

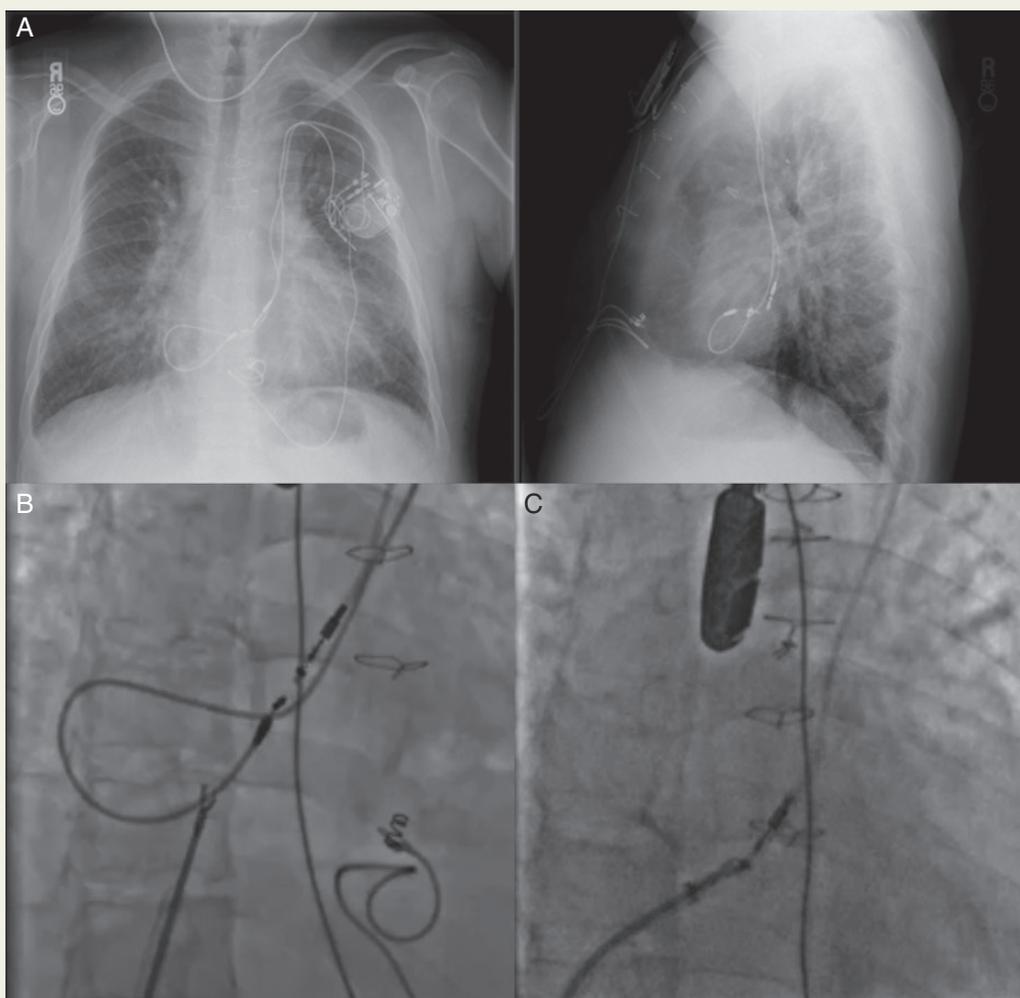
Left persistent superior vena cava lead extraction using a femoral approach

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A 27-year-old man with a congenital heart disease consisting of a double inlet left ventricle s/p a classic Fontan palliation and oversewing of a regurgitant tricuspid valve in 1991 with enlargement of a bulboventricular foramen in 1997, transposition of the great arteries, sub-aortic stenosis, a left persistent superior vena cava (LSVC), and a hypoplastic mitral valve was followed up in an adult congenital clinic. He had a single-chamber pacemaker implanted via the LSVC (Capsurefix 4068, Medtronic) for sinus node dysfunction in 1997 with the lead screwed directly into the ostium of the coronary sinus due to the inability to find an acceptable site for right atrial capture. In 2001, this lead was found to have a high capture threshold and was capped. A St Jude Medical Tendril 1388T lead was placed via the LSVC and screwed into the coronary sinus near the first lead (*Panel A*). In 2008, an epicardial right ventricular lead (MyoPore 511212, St Jude Medical) was implanted to serve as a backup because of gradually increasing thresholds on the RA lead. In 2015, the patient underwent a generator exchange. Two weeks later, he developed a methicillin sensitive *Staphylococcus aureus* pocket infection and bacteraemia. He subsequently was referred for system extraction. A 14- and then 16-Fr Excimer laser sheath (GlideLight[®], Spectranetics) were used to free both endocardial leads proximally. The laser sheaths could not be passed further than the proximal LSVC nor could a mechanical cutting sheath (TightRail, Spectranetics) due to the right angle of the LSVC take off. With further attempts, lead integrity proximally



began to deteriorate. Therefore, femoral access was obtained and a Byrd femoral work station (Cook Vascular) was advanced to the ostium of the coronary sinus. A Biotome (Radial Jaw Max Capacity 3, Boston Scientific) was used to grasp the most recent lead, which had prolapsed slightly into the right atrium, allowing successful extraction through the femoral sheath (*Panel B*). No portion of the older lead was accessible via the work station; therefore, a steerable femoral sheath (Flexcath, Medtronic) was advanced from the femoral vein and directed into the LSVC itself. Using the Biotome, the lead was successfully pulled free of the wall of the SVC. A goose neck snare (eV3, Plymouth) was then able to grasp the free end of the lead allowing for complete removal (*Panel C* and see Supplementary material online, *Video S1*). The epicardial lead was then cut and capped via a small abdominal incision, and the proximal part was removed via traction from the pocket. A temporary system with an active fixation lead in the coronary sinus was implanted. Because the patient was not a surgical candidate, a new single-chamber pacemaker via a right infraclavicular pocket was placed and the lead screwed directly into the coronary sinus on Day 19 after extraction.

To our knowledge, this is the first report of a successful femoral extraction of leads placed via an LSVC. Given the right angle take off of an LSVC, maintaining an adequate rail with a powered sheath can be challenging. We demonstrate that femoral access can serve as a safe alternative for LSVC lead extraction. The use of a steerable femoral sheath may be helpful in directing extraction tools to areas in the cardiovascular system not readily accessible by standard devices.

Supplementary material is available at *Europace* online.