authors declare no conflicts of interest.

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