Venoplasty of a chronic venous occlusion with ‘diathermy’ for cardiac device lead placement

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Article info

Article history:
Received 14 August 2018
Received in revised form 16 September 2018
Accepted 23 October 2018
Available online 25 October 2018

Keywords:
Diathermy
Venoplasty
Venous occlusion

Abstract

Venous revascularization is an approach used in patients with total venous occlusion requiring venous access for cardiac device lead placement. Several percutaneous approaches to venous revascularization have been proposed. For the first time, we describe the case of a 69-year-old male with total venous occlusion who was successfully revascularized using a ‘diathermy’ technique.

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1. Case presentation

A 69-year-old male with complete heart block was implanted with a dual-chamber permanent pacemaker (Sensia SEDRO1, Medtronic, USA) in 2013. The patient presented to the cardiac rhythm and device clinic for regular follow-up. Device interrogation showed a triggered elective replacement interval (ERI) and intermittent loss of right ventricular (RV) capture; RV lead threshold of 5.0 V/0.60 ms and impedance at 458 Ohms. The chest X-ray did not any signs of fracture or lead dislodgement. Trans-thoracic echocardiography revealed preserved left ventricular systolic function (LVEF 48%). The patient required battery replacement and RV lead implantation.

The patient was brought into the laboratory. Prior to the device procedure, left upper limb venography revealed an occluded vein at the level of innominate and superior vena cava (SVC) junction (Fig. 1A). The interventional cardiology and electrophysiology teams collaboratively performed the procedure. The left subclavian vein was accessed with a 7 French sheath, and using the femoral vein access site, a 7 French Ansel (ANL 1) long sheath (Cook Medical, USA) was advanced near the distal cap to establish access on both sides of the occlusion. Simultaneous injections through both sides revealed a long venous total occlusion with ambiguous proximal and distal stumps (Fig. 1B). A V-18 0.018 guidewire (Boston Scientific, USA) was used cross to the occluded segment; however, it was unable to puncture the distal cap. A Hi-Torque 0.014 Winn guidewire (Abbott Medical, USA) was used to puncture the distal cap. Despite successful drilling with several chronic total occlusions (CTO) guidewires, we could not cross the occluded part. At this stage, we decided to use ‘diathermy’ with the aid of a regular electrocautery machine. The Hi-Torque 0.014 Winn guidewire was connected to the electrocautery pen; 50 W of energy was applied to cross the distal segment of the occlusion (Fig. 2).

Retrograde angioplasty was performed using Sterling balloon (Boston Scientific, USA) (6 mm × 40 mm, at 14 arm) to facilitate antegrade and retrograde advancement of the guidewire into the SVC (Fig. 1C and D). A long SafeSheath® (Pressure Products, USA) was advanced through the subclavian vein, and a new RV lead (Tendril STS 2088TC, St Jude Medical, USA) was successfully placed to the RV septum (Fig. 1E and F). After obtaining good lead parameters, the lead was fixed to the fascia and attached to the new device (Endurity Core DR, St Jude Medical, USA). The previous lead was capped and the pocket was flushed with 80 mg Gentamycin and closed with 3 layers. The procedure was complicated by a large left-sided pneumothorax which resolved after chest tube insertion. The patient was discharged after a full recovery.

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https://doi.org/10.1016/j.ipej.2018.10.002
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Fig. 1. Upper and lower venograms showing total occlusion at the level of innominate vein and SVC (A and B). Retrograde angioplasty (C) and successful antegrade advancement of the wire (D). Advancement and placement of the RV lead to the right ventricular mid-septum (E and F).

Fig. 2. Diathermy technique is demonstrated.
3. Conclusion

In patients with CIEDs and chronic venous occlusions, revascularization using ‘diathermy’ radiofrequency energy can be a safe and effective approach. Further studies are needed to parse out the implications of the aforementioned observations.

Conflict of interest and disclosure of funding

All authors declare that, the manuscript, as submitted or its essence in another version, is not under consideration for publication elsewhere, and it will not be submitted elsewhere until a final decision is made by the editors of IPEJ. The authors have no commercial associations or sources of support that might pose a conflict of interest. All authors have made substantive contributions to the study, and all authors endorse the data and conclusions.

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