

## CASE REPORT

# Subcutaneous implantable defibrillator in dextrocardia secondary to Lobectomy

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## Case History

A 68-year-old woman was admitted following ventricular fibrillation (VF) arrest. She was deaf and mute, with previous pulmonary tuberculosis (TB) as a child requiring right lower lobectomy. Echocardiogram on admission showed normal left ventricular (LV) size, mild concentric hypertrophy (IVSd 1.2 cm), no regional wall motion abnormalities, mild mitral regurgitation, and ejection fraction (EF) of 60%. ECG: no conduction or repolarization abnormalities (QTc = 390 msec), ajmaline challenge was negative for Brugada syndrome. Cranial computed tomography (CT) showed no acute pathology and CT coronary angiogram showed unobstructed coronary arteries. Cardiac magnetic resonance imaging (CMR) confirmed good LV systolic function and no fibrosis. The decision was made to implant a subcutaneous implantable defibrillator (S-ICD). It was not appreciated by the team undertaking routine screening that the lobectomy had resulted in significant midline shift (Fig. 1), and screening was performed using the standardized approach. She passed in all three vectors (electrode on left sternal border).

The patient was brought to the laboratory and a fluoroscopic screen of a dummy device was conducted

### Key Clinical Message

Knowledge of anatomy is vital preimplant to screen the patient for the subcutaneous implantable defibrillator (S-ICD), particularly those who have previously had thoracic surgery. X-ray screening in these patients is highly recommended.

### Keywords

Dextrocardia, Lobectomy, subcutaneous implantable defibrillator, X-ray.

(Fig. 2). This showed a clear displacement of the heart to the right hemithorax, and indicates that the shock vector for the device would not have covered the heart in the standard left lateral generator position. At this point, the decision was made to implant the device on the right lateral chest wall with the shock coil on the left sternal border to insure an optimal shock vector across the ventricles (Fig. 3), and to maintain one fully screened vector (alternate vector). During implant, a successful defibrillation threshold test (DFT) at 65 J was achieved. Postimplant optimization confirmed the patient had three suitable sensing vectors. At 1-month follow-up, the patient had no episodes recorded by the device.

## Discussion

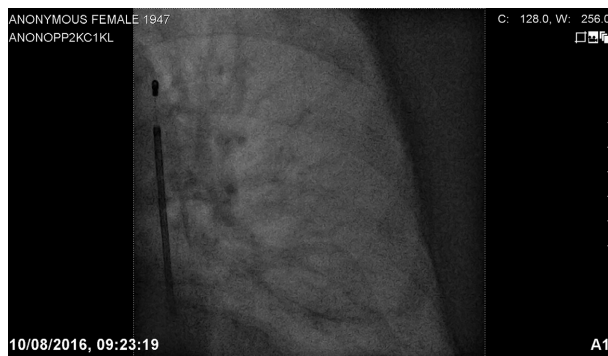
The S-ICD is becoming increasingly utilized in clinical practice, with registry data supporting its efficacy for use in a large variety of patients [1, 2]. Congenital heart disease which can provide challenging anatomy to enable adequate shock and sensing vectors [3]. However, there are no reports of using the S-ICD in a patient with a displaced heart within the chest cavity following thoracic surgery. Two previous cases describe S-ICD implantation



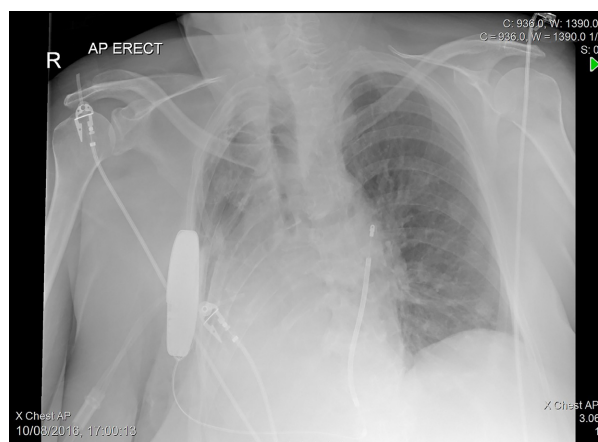
**Figure 1.** MRI chest demonstrating the heart occupying the right hemithorax due to the absence of the right lower lobe.

in dextrocardia [4, 5]. This is an important consideration and highlights the need to review chest radiographs before screening such patients for implantation especially those postcardiac and thoracic surgery or chest wall abnormalities, for example, pectus excavatum.

With more widespread utilization of the S-ICD, its use in difficult anatomies will increase to avoid the long-term risks of transvenous lead implantation. The key issue is to insure the optimal sensing and shock vectors tailored to the patient's anatomy. In this case, the can position was a mirror of a standard implant, with the S-ICD on the right lateral chest wall.



**Figure 2.** Fluoroscopic frame in PA view of L-Thorax, Dummy S-ICD lead is on L-sternal border. Note the absence of cardiac silhouette in left hemithorax.



**Figure 3.** Postprocedure chest X-ray in PA view showing cardiac silhouette to be displaced medially and S-ICD on the right side.

## Conclusion

Knowledge of cardiac displacement before screening is vital to insure the device is appropriate for the patient. X-ray screening for lead localization is strongly recommended in post-thoracic surgical patients as anatomies can be significantly distorted leading to suboptimal device placement.

## Conflict of Interest

PDL receives speaker fees, research and educational grants from Boston Scientific.

## Authorship

CM: drafted the manuscript and created revisions. IK: reviewed the manuscript and conceived the idea for the article. RS: reviewed and critically appraised the article. PDL: reviewed and critically appraised the article.

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