

## IMAGES IN ELECTROPHYSIOLOGY

## Left Diaphragmatic Hemiparesis

### An Unexpected Complication of Transvenous Lead Extraction

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We present a unique and unexpected complication, after a lead extraction in two separate patients, using a mechanical dilator sheath equipped with rotating threaded tip.

A 59-year-old woman (dilated cardiomyopathy, cardiac resynchronization therapy device implantation in 2010) and a 49-year-old man (noncompaction cardiomyopathy, implantable cardioverter-defibrillator implantation) were referred for extraction of the malfunctioning right ventricular leads. An Evolution mechanical dilator sheath (Cook Medical Inc., Bloomington, Indiana) was used to dissect adhesions via superior approach in both cases (Figure 1). The whole systems were successfully extracted and new systems were implanted directly thereafter. The first patient experienced thoracic pain, mild dyspnea, and dizziness on the first post-operative day, whereas the second patient developed dyspnea and sleeping disorders gradually during the first 4 months of follow-up. Left hemidiaphragm paralysis were diagnosed in both patients (Figure 2). The clinical symptoms of the first patient improved gradually, and a control chest x-ray at

3 months showed a normal diaphragm. Due to persistent, severe dyspnea, the second patient underwent a successful surgical plication of diaphragm 1 year later. At follow-up visit after 2 years, the clinical symptoms improved; the right

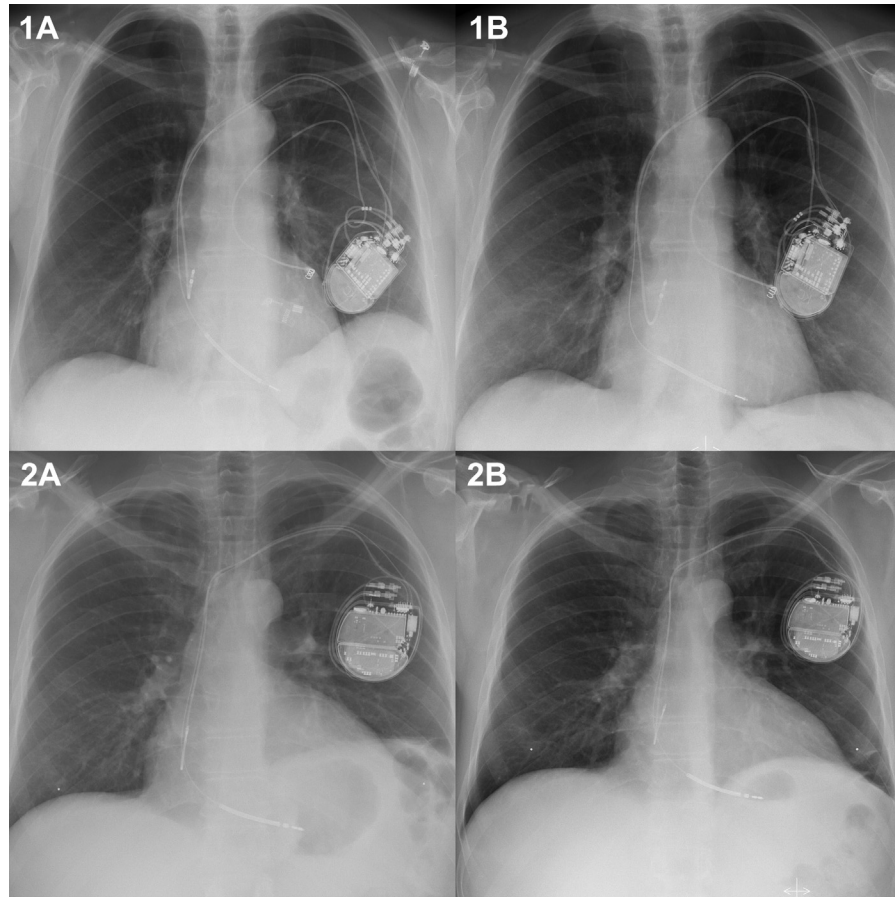
**FIGURE 1** Rotating and Cutting Tip of the Mechanical Dilator Sheath



The rotating and cutting tip of the Evolution mechanical dilator sheath (Cook Medical Inc., Bloomington, Indiana).

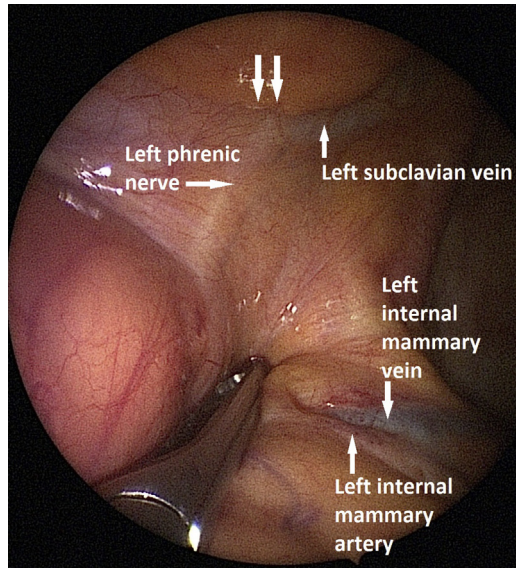
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**FIGURE 2** Chest X-Ray of Patients

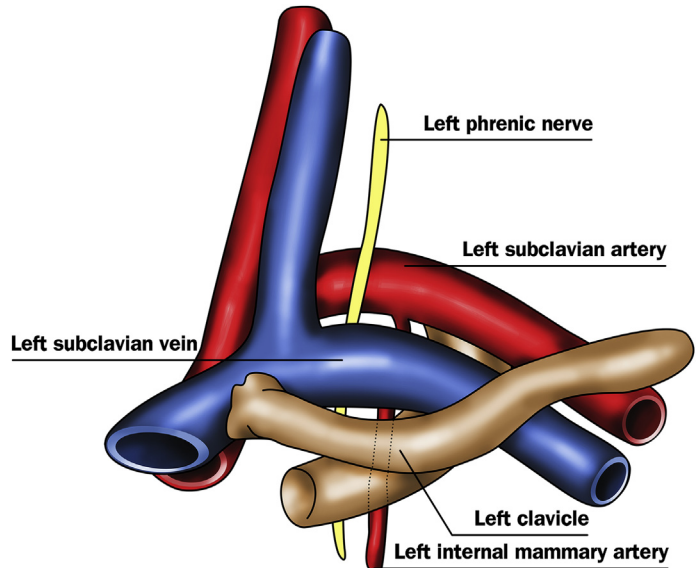
Case 1: **(1A)** First documentation of the left hemidiaphragm paralysis and **(1B)** 3 months after the initial procedure. Case 2: **(2A)** First documentation of the left hemidiaphragm paralysis and **(2B)** control after diaphragm plication.

**FIGURE 3** Thoracoscopic View on the Anatomical Correlation Between the Left Phrenic Nerve and the Left Subclavian Vein



The anatomical correlation between the left phrenic nerve and the left subclavian vein (thoracoscopic view). **Double arrow** shows the crossing part of the left phrenic nerve and the left subclavian vein.

**FIGURE 4** Schematic Representation of an Anatomical Correlation of the Left Phrenic Nerve and the Left Subclavian Vein



Schematic representation showing close proximity of the left phrenic nerve and the left subclavian vein.

hemidiaphragm showed normal function while the left side displayed no movement on chest x-ray.

This paralysis is suggested to be related to the damage of the left phrenic nerve during the process of dissecting adhesions in those parts of the left subclavian vein that run in the close vicinity of the nerve (**Figures 3 and 4**).

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