Sudden Asphyxial Cardiac Arrest Due to Esophageal Cancer

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Abstract

A 65-year-old woman with a sore throat and cough suddenly collapsed. She regained spontaneous circulation following resuscitation, but hypoxic encephalopathy was identified. Her vocal cords and the results of chest radiography were normal and no obstructive mass was identified in the neck on computed tomography (CT), but she demonstrated signs of obstructive upper airway. Bronchoscopy revealed tracheal stenosis. Chest CT showed tracheal compression by an esophageal tumor. Investigation of the trachea and surrounding organs by bronchoscopy and CT is important even when a patient with suspected respiratory arrest displays normal findings on chest radiography.

Key words: esophageal cancer, asphyxia, hypoxic encephalopathy, CT, bronchoscopy

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Introduction

Esophageal cancer usually causes dysphagia, weight loss, early satiety and/or iron deficiency anemia (1). This report describes an extremely rare case found after sudden asphyxial cardiac arrest due to esophageal cancer.

Case Report

A 65-year-old woman had been complaining of neck discomfort and cough for several months. Asthma had been diagnosed and a bronchodilator prescribed by a local medical clinic a week before presentation. She visited this clinic only once, as she disliked going to medical facilities. Past and family histories were unremarkable. She complained of sore throat and severe cough while in the sitting position. After her husband had already called an ambulance based on her complaints of dyspnea, she suddenly collapsed. Vocal cords appeared normal when an emergency medical technician performed trans-oral tracheal intubation at the scene. The thoracic cage expanded without difficulty on manual ventilation. After cardiopulmonary resuscitation, she regained spontaneous circulation at the scene. On arrival at the hospital, she was in a deep coma state with non-reactive dilated pupils and apnea. Physical examination including respiratory sounds showed no particular findings. Blood pressure was 188/66 mmHg and heart rate was 120 beats/min. Results of arterial blood gas analysis (FiO2 1.0) were: pH 6.907; PCO2 56.1 mmHg; PO2 385 mmHg; HCO3 -10.6 mmol/L; and base excess -22.6 mmol/L. Serum biochemical analysis failed to demonstrate the cause of sudden cardiac arrest, except for minor inflammatory findings (white blood cells, 9,100/μL; C-reactive protein, 1.1 mg/dL). Electrocardiography revealed depression of the ST segment at II, III and aVF, but heart sonography revealed normal wall motion. Chest radiography revealed no abnormalities. Head computed tomography (CT) revealed attenuation of the corticomедullary junction and neck CT showed no abnormal findings. Respiratory arrest due to severe combined acidosis and hypoxic encephalopathy was suspected, but initial examinations failed to demonstrate any cause of respiratory arrest. After tracheostomy on hospital day 8, she demonstrated signs of obstructive upper airway with severe hypoxia. Bronchoscopy revealed severe tracheal stenosis with bulging of the membranous portion (Fig. 1). Esophagogastroduodenoscopy revealed an esophageal tumor that biopsy identified as squamous cell carcinoma. Chest CT showed tracheal compression by the tumor (Fig. 2). Accordingly, the diagnosis was considered to be sudden asphyxia due to esophageal...
cancer, followed by hypoxic brain. She was transferred to another hospital in a vegetative state on hospital day 30.

**Discussion**

Previous studies have described sudden asphyxial cardiac arrest due to esophageal tumor (2-8). All cases involved benign tumors, and all but 1 case displayed laryngeal obstruction due to sudden prolapsed esophageal tumor. The remaining case involved esophageal leiomyoma measuring 7.5 cm in size originating at the posterior portion of trachea, which compressed the trachea anteriorly and resulted in fatal asphyxiation (3). A previous case study reported sudden suffocation caused by a foreign body in the upper intrathoracic esophagus, which compressed the trachea between the foreign body and sternum, as the posterior portion of the trachea is a membrane that is easily compressed (9). Since the present patient showed normal vocal cords, normal neck findings on neck CT, normal results on chest radiography, smooth oxygenation after tracheal intubation, and presence of tracheal compression by esophageal tumor based on the findings of chest CT, bronchoscopy and esophagoscopy, sudden asphyxia due to esophageal cancer was diagnosed.

The present patient had asphyxial cardiac arrest without severe esophageal symptoms such as dysphagia. One of the possible reasons for this outcome could be due to an inability to accurately diagnose her condition before onset of asphyxia. The patient was unwilling to go to the hospital, because she strongly disliked medical facilities. We could not obtain any detailed information on her present illness from her on presentation, due to hypoxic encephalopathy. While she may have previously experienced severe dysphagia or dyspnea, at least according to her husband, she had not complained of such symptoms until just before her collapse. Peacock et al also reported a case of sudden asphyxial death due to esophageal leiomyoma without any symptoms before collapse (3). A second possibility could be the presence of extra-esophageal developing type carcinoma of the esophagus. Development of gastric cancer from such an origin, as in leiomyoma, has been reported in gastric cancer, and esophageal cancer thus has the possibility to grow primarily outside the esophagus (10). A third possibility might have been enlargement of a metastatic lymph node. Greater enlargement of metastatic lesions in comparison to primary lesions has been reported (11). Enlargement of a metastatic lymph node of the esophagus in addition to the primary lesion could thus cause substantial compression of the trachea. Such a mechanism might explain why this patient had mainly demonstrated respiratory symptoms instead of esophageal symptoms.

The present patient also did not complain of dyspnea for a long time before collapse. Robie et al reported that asymptomatic airway stenosis by a tumor can induce sudden airway obstruction and death by anesthetics, paralysis or position change, but that theory does not apply to this case (12). Airway flow volume depends on the cube of the airway diameter. Accordingly, even a minor change in tracheal diameter can greatly influence the airway flow volume. A patient with airway stenosis would not always feel dyspnea (12, 13). However, once a patient experiences dyspnea with significant airway stenosis, even due to minor deterioration of airway stenosis, the patient could die of asphyxia unless appropriate airway securing procedures are performed (14-16). The results of biochemical analysis on arrival revealed inflammation in this patient. Moreover, she showed severe cough, which could induce inflammation of the airways or tracheal contraction (17, 18) before collapse. Accordingly, severe tracheal stenosis due to esophageal cancer without any symptoms may thus show deterioration due to inflammation, sputum or contraction, so that the occurrence of significant stenosis might have caused sudden asphyxial death in this case.

Investigating the trachea and surrounding organs by bronchoscopy, CT and esophagoscopy is therefore important even when findings on chest radiography are normal, if the patient is suspected to have suffered respiratory arrest.
References


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