

Tracheomediastinal fistula: complication of mediastinal lymphoma

Fístula traqueomediastinal: complicación de linfoma mediastinal

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Summary

Fistulas between the airway and other thoracic structures occur mainly with the esophagus and pleura; however, case presentations of fistulas with the mediastinum have been reported. Communications between the airway and the mediastinum are a low-incidence entity with high morbidity and mortality, mainly associated with malignant disease or chemotherapy and radiotherapy treatments. The clinical presentation is variable, but it is common for the initial symptoms to be due to airway obstruction. There are different treatment options that depend on the underlying pathologies, the condition and clinical evolution of the patient, the most frequent being definitive closure surgery. Few cases of patients with tracheomediastinal fistula secondary to mediastinal lymphoma have been reported in the literature, especially with spontaneous closure of the communication after expectant management and tracheostomy, which highlights the importance of this case.

Resumen

Las fistulas entre la vía aérea y otras estructuras torácicas ocurren principalmente en el esófago y la pleura; sin embargo, se han informado casos de fistulas con el mediastino. Las comunicaciones entre la vía aérea y el mediastino son una entidad de baja incidencia, pero con alta morbilidad, principalmente asociadas a patología maligna o tratamientos con quimio y radioterapia. La presentación clínica es variable, pero es común que los síntomas iniciales se deban a la obstrucción de las vías respiratorias. Existen diferentes opciones de tratamiento que dependen de las patologías subyacentes, y el estado y la evolución clínica del paciente, pero la más frecuente es la cirugía de cierre definitivo. En la literatura se han reseñado pocos casos de pacientes con fistula traqueomediastinal secundaria a linfoma mediastinal, especialmente con cierre espontáneo de la comunicación después de manejo expectante y traqueostomía, lo cual resalta la importancia de este caso.

Case description

VA 17-year-old male with a history of T-lymphoblastic lymphoblastic lymphoma with prevascular mediastinal lymph node involvement, under management with vincristine, daunorubicin and L-asparaginase. The patient initially came to the emergency room with headache and underwent a cranial computed axial tomography (CT) scan in which venous sinus thrombosis was detected. During admission, he presented bronchospasm and signs of respiratory distress and was transferred to the intensive care unit.

In the CT of the thorax, with contrast medium, a decrease in the caliber of the tracheal lumen in the subglottic region was identified, which was considered the cause of stridor; additionally, prevascular ganglionic conglomerates with peripheral enhancement and low central density were documented, suggestive of necrosis (Figure 1), which had decreased in size with respect to previous studies. The presence of a solution of continuity in the anterior wall of the trachea, a fistulous tract with

air communicating with the prevascular space (figure 2) and fluid inside the trachea, confirmed the passage of necrotic material from the mediastinum to the airway.

The surgical service considered expectant management and possible spontaneous closure of the fistula due to its small size and the absence of pneumomediastinum, cardiac tamponade or associated mediastinitis. Subsequently, the patient suffered ventilatory failure, so he underwent emergency surgery for the placement of a tracheostomy. After the procedure, a new chest CT scan was performed, which showed occlusion of the solution of continuity of the anterior wall of the trachea (Figure 3) due to the tracheostomy tube; however, multilobar pneumonia secondary to aspiration was also observed (Figure 4).

On reevaluation, the patient was found to have no mediastinal infectious compromise and occlusion of the fistula secondary to the tracheostomy tube, so the surgical service did not consider surgical intervention necessary. The pulmonology service attempted to dilate the tracheal

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stenosis by fibrobronchoscopy, which failed. The patient restarted the cycles of chemotherapy with cytarabine and antibiotic management was terminated for the pulmonary infectious process. The last thoracic tomographic acquisition showed spontaneous closure of the fistula, without the need for surgical intervention in addition to the tracheostomy.

Discussion

Abnormal communications between the airway and adjacent structures occur mainly with the esophagus, less frequently with the pleural space and rarely with the mediastinum (1). Tracheomediastinal fistulas are very rare and of unknown incidence; however, they are an important cause of increased morbidity and mortality in patients. Their origin can be malignant in cases of mediastinal lymphoma, tracheal cancer, squamous cell carcinoma and lung adenocarcinoma (1). Primary neoplasms of the trachea are infrequent, representing approximately 0.1% of malignant neoplasms (2). The involvement of the tracheobronchial tree by lymphoma is anecdotal and little has been described about the contiguous infiltration of the airway by mediastinal lymphoma.

There are cases describing fistulas of benign origin, secondary to necrotizing mediastinitis, infectious complications following heart-lung

transplantation, long-term sequelae of cardio-defibrillator implantation, migration of metallic bronchial stents or tuberculous lymphadenitis (1).

Regarding the development of fistulas secondary to medical treatments, the respiratory tract is sensitive to chemo- and radiotherapy, so complications such as fistulas may arise within 2 to 4 months after the start of treatment (1, 3). Pathophysiologic changes include a temporary inflammatory reaction associated with ciliary paralysis, as well as reactive fibrosis and endarteritis of tissues undergoing chemo- and radiotherapy, which compromise the vascular supply, creating a hypoxic environment for malignant cells and normal tissue. Hypoxia leads to mucosal edema, associated with cartilage necrosis and eventually perforation of the tracheal wall (1, 4).

In patients with non-small cell lung carcinoma, the use of bevacizumab in addition to chemotherapy increases progression-free survival. However, this drug is associated with adverse effects such as hypertension, thromboembolism, bleeding and gastrointestinal perforation. Although tracheal fistulas in the patient with lung carcinoma are a known complication, they are quite rare. Bevacizumab is a monoclonal antibody directed against vascular endothelial growth factor, which inhibits angiogenesis and therefore delays healing, which becomes a determining factor in the development of fistulas (3-5).



Figure 1. Chest CT with intravenous contrast medium, sagittal view. Large anterior mediastinal mass of low density and without enhancement (arrows), suggesting necrotic changes.

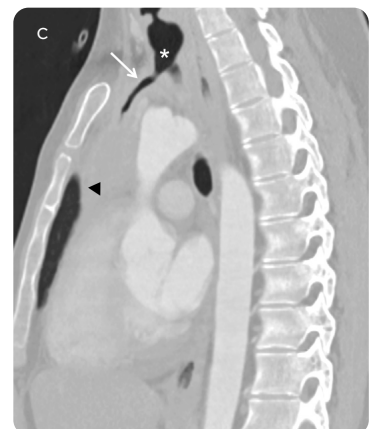
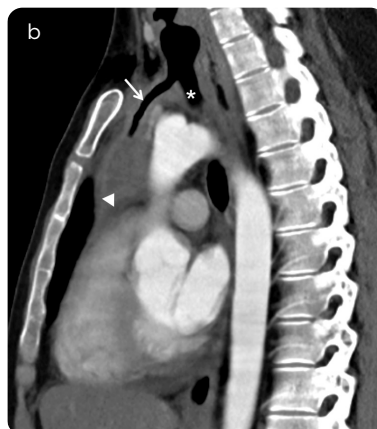
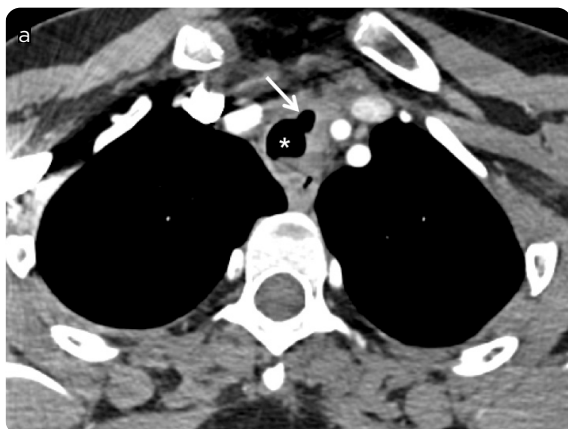


Figure 2. Chest CT with contrast medium, a) axial view in soft tissue window, b) sagittal view in soft tissue window and c) sagittal view in lung window. There is evidence of abnormal communication or fistula (white arrow) between the trachea (asterisk) and the mediastinal mass (arrowhead).

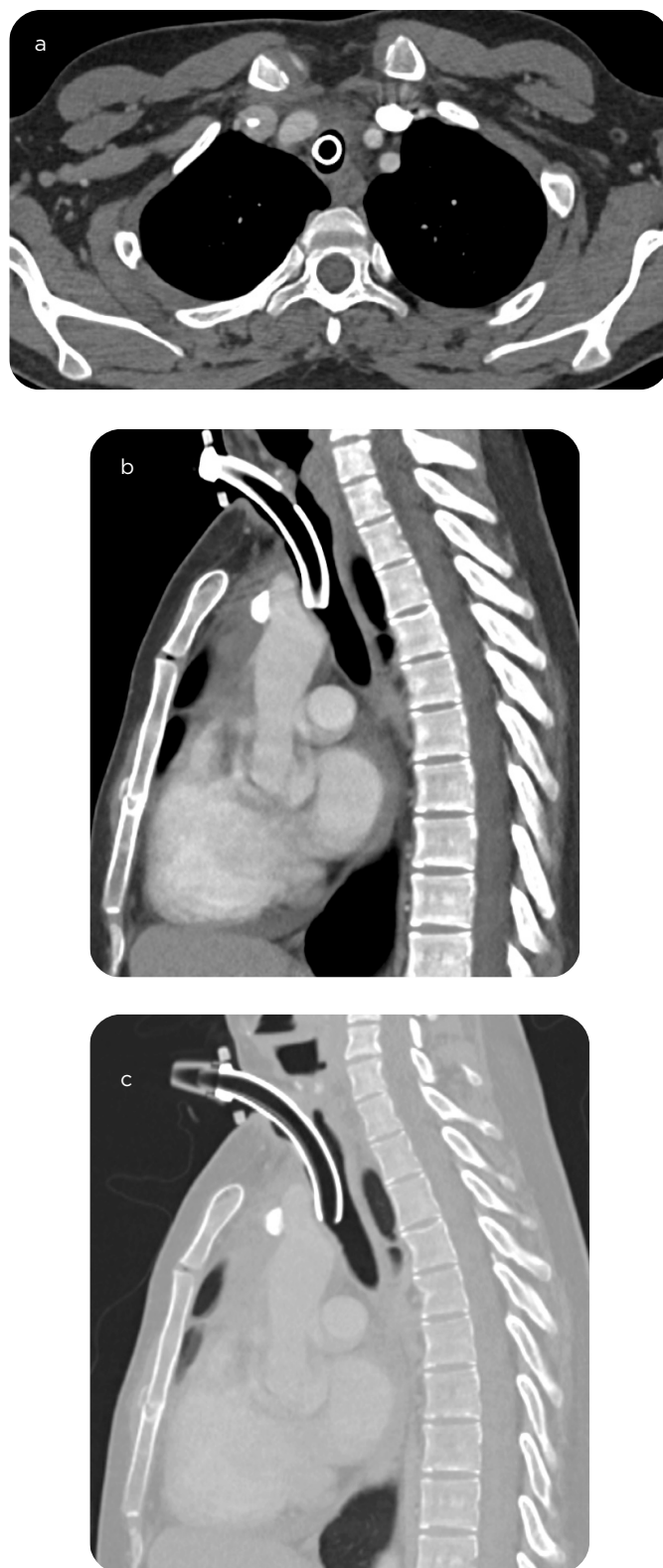


Figure 3. Chest CT with contrast medium, a) axial section in soft tissues window, b) sagittal section in soft tissues window and c) sagittal section in lung window. Complete closure of the fistula is evidenced after conservative treatment with tracheostomy.

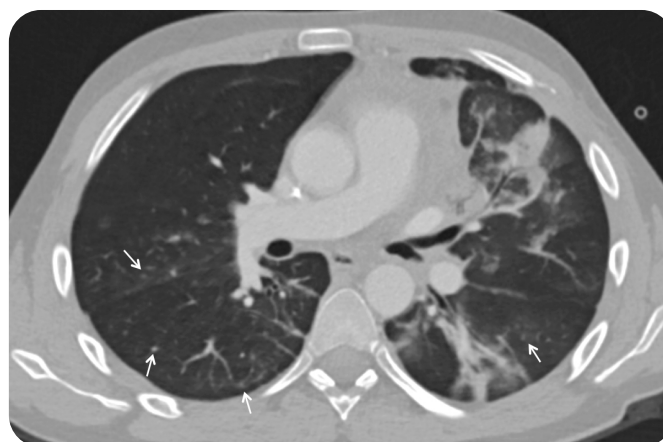


Figure 4. Chest CT with contrast medium, axial section in lung window. Multilobar pneumonia with irregular consolidations in the left lung parenchyma and multiple centrilobular nodules in both lungs (arrows) secondary to aspiration of necrotic material from the mediastinal mass through the tracheomediastinal fistula.

Mediastinal prevascular or paratracheal lymph nodes managed with chemotherapy or radiotherapy present changes due to necrosis, fibrosis or scarring. These changes tract the airways and generate the fistulous tract. The presence of enlarged lymph nodes, which are in contact with the tracheal wall, may increase the likelihood of fistula development (4).

The clinical presentation is variable, with manifestations such as cough with expectoration, tension pneumothorax, massive compressive hemothorax or mediastinal infections (6). The most frequent complications of tracheomediastinal fistulas are mediastinitis and the development of multilobar pneumonia secondary to aspiration of necrotic material (7).

The management of tracheomediastinal fistulas is complex and there is no established consensus. In the case of malignant etiology, treatment is usually palliative (1). If the patient is a candidate for major interventions, open surgery, flap repair or bronchoscopic stent insertion can be performed (1, 6).

Bronchopleural and tracheoesophageal fistulas should be considered as differential diagnosis from tracheomediastinal fistulas. Bronchopleural fistulas have diverse etiologies, mainly secondary to pulmonary resections, infections (tuberculosis), radio and chemotherapy. Management is generally surgical, with a high success rate and low mortality. Among the most commonly used interventions are open drainage, closure with intercostal muscle or omentum flap and transsternal bronchial closure. Bronchoscopy can be implemented as a diagnostic tool or as a therapeutic means through the use of endoluminal occlusive agents, mainly in unstable patients with high surgical risk (7).

Tracheoesophageal fistulas are frequent in patients with advanced or inoperable esophageal neoplasms, mainly in the subcarinal region. In these cases, management is based on palliative measures and improvement in quality of life (7).

Conclusion

It is essential that radiologists know all the possible complications of mediastinal lymphoma, including tracheomediastinal fistulas, which increase patient morbidity and mortality. Knowing when to suspect and how to properly diagnose this condition allows for an early decision on treatment, thus better patient management.

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