

유방확대술 중 발생한 Takotsubo 심근병 1례

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A Case Report of Takotsubo Cardiomyopathy During Breast Augmentation

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Purpose: Takotsubo cardiomyopathy is a relatively uncommon type of stress-induced cardiomyopathy characterized by transient left ventricular regional wall motion abnormalities. Emotional and physical stresses play a key role in this type of cardiomyopathy in postmenopausal women. The current hypothesis is that the syndrome represents a form of catecholamine surge due to stress or epinephrine-mediated acute myocardial stunning.

Methods: A 44-year-old woman had suffered premature ventricular contraction following a cardiogenic shock during a breast augmentation surgery under enflurane anesthesia and tumescent solution infiltration. She was treated with cardiopulmonary resuscitation at a local clinic. Then she was brought to the Emergency Department of the authors' hospital.

Results: The woman's echocardiogram showed an ejection fraction of 20~25% with associated basal hyperkinesis and left ventricular apical ballooning. The patient was admitted to the ICU and required inotropic support for two weeks. The patient's condition dramatically improved, and her ejection fraction returned to 70%.

Conclusion: It is believed that there were multiple triggering factors of the onset of Takotsubo cardiomyopathy in the woman's social and family history, including infiltration of a large volume of the tumescent solution and VPCs induced by enflurane anesthesia without premedi-

cation. The importance of careful history-taking, careful pre-operative consultation on psychological suffering especially for breast surgery, premedication before surgery, patient reassurance, and post-operative psychosocial and emotional assistance was again seen in this case.

Key Words: Takotsubo cardiomyopathy, Breast augmentation

I. INTRODUCTION

Stress-induced cardiomyopathy (also termed Takotsubo cardiomyopathy and the transient left ventricular apical ballooning syndrome) was first described by Dote et al.¹ It was so named because of the peculiar shape of the left ventricle, which resembles a Japanese octopus trap with a round bottom and a narrow neck. Numerous cases are reported in recent literature.^{2,3} Despite of increasing awareness of this ailment, the mechanism of the disease remains unknown.

It is believed that Takotsubo cardiomyopathy was induced by both factors in this case. Moreover, the ventricular premature contractions (VPCs) that occurred under enflurane anesthesia during the breast augmentation surgery added extra weights.

II. CASE

A 44-year-old woman was admitted to the Emergency Department of the authors' hospital after a cardiac arrest resuscitated by cardiopulmonary resuscitation during her breast augmentation surgery in a local clinic. She denied any incidence of previous hospitalization for cardiac disease, dyspnea, dizziness, or fever. Her family history showed no cardiovascular risk factors, but she had suffered from conflicts with her mother-in-law and her husband. Moreover, her social work was very stressful. Before the operation, she was concerned about the breast surgery and she experienced slight dizziness because of insufficient sleep. Moreover, she had suffered from emotional stress because of her small breast (Fig. 1). Her operative history is as follows.

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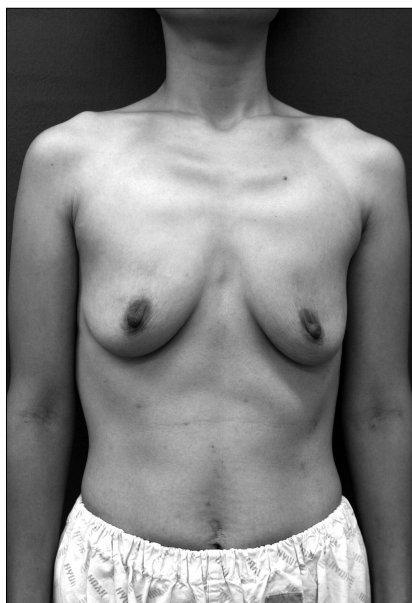


Fig. 1. A 44-year-old woman had suffered from emotional stress because of a small breast.

About 1 liter of tumescent solution consisted of 1-liter Hartman solution, 15 mL bicarbonate, 25 mL lidocaine, and 1 cc epinephrine was injected into both breasts, and 1 : 20,000 epinephrine mixed with 10 cc lidocaine was injected into the designed transaxillary incision line. At the start of the incision, the anesthesiologist pointed out VPCs in the patient, and treated the VPCs with intravenous lidocaine, which did not subside. Then the patient went pulseless and eventually fell into cardiogenic shock. The local clinic did not have a cardioversion machine and appropriate cardiac drugs, so the anesthesiologist and plastic surgeon performed cardiopulmonary resuscitation on her and injected her with epinephrine and atropine. Fortunately, 2 minutes later, she recovered dramatically.

A physical exam showed normal heart and lung sounds, but the patient complained of general weakness and dizziness. For a more exact evaluation, she was transferred to the Emergency Department of the authors' hospital.

The initial laboratory tests showed significant cardiac enzyme levels, with troponin I elevated to 1.64 ng/mL; myoglobin elevated to 183 ng/mL; and CK-MB elevated to 5.7 ng/mL. The BNP was within normal limits, and the chest X-ray results were unremarkable.

The patient's electrocardiogram revealed ST segment elevations. Her echocardiogram showed an ejection fraction of 20~25% with left ventricular hyperkinesis and left ventricular apical ballooning (Fig. 2). The patient was admitted to the cardiac Intensive Care Unit of the

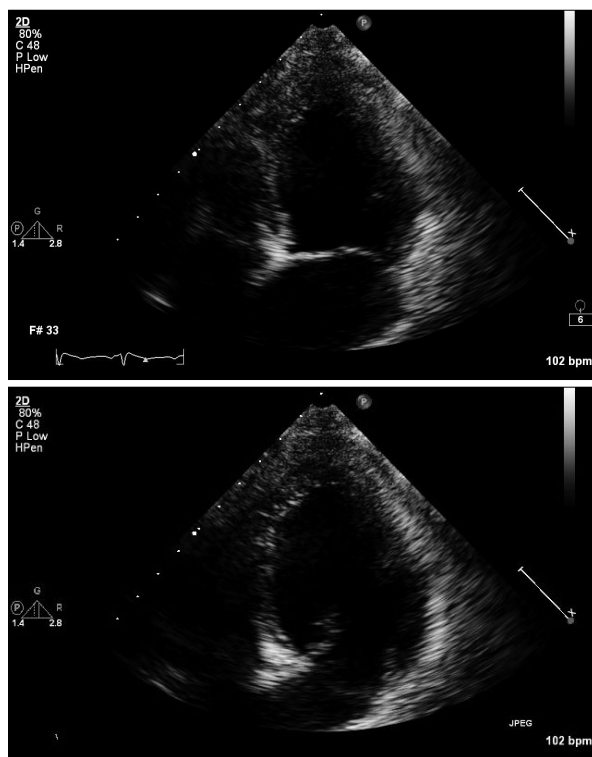


Fig. 2. (Above) A systolic echocardiogram shows that the left ventricular tip (apex) is paralyzed, a condition called "apical ballooning." (Below) A diastolic echocardiogram shows that the wall motion has decreased. This condition is still apical ballooning.

hospital, and coronary arteriographies were performed, which showed normal results. Takotsubo cardiomyopathy was diagnosed based on the normal angiographic findings and the characteristic findings from the echocardiogram. The patient required inotropic support for five days, and on the seventh day, her inotropic support was reduced. Then she went into cardiogenic shock and concomitant hypotension, so the inotropics were maintained for two more weeks. Subsequent 2-D echo was followed up at her bed side. A repeated echocardiogram on Day 14 revealed an ejection fraction of 60~65%, with improved apical wall motion (Fig. 3). Discharge plans were thus made.

The patient's condition dramatically improved. Moreover, her ejection fraction returned to 70% in the Out-patient Department. The planned breast augmentation surgery was canceled.

III. DISCUSSION

Takotsubo cardiomyopathy is a relatively uncommon stress-induced type of cardiomyopathy that is charac-

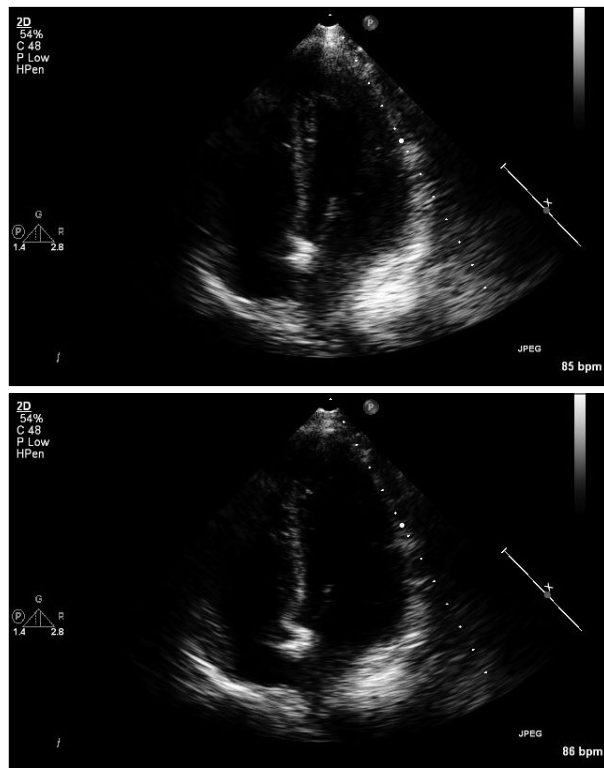


Fig. 3. (Above) An echocardiogram shows a full-recovery state and increased wall motion compared to the initial echocardiogram. (Below) The apical ballooning disappeared.

terized by a form of reversible ventricular dysfunction and compensatory increase in basal hyperkinesis.⁴ The image on the echocardiogram resembles a Japanese octopus trap with a round bottom and a narrow neck, called “Takotsubo”.^{1,3} Clinically, cardiomyopathy occurs most commonly in postmenopausal women aged between 55 and 70 years.¹⁻³

The clinical findings mimic that of a myocardial infarction, and the most frequent findings are elevation of the ST segment in an ECG and biologic cardiac markers.^{2,4} Thus, these findings are not helpful in differentiating the disease from myocardial infarction. This case also showed these characteristics. The clinical presentation ranges from mild symptoms to cardiogenic shock, and the need for hemodynamic resuscitation support. Despite the increased awareness of the disease, its pathophysiology remains unclear.

Some reports were highlighted on physical and emotional stress as the common triggering factors.³ In this article, the patient had emotional stress from her mother-in-law, her husband, and her social work. Moreover, she was very concerned about the surgery. The patient also had physical stresses from the general anesthetic surgery,

which deprived her of sleep. It is believed that these conditions aggravated the Takotsubo cardiomyopathy. Other triggering factors could have been the anesthesia without premedication. In some local aesthetic clinics, general surgery is performed immediately when patients arrive in the clinic. Thus, there is no chance to apply premedication and provide reassurance for the surgery, and there are no chances to prepare the patient for the surgery. Moreover, enflurane anesthesia was preferred rather than sevoflurane because of economic constraints. Enflurane inhalation anesthetic agents sensitize the myocardium to catecholamines,^{5,6} and VPCs may result when these agents are used with epinephrine infiltration.⁷

During the breast augmentation, much tumescent solution was injected to reduce bleeding. It is hypothesized that the injection of epinephrine and the enflurane anesthesia without premedication induced uncontrolled VPCs, which worsened the cardiomyopathy that occurred after the cardiogenic shock. Fortunately, the patient recovered dramatically without complications.

This rare case of cardiomyopathy points out several lessons. First, the patient’s history was checked, and it was found that no care was taken in drawing out her medical history. Her pre-operative consultation on her plastic surgery always focused on her external appearance and the pre-operative design, especially in the local clinics. Thus, no information was available on her psychological stress due to her small breast; her medical, social, and family history; and her insufficient sleep before the surgery because of her anxiety about the details.

Anxiolytic premedication is not usually prescribed for day-surgery in local-aesthetic clinics because of concerns that post-operative sedation may delay recovery from anaesthesia and discharge from the day-surgery aesthetic clinic, especially during breast augmentation surgery. Sleep medication and reassurance before immediate pre-operative consultation and anxiolytics could help reduce physical and emotional stress.

Second, injection of much tumescent solution and enflurane anesthesia without premedication caused VPCs, which doubled the strength of the onset of Takotsubo cardiomyopathy. The effect of premedication on the occurrences of dysrhythmias was also described.⁸ The importance of premedication before surgery was overlooked.

Third, there are many problems during cardiopulmonary resuscitation in local aesthetic clinics. Plastic surgeons do not have much experience with cardiopulmonary resuscitation, and they do not have cardiac drugs and tables. It is believed that basic information on

cardiopulmonary resuscitation and drugs are needed in the operation room for general surgery even in local day-surgery aesthetic clinics.

Early aggressive management of hemodynamic support, such as fluid resuscitation and inotropic support, saved the patient's life and made her recover fully. In her discharge plan, however, routine follow-ups and stress management should have been considered, as needed. When an emotional stressor has been identified as the triggering event, targeted emotional assistance, in addition to the standard psychological support provided, should be given.⁴

Many plastic surgery operations are performed in local aesthetic clinics. They do not have much information on cardiac problems. Sometimes, devastating results ensue from a general operation. In this article, an extremely rare case called Takotsubo cardiomyopathy occurred during breast augmentation surgery. The importance of careful history taking, careful pre-operative consultation on psychological suffering especially due to the breast surgery, premedication before the surgery, patient reassurance, and post-operative psychosocial and emotional assistance should be reconsidered.

It is believed that there were multiple triggering factors of Takotsubo cardiomyopathy in the patient's social and family history, which was degraded by the injection in her of a large volume of tumescent solution, and the administration to her of enflurane anesthesia without premedication that induced her VPCs.

In this article, the importance of careful history taking, careful pre-operative consultation on psychological

suffering especially due to breast surgery, premedication before surgery, patient reassurance, and post-operative psychosocial and emotional assistance was seen.

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