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A Shocking Twist.

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Part One

A 61 year old man presented to the emergency department (ED) after receiving multiple shocks from his cardiac resynchronisation therapy-defibrillator (CRT-D) device, implanted two months previously for NYHA III heart failure and left bundle branch block (LBBB). He had hiccoughs and was anxious but denied chest pain and dyspnoea. He had chronic atrial fibrillation (AF). He was haemodynamically stable but received several further unheralded shocks. The cardiac monitor appeared to show atrial fibrillation and LBBB throughout. His presenting chest radiograph is demonstrated in **Figure-1**.

What is the most likely cause for this man's CRT-D firing?

a. Lead fracture
b. Lead migration
c. Pacemaker mediated tachycardia (PMT)
d. Ventricular fibrillation (VF)
e. Ventricular tachycardia (VT)

Part Two

Answer: (b) Lead migration

Defibrillation is unpleasant for patients and challenging to manage. Prompt identification of the cause is essential. Here, both the cause and acute management can be deduced from the chest radiograph (**Figure-2**). This is a case of "Twiddler's Syndrome", which results from unintentional, often subconscious manipulation ('twiddling') of the generator box by the patient within the sub-cutaneous pocket. Twiddling rotates the box which retracts the leads resulting in malfunction of the device. For a simple bradycardia device, this results in failure to pace, but in this case, AF was intermittently sensed and interpreted by the device as VF because the device cannot 'know' the lead tip was located in the right atrium (RA) and not the right ventricle (RV). The device therefore delivered therapy i.e. defibrillated. Hiccoughs occurred secondary to phrenic nerve irritation by the displaced lead. The post-implantation radiograph (**Figure-3**) demonstrates the appropriate position of the leads.

Acute management was sedation, cardiac monitoring, and device interrogation. A magnet was applied to the skin directly over the device. For an implantable defibrillator, this deactivates therapy but not bradycardia pacing. The RV lead was repositioned later that day.

The absence of VT and /or VF on the cardiac monitor discounts (d) and (e). Lead fracture is unlikely in a new system. PMT requires ventricular-atrial conduction and therefore an atrial lead; absent in this case due to chronic AF.

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Competing interests None

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FURTHER READING

1. Robbinson LA, Windle JR. Defibrillator twiddler's syndrome. Ann Throrac Surg 1994;58:247-24