Pitfalls of internal cardioverter defibrillator implantation: Part I

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A 68-year-old male with a previous medical history consisting of a prior inferior myocardial infarction and colon cancer with curative treatment by operation and combined radiotherapy and chemotherapy was brought to the emergency room feeling unwell with nausea and dizziness that occurred when he was watching the professional soccer competition. Broad complex tachycardia with a heart rate of 191/min was recorded on the 12 lead ECG (Figure 1). Because of haemodynamic instability, patient underwent immediate electrical cardioversion after intravenous administration of propofol. The patient had no recent history of chest pain or signs of overt heart failure. A coronary angiogram revealed stenoses in the proximal LAD and mid RCA which were treated with PCI and insertion of bare metal stents. Radionuclide ventriculography showed an ejection fraction of 28%. The patient was referred for implantation of an internal cardioverter defibrillator (ICD) according to current guidelines. The patient was right-handed and a standard approach of implantation in the left pectoral region was chosen. An incision was made in the Mohrenheim’s groove and dissection of the cephalic vein was attempted but it was not present. Via an uncomplicated puncture of the subclavian vein, two guidewires were advanced into the superior vena cava. A persistent left superior vena cava seemed to be present draining in the right atrium through the coronary sinus (Figure 2A) and implantation was stopped. After several hours waiting time and chest X rays which ruled out pneumothorax, implantation was performed on the right side through puncture of the subclavian vein (Figure 2B). Implantation was uneventful until defibrillation threshold testing (DFT) was performed, which was unsuccessful even at a maximum output of 31J. Retesting 1 day later showed failure of effective defibrillation.

Questions
(1) Which rhythm disorder is the broad complex tachycardia seen in Figure 1?
(2) What is the chance of failure of DFT test depending on the position of the can and leads or choice of the device and leads?
(3) Is left-sided implantation of an ICD safe and effective in patients with persistent left superior vena cava?

Figure 1 Twelve lead ECG of the patient presenting with broad complex tachycardia.
Figure 2  Chest X rays (posteroanterior view) (A) during implantation procedure after administration of i.v. contrast via the left arm, and (B) after ICD implantation.