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Case Report

Analysis of a Rare Case of Hemorrhage-Related Mortality in an Esophageal Cancer Patient Developing Tracheoesophageal Fistula Post-Chemoradiotherapy Scheduled for Local Anesthesia Endoscopic Stent Placement and Challenges in Perioperative Management outside the Operating Room

Xiaochen Ji[1]*, Li Chenchen[2] and Boya Zhang[3]

[1]*Department of Anesthesiology, Cangzhou Central Hospital, China*

[2]*Anesthesiology Center of Cangzhou Central Hospital, Attending Physician, China*

[3]*Anesthesiology Medical Center of Cangzhou Centra Hospital, Head Nurse, China*

***Corresponding author**

Xiaochen Ji, Department of Anesthesiology, Cangzhou Central Hospital, Cangzhou, 061014, China, Tel: +8613803179572

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Abstract

Esophageal cancer, particularly esophageal squamous cell carcinoma (ESCC), is a major global health issue, with a significant prevalence in China. The disease is complicated by its late diagnosis and poor prognosis, exemplified by a five-year survival rate of merely 15-25%. A severe complication of ESCC is the development of tracheoesophageal fistula (TEF), which can arise from advanced disease or treatment-related factors, leading to symptoms such as cough and respiratory distress. This case report presents a unique instance of a patient with ESCC complicated by TEF and concomitant coronary heart disease, illustrating the diagnostic challenges posed by overlapping clinical manifestations. The misattribution of TEF symptoms to disease progression emphasizes the necessity for heightened clinical suspicion and the implementation of tailored management strategies. The complexity of this case highlights the importance of a multidisciplinary approach involving oncologists, cardiologists, and critical care specialists to optimize patient care and outcomes. Furthermore, it underscores the critical need for early recognition and individualized treatment plans to address the diverse clinical presentations and therapeutic responses in this patient population. While this case contributes valuable insights to the existing literature, it also calls for larger multicenter studies to validate findings and develop standardized protocols for managing TEF in patients with esophageal cancer. Ultimately, advancing our understanding of the interplay between esophageal cancer and its complications is essential for improving survival rates and the quality of life for affected individuals, with this case serving as a foundational reference for future research endeavors.

INTRODUCTION

Esophageal cancer is a significant global health concern, particularly in China, where it is predominantly represented by squamous cell carcinoma (ESCC), accounting for over 90% of cases [1]. The rising incidence of this malignancy is attributed to various risk factors, including tobacco use, alcohol consumption, and dietary habits [2].

Notably, the prognosis for esophageal cancer remains poor, with a five-year survival rate hovering around 15-25% due to late diagnosis and the aggressive nature of the disease [3]. The clinical presentation of esophageal cancer is often nonspecific, making early detection challenging, as patients typically present with symptoms such as dysphagia, chest pain, and weight loss [4].

A particularly severe complication of esophageal cancer is the development of tracheoesophageal fistula (TEF), which can occur following advanced disease or as a result of therapeutic interventions such as chemoradiotherapy [5]. The clinical manifestations of TEF include cough, hematemesis, and respiratory distress, further complicating management and leading to increased morbidity and mortality [6]. The diagnosis of TEF poses significant challenges, particularly due to overlapping symptoms with esophageal cancer, necessitating a high

index of suspicion and rapid intervention to mitigate adverse outcomes [7].

This case report presents a rare instance of a patient with esophageal squamous cell carcinoma who developed TEF in conjunction with coronary heart disease. This case is invaluable in underscoring the complexities involved in diagnosing and managing TEF, particularly in patients with pre-existing comorbidities that complicate surgical and anesthetic approaches. It emphasizes the critical need for early recognition and tailored management strategies, as well as the importance of multidisciplinary collaboration in navigating the intricacies of such complicated cases. Moreover, this report aims to fill a gap in the literature regarding the management of esophageal cancer and its complications, thereby contributing to improved clinical practices and patient outcomes. The findings from this case may serve as a foundation for future studies aimed at enhancing the understanding and treatment of esophageal cancer, particularly in patients with multifaceted health challenges.

CASE PRESENTATION

Patient Information

The patient, Mr. Chen, a 64-year-old male, was admitted on July 5, 2025, at 09:06 due to the identification of a tracheoesophageal fistula following chemoradiotherapy for esophageal carcinoma. His medical history includes coronary artery disease. In May 2022, he experienced no significant solid food obstruction but required water for swallowing, accompanied by acid reflux and heartburn, with occasional right-sided chest pain. He did not report chest tightness, dyspnea, or referred pain to the shoulder and back, nor did he experience cough, sputum, or hemoptysis. The patient had previously consulted at a local hospital where an esophagogastroduodenoscopy revealed an esophageal mass and chronic non-atrophic gastritis with erosion; pathology confirmed squamous cell carcinoma at the 16-21 cm segment of the esophagus. In June 2022, he was referred to our institution where enhanced CT imaging showed thickening of the upper thoracic esophageal wall, indicative of esophageal cancer, alongside multiple mildly enlarged lymph nodes paratracheally on the right and old tuberculosis in the right upper lobe with pleural effusion changes in the lower lobes. Based on these findings, he was diagnosed with esophageal cancer involving the cervical and upper thoracic segments, suspected lymph node metastasis, and was recommended for chemoradiotherapy.

Clinical Findings

On the morning of July 7, 2025, the patient was scheduled for esophageal stent placement. The attending physician consulted for pain management support, considering the presence of a tracheoesophageal fistula which poses a risk for aspiration during anesthesia. Therefore, a decision was made to proceed with conventional endoscopic therapy. Prior to the procedure, the patient received a topical anesthetic (Dacronin gel), but subsequently experienced massive hematemesis. The endoscopist was unable to perform the procedure successfully and contacted the attending physician and department head for further treatment planning. Approximately two minutes after the onset of hematemesis, the patient lost consciousness. Medical personnel promptly repositioned him laterally on the examination table, established intravenous access, performed cardiac monitoring, and cleared the oral and airway contents. Consent from the family was obtained for endotracheal intubation, and emergency consultations were initiated with the ICU, respiratory medicine, and thoracic surgery departments.

Diagnostic Assessment

Upon the arrival of the emergency ICU and respiratory medicine specialists, resuscitation efforts commenced. The patient was found to be vomiting soft tissue and coagulated blood, with cardiac monitoring revealing a gradual blood pressure decline to 90/60 mmHg and a heart rate of 65 bpm. At 09:35, dopamine 100 mg was administered intravenously along with fluid resuscitation. The thoracic surgeon assessed the patient's condition and determined that vital signs were not suitable for emergency surgery; discussions with the family led to a decision against surgical intervention. By 09:40, the patient's blood pressure dropped further to 70/50 mmHg, prompting another dose of dopamine 100 mg, with heart rate decreasing to 55 bpm. At 09:50, epinephrine 1 mg was injected, followed by external chest compressions.

Therapeutic Intervention

During mechanical ventilation, it became evident that effective ventilation could not be maintained, leading to a bronchoscopy which revealed extensive blood clots obstructing the trachea that could not be removed. By 10:10, the patient experienced another drop in blood pressure and heart rate; dopamine 100 mg and epinephrine 1 mg were again administered, while chest compressions and mechanical ventilation continued. At 10:31, cardiac monitoring indicated asystole, and medical staff informed the family that resuscitation was unsuccessful, although the family requested to continue resuscitative efforts.

Follow-up and Outcomes

At 10:54 on July 7, 2025, ECG findings showed a flatline

across all leads, and the patient was ultimately pronounced dead.

DISCUSSION

Tracheoesophageal fistula, as a severe complication of esophageal carcinoma, significantly escalates patient mortality and the complexity of treatment. Literature suggests various approaches for managing tracheoesophageal fistulas, with studies indicating that self-expanding metallic stents (SEMS) can effectively alleviate symptoms and enhance the quality of life for patients. For instance, in a study involving 12 patients with tracheoesophageal fistula treated with SEMS, 100% experienced symptom relief, and 42% regained the ability to eat orally. However, the unique aspect of this case is the patient's coexisting coronary artery disease, which markedly increases the risks associated with anesthesia and surgical intervention, necessitating a highly individualized treatment approach.

Furthermore, this case underscores the importance of multidisciplinary collaboration in emergency management. The coordinated efforts of the departments of respiratory medicine, thoracic surgery, and intensive care can facilitate the rapid formulation of a resuscitation plan, thereby improving survival rates. Effective airway management is critical, particularly during intubation, where timely clearance of the airway is essential to prevent asphyxiation. Moreover, communication between healthcare personnel and the family is vital during emergency situations, helping to mitigate potential legal disputes and emotional conflicts associated with medical decisions. In summary, clinicians must remain vigilant and develop tailored treatment plans to enhance patient survival and quality of life in the face of complex cases.

In conclusion, the occurrence of tracheoesophageal fistula in patients with esophageal cancer not only exacerbates the clinical condition but also complicates treatment strategies. Early recognition and management of this complication are crucial, especially following chemoradiotherapy when patients may present with symptoms such as cough, hematemesis, and dyspnea. Existing literature emphasizes the role of imaging and endoscopic evaluations as key components in the early identification of tracheoesophageal fistula. Studies have shown that early endoscopic intervention can significantly improve survival rates and quality of life. However, when considering individualized treatment, the presence of comorbidities, such as coronary artery disease, substantially heightens the risks associated with anesthesia and surgery, making comprehensive treatment planning essential.

Additionally, the management of tracheoesophageal fistulas requires interdisciplinary collaboration to ensure optimal treatment support during emergencies. Evidence indicates that collaboration among respiratory medicine and intensive care specialists can lead to the swift development of rescue protocols, enhancing patient survival chances. During emergency care, timely communication between healthcare providers and the patient's family is critical, contributing to the reduction of legal disputes and emotional tensions surrounding medical decisions. Overall, clinicians must maintain a high level of awareness and adopt personalized treatment strategies to improve patient survival and quality of life when faced with complex cases.

Reflecting on this case, it is imperative to highlight the rare and complex clinical scenario of tracheoesophageal fistula in a patient with esophageal cancer, which illustrates the challenges inherent in disease management. The emergence of this complication post-chemoradiotherapy, compounded by the patient's coronary artery disease, significantly heightens the complexity of treatment. Effective management of this case necessitates individualized treatment plans addressing the fistula, while considering the patient's overall health status to minimize surgical risks and ensure optimal clinical outcomes. This case underscores the need for clinicians to possess keen observational skills and comprehensive judgment capabilities to promptly identify early symptoms, thereby avoiding misdiagnosis and treatment delays. The importance of multidisciplinary collaboration is exemplified, as coordinated efforts among respiratory, thoracic, and intensive care specialists not only enhance efficiency but also improve patient quality of life.

However, it is essential to acknowledge limitations in this case report. The small number of cases restricts the ability to conduct large-scale statistical analyses, potentially impacting the generalizability of conclusions. Moreover, individual variability and the diversity of comorbidities pose challenges in the widespread application of treatment strategies. Future research should consider establishing a more systematic case database to accumulate representative case data, aiming to provide a more robust basis for clinical treatment. Additionally, multicenter clinical trials are recommended to explore the efficacy of various treatment strategies in complex cases, ultimately offering critical insights for improving the management of esophageal cancer patients and enhancing their survival rates.

The management of tracheoesophageal fistula (TEF) in patients with esophageal cancer presents significant

diagnostic and therapeutic challenges, especially when accompanied by comorbid conditions such as coronary artery disease. In our case, the patient exhibited symptoms commonly associated with TEF, such as cough and respiratory distress, which were initially misattributed to late-stage progression of the esophageal malignancy. This misdiagnosis is consistent with findings in the literature, where patients often present with overlapping symptoms that complicate accurate diagnosis [1,2]. Previous studies highlight that the development of TEF in esophageal cancer patients can stem from tumor invasion and treatment-related tissue necrosis, necessitating a high index of suspicion among clinicians [3,4]. The presence of coronary artery disease in our patient further complicated the treatment strategy, as the risks associated with surgical intervention require careful consideration of the patient's overall health status and functional reserve [5,6].

Moreover, the literature emphasizes the importance of a multidisciplinary approach in managing complex cases of TEF, particularly those arising from malignancy. Collaborative efforts involving specialists from oncology, cardiology, and critical care can enhance decision-making and improve patient outcomes [7-9]. In this context, comprehensive assessments and tailored treatment strategies are crucial, as they significantly influence morbidity and mortality rates associated with TEF in esophageal cancer Patients [10,11]. The need for individualized care is underscored by the varying responses to treatment modalities, emphasizing the challenges faced in achieving optimal management outcomes for patients with this complex interplay of condition [12,13].

The early identification of tracheoesophageal fistula (TEF) in patients with esophageal cancer is paramount, as misdiagnosis can significantly exacerbate morbidity and mortality. Symptoms such as cough, hematemesis, and respiratory distress may be erroneously attributed to late-stage disease progression, highlighting the critical need for heightened clinical suspicion in these case [13,14]. The association of TEF with esophageal cancer often arises from tumor invasion and treatment-related complications, necessitating a thorough understanding of the pathophysiological mechanisms involved [15,16]. Furthermore, the presence of comorbidities such as coronary artery disease complicates the clinical landscape, as surgical interventions may pose significant risks to patients with compromised functional reserve [17,18].

In managing TEF, a multidisciplinary approach is not only advisable but essential, integrating expertise from oncology, cardiology and pulmonology [19,20]. Such collaboration facilitates timely and effective treatment strategies, particularly in acute scenarios where rapid decision-making is crucial [21,22]. The implementation of robust emergency management protocols can markedly improve patient outcomes by addressing complications promptly and effectively [16]. Continuous education and training for healthcare providers regarding the complexities of TEF management can further enhance clinical care, ensuring that teams are equipped to recognize and respond to the early signs of this challenging condition [22,23].

CONCLUSION

In conclusion, the management of tracheoesophageal fistula (TEF) in the context of esophageal cancer presents a multifaceted challenge that necessitates a nuanced understanding of the interplay between malignancy and comorbid conditions, such as coronary artery disease. This case underscores the importance of early recognition and accurate diagnosis of TEF, as misattribution of symptoms can lead to worsened patient outcomes. Individualized treatment plans are essential, given the diverse clinical presentations and the varying responses to therapeutic interventions observed in this patient population. Moreover, the collaboration among multidisciplinary teams, including oncologists, cardiologists, and critical care specialists, is vital in navigating the complexities of management, particularly in acute settings where rapid decision-making is crucial. This case not only highlights the necessity for heightened clinical suspicion in recognizing TEF but also emphasizes the imperative for continuous education and training among healthcare providers to enhance clinical acumen in managing such intricate cases.

Reflecting on the limitations of this case report, it is evident that while individual case studies provide valuable insights, they also underscore the need for larger, multicenter studies to validate findings and develop standardized management protocols for TEF in esophageal cancer patients. The establishment of comprehensive patient databases could facilitate future research endeavors, allowing for the aggregation of clinical data that can better inform treatment strategies and improve patient outcomes. Ultimately, advancing our understanding of the complications associated with esophageal cancer through rigorous research will be crucial in enhancing survival rates and quality of life for affected individuals. This case serves as a foundational reference for future investigations aimed at refining treatment paradigms in the face of such complex clinical challenges.

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