Case Report

Ventricular Fibrillation Resulting from Diaphragmatic Stimulation during Gastric Bypass Surgery

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Key Words

Cardiovascular disorders · Obesity · Bariatric surgery · Ventricular fibrillation

Abstract

Objective: Gastric bypass operations are common and severely obese patients are prone to arrhythmias, particularly atrial fibrillation. Intraoperative ventricular arrhythmias during bariatric surgery have not been reported previously. **Case Report:** A 35-year-old, severely obese, diabetic woman with no other prior medical history underwent thorough preoperative cardiovascular evaluation before having laparoscopic Roux-en-Y gastric bypass. Intraoperatively she developed sudden onset ventricular fibrillation during the use of unipolar electrocautery near the Angle of His. The procedure was aborted, and the patient underwent repeat cardiovascular assessment including coronary angiography and serial electrophysiology studies before being unremarkably re-operated 6 months later, at which time a harmonic scalpel was used for dissection. 12 months post operation, the patient remains asymptomatic. **Conclusion:** Owing to the proximity of the right ventricle overlying the diaphragm, far-field stimulation was likely responsible for inducing VF.

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Introduction

The number of obesity operations is rapidly increasing as safety is significantly improving [1]. Although obesity is a risk factor for arrhythmias [2], cardiomyopathy [3], and ischemic heart disease [4], intraoperative ventricular fibrillation during obesity surgery has never been reported.

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Case Report

This report presents an unusual case of cautery-induced ventricular fibrillation (VF) in a 35-year-old, severely obese (BMI 52 kg/m²), diabetic woman with unremarkable preoperative stress testing and cardiac echocardiography without evidence of intraoperative cardiac ischemia. During laparoscopic Roux-en-Y gastric bypass, the patient had sudden onset of VF coincident with the use of unipolar electrocautery near the Angle of His, and the procedure was aborted. She had no mitigating metabolic or pulmonary abnormalities.

During postoperative cardiac re-evaluation including coronary angiography, cardiac magnetic resonance imaging, and serial invasive electrophysiology studies 6 months apart, she did not exhibit any abnormalities and was non-inducible for arrhythmias. The mechanism for her VF was felt to be iatrogenic and related to the use of monopolar electrocautery near the right ventricle which may have led to far-field stimulation and VF, as has been described earlier during subdiaphragmatic electrocautery [5].

Discussion

The type of cautery used and the location of the dispersive pad may explain how this may have occurred. The most commonly used electrode configuration is unipolar where the dispersive electrode is a pad positioned on the back, shoulder, or thigh. Since current has direction, the location of the dispersive pad influences the vector and may lead to unintended delivery of electrical current to nearby anatomic structures. The use of unipolar cautery in the vicinity of the Angle of His as in this case raises the possibility that right ventricular myocardial tissue was electrostimulated. This complication is much less likely to occur with bipolar current [6, 7].

The role of epicardial fat may have a protective role in impeding electrical conductivity and may be a reason for the rarity of this complication. Mathematical modeling has suggested reduced penetration of radiofrequency ablation of atrial tissue by overlying adipose tissue [8]. Clinical experience in the ablation of epicardial ventricular tachycardia has proven overlying adipose tissue to be a limiting factor in lesion formation, hence requiring greater power for effective ablation [9]. This case prompts further questions regarding the potential role of pericardial adipose tissue during obesity-related surgery.

Disclosure Statement

I have no conflicts of interest. Nothing to disclose.

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