

# Transvenous extraction of an implantable cardioverter-defibrillator lead looped and damaged in subclavian vein

Przeżyłne usunięcie uszkodzonej i spętanej w lewej żyły podobojczykowej elektrody ICD

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We present a case of damaged lead transvenous extraction in a 26-year-old patient after surgical correction of Fallot tetralogy at the age of nine, and after implantable cardioverter-defibrillator (ICD) implantation as secondary prevention at the age of 19. A one-coil passive fixation lead (Medtronic Sprint 6932) was implanted by subclavian venipuncture to the right ventricular apex. In follow-up, adequate interventions were noted and significant sinus bradycardia in Holter ECG was observed as a result of treatment with metoprolol and dronedaron. In 2011, an exchange of one-chamber to two-chamber ICD was performed. Active fixation atrial lead (Biotronik Setrox) was implanted by left subclavian venipuncture to the right auricle. In X-ray examination performed after implantation, looping in the left subclavian vein and significant pulling-up in heart cavities of the ventricular lead was diagnosed (Fig. 1A). Most probably the lead was pulled up in the terminal stage of atrial lead implantation during vascular sheath removal made without X-ray control. After 18 months of correct ICD functioning, episodes of short cycles in intracardiac ventricular electrograms were registered. In TTE, significant tricuspid regurgitation, related to pressure on the septal cusp of the tricuspid valve by stretched ventricular lead, was observed. Therefore, TLE was planned. In left subclavian vein venography, vessel patency and the presence of ventricular lead loop outlining vessel lumen with atrial lead inside this loop was confirmed (Fig. 1B). Additionally, during the procedure atrial lead isolation damage in ICD pocket was diagnosed. The atrial lead was extracted by simple traction (Fig. 2A). Next, extraction of the ventricular lead was performed with the use of a mechanical Cook set. Inserting metal wire inside the lumen was possible only up to half of the lead loop. An attempt at lead unlooping was unsuccessful due to the strong adherence of the lead to the subclavian vein wall (Fig. 2B). Gradually, with the help of yellow and then white Byrd dilators, the lead was separated from adhesions and the loop was straightened (Fig. 2C). Unlooping allowed us to remove and cut off the lead fragment with closed lumen outside the vein (Fig. 3A; fragments 2b and 2c). Then a metal wire was inserted into the lumen in order to stiffen the remaining lead fragment. The lead was separated from adhesions along its whole length with the use of yellow and white Byrd dilators and removed (Fig. 2D). Guide wires for new lead implantation were inserted into the heart through a Byrd dilator internal lumen. New leads with active fixation to the right atrium and ventricle were implanted. An image of the removed lead fragments is presented in Figure 3. In the early postoperative period, the presence of fluid in the left pleural cavity was observed. During drainage, 900 mL of blood liquid was aspirated. In laboratory tests, a decrease in morphology was noted, however it not require blood transfusion. After 24 h the drain was removed. Further hospitalisation was successful.

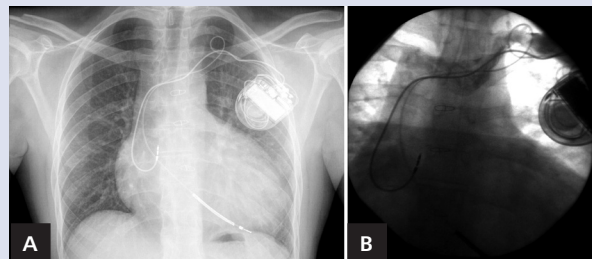


Figure 1. A. X-ray PA projection; B. Left subclavian venography

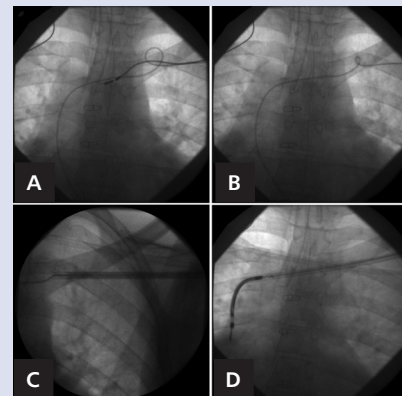


Figure 2. A–D. X-ray during lead extraction

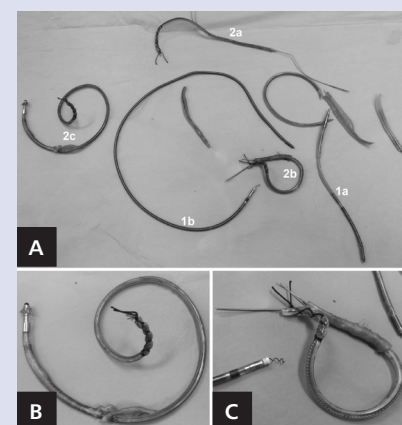


Figure 3. A. All removed fragments of atrial and ventricular leads (1a and 1b — atrial proximal and distal; 2a, 2b, 2c — ventricular proximal, looped and distal with coil); B. Distal ventricular with connective tissue; C. Ventricular loop with tissue adherence to subclavian vein

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**Conflict of interest:** none declared