A Case of Takotsubo Cardiomyopathy after Airway Stenting

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Abstract

Takotsubo cardiomyopathy is a recently recognized acute cardiac entity. It is characterized by transient left ventricular apical ballooning which is usually preceded by physiological or psychological stress. We report a case of peribronchoscopically occurring Takotsubo cardiomyopathy accompanying severe malignant bronchial stenosis. A 58-year-old Japanese woman with colon cancer, complaining of persistent dyspnea due to severe stenosis of both main-stem bronchi caused by mediastinal lymph node metastases was referred to our hospital. Her respiratory condition worsened over two days. Two airway stents were implanted and airway patency was successfully restored. However, her blood pressure and oxygen saturation became unstable immediately after the procedure with notable blood tinged foamy sputum. Echocardiography and electrocardiographic findings led to the diagnosis of Takotsubo cardiomyopathy. Cardiac function improved 14 days later by treatment with diuretics and dopamine, and she was discharged one month after stent implantation.

Key words

bronchial stenosis, airway stent, Transient left ventricular dysfunction syndrome

Introduction

Takotsubo cardiomyopathy or transient left ventricular dysfunction syndrome is a recently recognized acute cardiac entity. It is characterized by transient left ventricular apical ballooning which is usually preceded by physiological or psychological stress. We report a case of peribronchoscopically occurring Takotsubo cardiomyopathy accompanying severe malignant bronchial stenosis.

Case Report

A 58-year-old Japanese woman, diagnosed as colon cancer 4 years previously, was admitted to a hospital due to dyspnea and difficulty with speech resulting from severe stenosis of both main-stem bronchi caused by mediastinal lymph node metastases. Her respiratory condition worsened over two days, and she suffered panic attacks from severe stress. She was then intubated, and referred to our hospital. Soon after her arrival, we performed bronchoscopy which revealed severe stenosis of both main-stem bronchi due to tumor. Subsequently, two self-expandable metallic stents, Spiral Z stents (Medico’s Hirata Inc., Osaka, Japan) were implanted to the left main bronchus (diameter, 16 mm for proximal end/12 mm for distal end; length, 60 mm) and to the right main bronchus (diameter, 12/10 mm; length, 40 mm), and airway patency was successfully restored (Fig. 1). However, her blood pressure and oxygen saturation became unstable immediately after the procedure with notable blood tinged foamy sputum. A chest radiograph showed bilateral alveolar infiltrates immediately after air-
way stenting (Fig. 2A). Since echocardiography revealed akinesis of the left ventricular apex with an ejection fraction of 30% (Fig. 3) and electrocardiographic findings showed negative T waves on precordial leads together with the minimal elevation of cardiac enzyme, she was diagnosed as Takotsubo cardiomyopathy. Cardiac function improved 14 days later by treatment with diuretics and dopamine. A repeat echocardiography showed an ejection fraction of 56% with improvement in apical function (Fig. 4). The value of brain natriuretic peptide (BNP) showed improvement from 2448 to 104 pg/ml. Flow volume loop after implantation of metallic stents showed improvement of airflow limitation (Fig. 5). She was discharged home in stable condition one month after stent implantation (Fig. 2B).

Discussion

Takotsubo cardiomyopathy was first described by Sato and Dote et al. in Japanese patients as a unique “short neck round-flask”-like left ventricular apical ballooning. It was named for a fishing pot with a narrow neck and wide base used to trap octopus. This disease occurs mainly in postmenopausal women accompanying psychological or physiological stress such as general surgery, hypoglycemia, and hyperthyroidism, but the pathophysiologic basis of this syndrome is still unclear. Four diagnostic criteria have been proposed for Takotsubo cardiomyopathy: 1) new electrocardiographic abnormalities, either ST elevation or T wave inversion; 2) absence of obstructive coronary artery disease; 3) transient akinesia or dyskinesia of the left ventricle; and 4) absence of (idiopathic) cardiomyopathy, head trauma, intracranial bleeding, or pheochromocytoma.
This case involved a postmenopausal woman with psychological or physiological stress factors, such as severe dyspnea, advanced stage malignancy, which may have caused Takotsubo cardiomyopathy. It seems that some patients presenting with dyspnea may have unrecognized Takotsubo cardiomyopathy after interventional pulmonology such as rigid bronchoscopic debulking, balloon dilation, endobronchial laser therapy, and stenting for tracheobronchial stenosis. Guerrero and Ernest reported the first case of Takotsubo cardiomyopathy following implantation of a metallic covered stent using rigid bronchoscopy under general anesthesia. They hypothesize that the physical stress induced by the bronchoscopic procedure of the endobronchial tumor triggered a supraphysiologic catecholamine surge leading to microvascular dysfunction and the echocardiographic changes consistent with a transient left ventricular dysfunction syndrome. To our knowledge, our case is the second report of Takotsubo cardiomyopathy following implantation of a metallic uncovered stent using rigid bronchoscopy under general anesthesia. Other causes of cardiogenic shock were considered including acute coronary syndrome, massive pulmonary embolism, and
ARDS, but these were ruled out after extensive evaluation. Takotsubo cardiomyopathy has been reported as an immediate reaction to induction of general anesthesia, but the discordance with the onset of symptoms in our patient argues against this association. Our subject developed cardiogenic shock immediately after airway stent implantation.

Generally, treatment of Takotsubo cardiomyopathy beyond standard supportive care for congestive heart failure with diuretics and vasodilators remains largely empirical. When medical support is provided initially, patients with Takotsubo cardiomyopathy have rapid clinical and echocardiographic improvement and have an excellent prognosis. For our case, the patient’s cardiac functions were stabilized two weeks after treatment for cardiomyopathy.

**Conclusion**

We report a typical case with Takotsubo cardiomyopathy occurring in a 58-year-old Japanese woman immediately after airway stent implantation. To assess the peri-bronchoscopic cardiac risk such as Takotsubo cardiomyopathy, we must review the individual patient’s risk in view of their history and potential for complications with interventional bronchoscopy.

**References**


悪性気道狭窄に対し気道ステント留置直後に
たこつぼ心筋症を発症した1例

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抄録

たこつぼ心筋症は急性心筋梗塞に類似した胸部症状や心電図変化を呈し、急性期には左室心尖部を中心に広範囲な壁運動低下を認める。発生原因は不明であるが、肉体的もしくは精神的に多大なストレスを受けているときに発症することが多い。

今回、我々は直腸癌の経腸リンパ節転移から高度な気道狭窄を起こし、気道ステントを留置した直後に発症したたこつぼ心筋症の1例を経験したので報告する。症例は58歳、女性。大腸癌の経腸リンパ節転移のため左右主気管支には著しい狭窄を呈していた。このため患者は2日間、強い呼吸困難を訴え続けた。治療のため左右主気管支に2本のSpiral Z stentsを留置し、気道の確保をなし得たが、ステント留置直後から急激な血圧低下と泡沬状の血性痰を認め、心電図と心エコー検査を行ったたこつぼ心筋症と診断した。利尿剤、ドーパミン製剤投与などの保存的治療を行い14日後には症状の改善を認めた。

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