A challenging image during pacemaker implantation

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Right answer: C. Venous spasm

This venographic appearance is compatible with venospasm. Although it is usually known as an arterial phenomenon, severe spasm can be seen in the central veins, as in this case. Venous spasm has been reported during right heart catheterizations and central venous catheter placements for digital subtraction angiography, with an incidence of 2% and 5%, respectively (1). Because of its strongest effect on the venous system, nitroglycerin is a reasonable approach for relieving the spasm. However, venous spasm may not resolve with nitroglycerin. As in our case and in two previously reported cases of central venous spasm during pacemaker implantation, incremental doses of intravenous nitroglycerin failed to relieve the venospasm (2, 3).

Venous spasm during pacemaker implantation is a rare clinical entity, with only a few cases reported in the literature (2-4). The exact mechanism of venous spasm remains unknown, but it may be related to the chemical effect of the contrast or a mechanical effect of multiple needle punctures and guidewire placement (2).

Paget-Schroetter syndrome is a form of upper extremity deep vein thrombosis that can occur spontaneously or after vigorous exercise. It is also known as effort thrombosis, and the pathogenesis involves extrinsic compression and repetitive injury of the subclavian vein between the first rib and overlying clavicle, particularly during strenuous activities involving arm elevation or exertion (5, 6).

Subclavian vein and artery transposition is a very rare anomaly in which the subclavian vein and subclavian artery are switched in position or transposed. In this rare anatomic variation, the usual location of the subclavian artery (cephalad to the subclavian vein) is switched to caudal to the subclavian vein. In such cases, ultrasound imaging is necessary for understanding the anatomic relationship of the artery, vein, clavicle, and lung (7).

Lead-induced venous thrombosis is reported in an average of 12% (range 2%-22%) of patients, from several days to 9 years after pacemaker implantation, and only 1% to 3% of patients with upper extremity venous thrombosis develop symptoms (8). In the hospital course and control visit, our patient had no signs or symptoms attributable to venous thrombosis. Indeed, there was no evidence for venous thrombosis on the venography (presence of a collateral vessel, a visible thrombus, and/or long length of the occlusion). Therefore, venous thrombosis is a much less likely possibility (9).

This report highlights the importance of using venography after multiple unsuccessful attempts to puncture the subclavian vein and using hydrophilic guidewires in cases of venous spasm with successful cannulation and no good flashback. At the end of the procedure, a venography was performed again and revealed partial reversal of the venospasm (Fig. 3, Video 3).

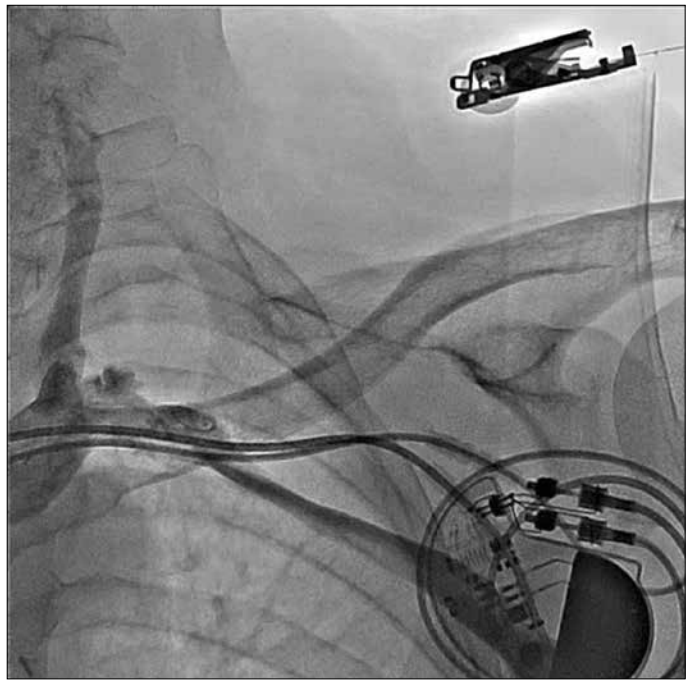

Figure 3. Partial reversal of the spasm at the end of the procedure

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Video 3. Partial reversal of the spasm at the end of the procedure

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