Pneumopericardium after epicardial catheter ablation detected with “bruit de moulin”

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Introduction

After catheter ablation using an epicardial approach, aspirated air in the pericardial space causes pneumopericardium. We present a case in which pneumopericardium was detected with “bruit de moulin” after an epicardial approach, with the accompanying supplemental sound data.

Case report

A 62-year-old man, who had an implantable cardioverter-defibrillator and a subcutaneous coil for high defibrillation thresholds, underwent ablation for ventricular tachycardia via an endocardial and epicardial approach after providing written informed consent. The epicardium was accessed at the anterior site of the right ventricle via a subxiphoid puncture using an 18 gauge Tuohy needle. We inserted a 9F sheath (RADI focus, TERUMO, Tokyo, Japan), which has a valve at the entry point. The epicardium was mapped with ThermoCool SmartTouch Navistar and DeccaNav (Biosense Webster, Diamond Bar, CA) via the sheath. We changed the catheters 3 times during the procedure. After the procedure, air and epicardial fluid were aspirated using a pigtail catheter at the several positions and the side port of the sheath. We confirmed that there was no echo-free space with intracardiac echocardiogram and then pulled the sheath. A chest radiograph was obtained with the patient in a supine position, and it showed no evidence of pneumopericardium (Figure 1). The next day, the patient complained that his heart sounds were audible when he lay on his left side and they were loud enough to be heard at a distance from the patient (Supplemental Sound Data). A computed tomography scan and a chest radiograph taken in the standing position revealed pneumopericardium (Figure 2A and B). Because he was hemodynamically stable, drainage of the pericardial air was not performed. His heart sounds normalized 3 days postoperatively. Three weeks later, a chest radiograph taken in a standing position showed no silhouette around the heart (Figure 2C).

Discussion

In this case, pneumopericardium occurred owing to an insufficient aspiration of air after an epicardial approach. It is reported that pericardial air obscures the heart on transthoracic echocardiography, which shows pneumopericardium. Transthoracic echocardiography may be useful to detect pericardial air. "Bruit de moulin" is a precordial sound heard in the setting of pneumopericardium. Electrophysiologists should know this distinctive sound to reveal occult pneumopericardium.

KEY TEACHING POINTS

- Insufficient aspiration of air after an epicardial approach may cause pneumopericardium. Pneumopericardium not only is related to cardiac tamponade but also leads to a high threshold for defibrillation.
- A chest radiograph, which is obtained with the patient in a supine position, is not sufficient for checking pneumopericardium after an epicardial approach. Transthoracic echocardiography may be useful to detect pericardial air.
- "Bruit de moulin" is a precordial sound heard in the setting of pneumopericardium. Electrophysiologists should know this distinctive sound to reveal occult pneumopericardium.

Figure 1 A chest radiograph was obtained with the patient in the supine position just after the epicardial approach.
Electrophysiologists should check pericardial effusion and air using not only intracardiac echocardiography but also transthoracic echocardiography. "Bruit de moulin" is a precordial sound heard in the setting of the pneumopericardium, which was first described by Bricketeau in 1844. When air accumulates at the point of contact with the heart, the sound is generated by the heartbeat.

Pneumopericardium not only is related to cardiac tamponade but also leads to a high threshold for defibrillation.

Conclusion
Insufficient aspiration of air after an epicardial approach may cause pneumopericardium. Electrophysiologists should know this distinctive sound to enable diagnosing occult pneumopericardium.

Appendix
Supplementary data
Supplementary data associated with this article can be found in the online version at https://doi.org/10.1016/j.hrcr.2018.07.008.

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