Bigeminy in a Patient Undergoing Appendectomy –
A Probable Mitral Valve Prolapse Syndrome

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Introduction

A higher incidence of atrial and ventricular arrhythmias has been reported in patients with mitral valve prolapse (MVP) and abnormalities of the autonomic nervous system may explain the risk of arrhythmic events.(1-3) MVP syndrome patients are usually asymptomatic unless altered autonomic function, catecholamine responsiveness, or possibly both provoke symptoms like palpitations, chest pain, fatigue, dyspnea, dizziness, syncope, and panic attacks.(4) We experienced a possible MVP syndrome patient who showed bigeminy at the operating room which disappeared when appendicitis was treated.

Case report

A 35 year-old female patient, 151 cm in height and 55 kg in weight, was diagnosed with a perforated appendicitis. She was to undergo emergency laparo-

scopic appendectomy. She had no known abnormalities on medical history and preoperative lab results were within normal range. Except preoperative ECG which showed sinus rhythm with occasional premature ventricular complexes (Fig. 1).

At the operating room, routine noninvasive monitoring devices were applied to the patient, which included ECG, pulse oximetry, and blood pressure. The patient’s blood pressure was 100/58 mmHg, oxygen saturation was 97% but continuous bigeminy were noticed on ECG (Fig. 2). A thorough reevaluation of patient’s past history was done. She never experienced any symptoms and did not complain any symptoms even though she was having bigeminy at the moment. Direct arterial pressure monitoring via radial artery cannulation was performed and arterial blood gas analysis was done. Electrolytes were within normal range and the patient did not have any acid-base imbalance.

General anesthesia was performed with propofol, remifentanil, and rocuronium. No premedication was given. Endotracheal intubation was performed without complications and ventilated with oxygen and air (FiO₂ 0.5). During surgery, bigeminy continued. Systolic blood pressure was maintained between 100 and 130
mmHg and heart rate between 80 and 100 beats/min. When appendix was taken out, bigeminy started to disappear. Trigeminy and then frequent premature ventricular complexes were shown on ECG. Vital signs were stable throughout this period. After the patient recovered spontaneous respiration, glycopyrrolate 0.2 mg and pyridostigmine 10 mg were intravenously injected to reverse the muscle relaxation, and the patient was extubated.

At recovery room, ECG was continuously monitored. Frequent premature ventricular complexes were still observed but continuous bigeminy was not shown. The patient did not complain any symptoms and she was transferred to the general ward. One day after the operation, ECG was taken which showed normal sinus rhythm with heart rate 76 beats/min.
Discussion

Pre-existing heart disease is a known cause of perioperative cardiac arrhythmias. But our patient had no history suggestive of any heart disease and had preoperative normal hemodynamics.

Acute onset ventricular bigeminy carries an increased potential for hemodynamic instability including ventricular fibrillation or cardiac asystole. Hence it requires a prompt diagnosis and treatment. Intra-operative bigeminy has been reported with rheumatic heart diseases, hypokalemia, inadequate analgesia and old age.(5-7) But one must also suspect MVP especially when the patient is a female between 30~50 years of age. 2.5~5% of general population is known to have MVP and it is common in women (2/3 of adults) during 30~50 years of age.(7) Ventricular arrhythmias are known to be common in patients with MVP.(8-10) And studies have found that the degree of mitral regurgitation and the degree of the prolapse were independent predictors of ventricular tachycardia.(11,12)

Most patients with MVP are asymptomatic because 80% of MVP patients experience MVP without serious complications, which is called MVP syndrome. MVP syndrome patients do not show symptoms unless altered autonomic function or catecholamine response trigger symptoms of chest pain, fatigue, palpitations, dyspnea, dizziness, syncope, or panic attacks. These various symptoms reflect a neuroendocrine or an autonomic basis and usually symptoms diminish or disappear over time. The prognosis for MVP syndrome patients is excellent with a normal life expectancy.(4)

Unlike MVP syndrome, other 20% of MVP patients may develop serious complications such as severe mitral regurgitation, infective endocarditis, sudden death, and cerebral ischemia. Also symptoms of progressive mitral regurgitation require treatment like mitral valve replacement.(13)

For MVP syndrome patients, general anesthesia is not prohibited. Usually invasive monitoring is not necessary and complications do not occur. But preoperative sedation is useful to suppress an increased sensitivity to catecholamines and painful stimuli may exacerbate the autonomic system, causing arrhythmias. It is important to maintain adequate depth of anesthesia to minimize catecholamine levels and avoid anticholinergic premedications. Also decreases in left ventricular end-diastolic volume and systemic vascular resistance, or increased contractility and tachycardia should be avoided because MVP may be enhanced such that cardiac output and coronary perfusion are decreased. Since hypercapnia, hypoxia, and electrolyte disturbances increase ventricular excitability, they should be corrected.(7)

This patient presented bigeminy at the operating room with no known cardiac history or symptoms probably had MVP syndrome. Because of perforated appendicitis and pain, exacerbated autonomic system and the emotional stress probably caused increased sensitivity to catecholamines, first causing frequent PVC then bigeminy. When the appendix was removed and the patient was at the recovery room, increased catecholamines and exacerbated autonomic system lessened and the cardiac rhythm started to return to normal. It would have been wise to perform TEE when the patient was under general anesthesia to confirm MVP or MR caused by MVP.

Therefore, if female patient presented with cardiac arrhythmia with no known cardiac history or symptoms, it is important to rule out MVP syndrome by asking a thorough past history and if possible, using TEE.
**Abstract**

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A 35 year-old female patient with no known cardiac history was to undergo emergency laparoscopic appendectomy due to perforated appendicitis. Preoperative lab results were within normal range except ECG, which presented sinus rhythm with occasional premature ventricular complexes. At the operating room, ECG showed continuous bigeminy. General anesthesia was performed and no adverse events were observed during the anesthetic management. At the end of operation, bigeminy started to disappear and one day after the surgery, ECG returned to normal sinus rhythm. One must suspect mitral valve prolapse syndrome when the patient is a female between 30~50 years of age presenting arrhythmia with no known heart disease. Due to exacerbated autonomic system and the emotional stress can trigger symptoms of chest pain, fatigue, palpitations, dyspnea, dizziness, syncope, or panic attacks which disappear when the trigger is gone.

**Key Words:** Bigeminy, Mitral valve prolapse

**References**
