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Tracheal Diverticulum Mimicking Pneumomediastinum: A Case Report Emphasizing the Importance of Differential Diagnosis in Chest Imaging Evaluation

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Abstract

A tracheal diverticulum (TD) is a generally benign medical condition, where there is an outpouching of the tracheal wall. Additionally, it is generally asymptomatic but there have been reported cases of adverse outcomes linked to TD. Here we present a case of a tracheal diverticulum that was incidentally found during the workup for stroke in a patient. Moreover, due to its radiologic appearance, there was concern for pneumomediastinum. We highlight the presentation and clinical importance of TD owing to the complications one is predisposed to from having this condition.

Categories: Radiology, Pulmonology, Anatomy

Keywords: pneumomediastinum, idiopathic hemidiaphragm paralysis, radio-graphic finding, congenital abnormality, pulmonary disease, tracheal diverticulum

Introduction

A tracheal diverticulum (TD) is considered an uncommonly diagnosed medical condition in which there can be an outpouching of the tracheal wall with a currently reported prevalence of 2.4-8.1% [1]. TD may be separated into two categories: congenital and acquired. Congenital TD is generally made of all layers of the tracheal wall (respiratory epithelium, smooth muscle, and cartilage) and located below the vocal cords to just above the carina, whereas an acquired TD has no involvement of the smooth muscle or cartilage. Comparatively, congenital TD is larger in size and has larger communication with the trachea. While congenital diverticulum is due to developmental failure, the development of an acquired TD is associated with chronic increases in intraluminal pressure, such as in chronic obstructive pulmonary disease (COPD), which leads to the weakening of the tracheal wall [1]. Although TDs are considered benign in nature, they are occasionally symptomatic, presenting with cough, dyspnea, frequent respiratory infections, dysphonia, or hiccups [2-4]. Additionally, there have been several reported cases of adverse outcomes associated with TD associated with ventilatory support [5-7]. This is especially concerning in patients with acquired TD as they are generally a population with chronic lung problems that lead to sometimes invasive ventilatory intervention [1].

We present a case of an incidental finding of TD during a stroke/transient ischemic attack (TIA) evaluation in the emergency department in hopes of highlighting awareness of TD given that chest imaging is now ubiquitous in clinical practice and the importance of documentation of this condition for managing patients given reported associated adverse complications.

Case Presentation

This is a case of a 59-year-old female with a known past medical history of asthma, schizophrenia, and Parkinson's disease, who was brought into the hospital with the chief concern of lightheadedness. She presented with associated nausea, left-sided headache, and worsening body stiffness with an inability to ambulate for five days. Upon presenting to the emergency department, the patient was worked up for a stroke. Computed tomography (CT) of the head, CT angio of the head and neck, and CT perfusion were performed, which ruled out an acute cerebrovascular accident; however, on the CT angiogram of the head and neck, she was found to have an incidental finding of pneumomediastinum in the right superior thoracic cavity without extension into the neck. She denied having a history of shortness of breath, coughing spells, nausea, or vomiting associated with retching and denied any substance use. Pulmonary services were consulted and a dedicated CT chest was performed, which suggested the air pocket was likely a congenital TD (Figures 1, 2) and right hemidiaphragm (Figure 2). No previous images were available for comparison. No intervention was required as she was asymptomatic. The TD finding was explained to her, and the finding was documented in her medical record for future reference.

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FIGURE 1: Computed tomography (CT) of the chest without contrast, axial lung window. Red arrow points to tracheal diverticulum, lateral to trachea.

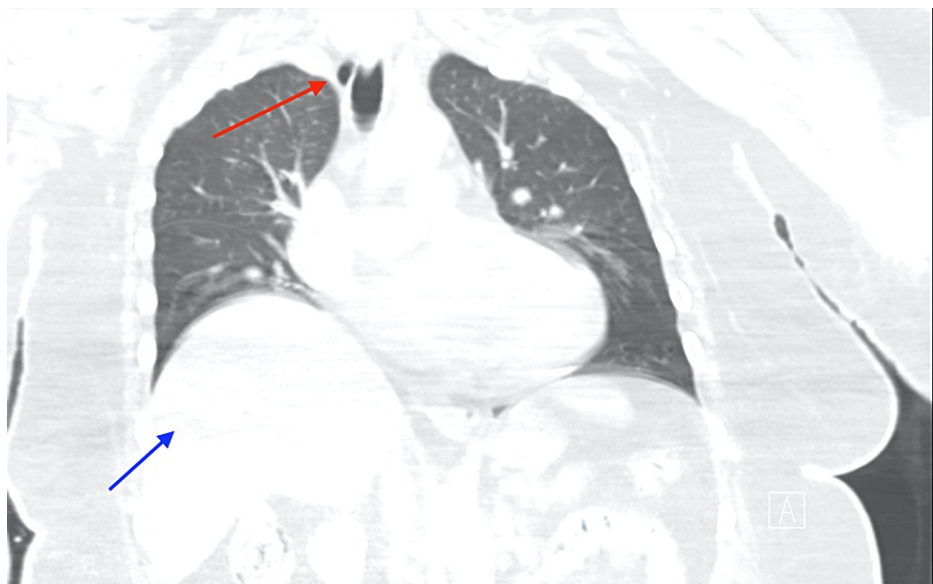


FIGURE 2: Computed tomography (CT) of the chest without contrast, coronal lung window. Red arrow points to tracheal diverticulum, lateral to trachea, and blue arrow points to right hemidiaphragm.

Discussion

TD, a type of paratracheal air cyst, is characterized as a benign out-pouching of the tracheal wall lined by ciliated columnar epithelium [1,8]. Typically an auxiliary finding on imaging studies with an approximate incidence of 2.4%, TD rarely warrants intervention [9]. TD forms one subgroup of the many anatomical thoracic variants, which includes cardiac bronchus, thoracic bronchus, and azygous lobe with a prevalence of 0%, 0.2%, and 0.8%, respectively [10]. The current diagnostic approach to TD involves a thorough clinical evaluation, imaging studies, and, in some cases, bronchoscopy. Bronchoscopy may be necessary in cases where the diagnosis is unclear, or to assess the extent of the TD. A recent retrospective study on the use of magnetic resonance imaging (MRI) in the evaluation of TD showed that it was useful in providing additional information about the wall, unable to be seen on CT. It also showed that the MRI was superior in evaluating

for infection and response to therapy in cases of infected TD [11]. TD is most frequently located posterolaterally, on the right, at the level of Th1-Th3, likely because this area is unprotected while this corresponding area on the left is protected by both the aortic arch and esophagus [12]. While tracheal TDs are often incidental and asymptomatic, it is not uncommon that they can be misdiagnosed as pneumomediastinum [13]. TD has also been reported in a case of spontaneous pneumomediastinum (SPM) in a 25-year-old asthmatic patient who was later discovered to have a TD [14]. Despite not having a history of penetrating trauma, this patient had a history of asthma which, given its association with SPM, validates the suspicion for a pneumomediastinum.

Although rare, TD can be symptomatic, manifesting as recurrent respiratory tract infections since the cavitation becomes a nidus for infections. Chronic cough, hemoptysis, dyspnea, stridor, and dysphonia are among the other symptoms that are associated with TD [15]. The presence or absence of symptoms dictates the management of TD. Small, asymptomatic TD may not require any treatment and can be managed with observation, as in our current patient. Surgical resection is the preferred treatment modality for symptomatic cases. Endoscopic resection or thoracoscopic resection may be used to remove the TD. In the case of our patient, no management was required, but it is important to include this finding in her history, given the reported complications associated with TD.

Current literature also revealed that TD predisposes patients to significant complications and/or may be associated with worse outcomes. Potential complications include infections that may even progress to paratracheal abscesses or empyema secondary to recurrent upper respiratory tract infections [1,16]. The presence of TD can also complicate interventions such as tracheal intubation and administration of positive pressure ventilation since the TD is prone to perforation, giving rise to pneumomediastinum [17]. A literature review has also revealed cases reported of TD arising after non-invasive ventilation in coronavirus disease 2019 (COVID-19) patients, which had an associated pneumomediastinum [5]. Regarding this case, no complications or symptoms were reported after the incidental finding was determined to not be a pneumomediastinum but instead a TD. We highlight the importance of this differential diagnosis in the evaluation of imaging because, despite the benign course, TD may have implications for the clinical course of the patient.

Conclusions

Often incidental and asymptomatic, TD can be misdiagnosed as pneumomediastinum in imaging studies. In the rare instance a TD is symptomatic, it may present as recurrent respiratory tract infections or chronic cough, therefore warranting further evaluation and treatment. If the patient is asymptomatic, treatment is not indicated. However, despite its benign course, it is recommended to include TD as a differential diagnosis in the evaluation of imaging given its complications.

Additional Information

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

1. Tanrivermis Sayit A, Elmali M, Saglam D, Celenk C: The diseases of airway-tracheal diverticulum: a review of the literature. *J Thorac Dis.* 2016, 8:E1163-7. [10.21037/jtd.2016.10.92](#)
2. Gao HJ, Gong L, Jiang ZH, Wei YC, Ma K: A tension tracheal diverticulum: recurrence after interventional sclerotherapy followed by transcervical resection. *Ann Transl Med.* 2019, 7:12. [10.21037/atm.2018.11.35](#)
3. Kokkonouzis I, Haramis D, Kornezos I, Moschouris H, Katsenos S, Bouchara S: Tracheal diverticulum in an asymptomatic male: a case report. *Cases J.* 2008, 1:181. [10.1186/1757-1626-1-181](#)
4. Haloui O, Nabou O, Musallam M, Thouil A, Kouismi H: Chronic cough revealing a tracheal diverticulum: a case report. *Cureus.* 2022, 14:e26958. [10.7759/cureus.26958](#)
5. Joseph VM, Lynser D, Tiewsoh I, Dutta K, Phukan P, Daniala C: Tracheal diverticulum in SARS-CoV-2 patients on non-invasive ventilation a not so "spontaneous" cause of pneumomediastinum? an imaging pictorial presentation of two cases with review of literature. *Acta Med Litu.* 2021, 28:302-7. [10.15388/Amed.2021.28.2.19](#)
6. Flores-Franco RA, Silva-Alcaraz J: Acquired tracheal diverticulum as an unexpected cause of endotracheal tube cuff leak. *J Crit Care Med (Targu Mures).* 2015, 1:171-3. [10.1515/jccm-2015-0024](#)
7. O'Leary CN, Ryan JW, Corbett G, Ridge CA: Barotrauma induced tracheal diverticulum rupture: imaging findings. *BMJ Case Rep.* 2016, 2016: [10.1136/bcr-2016-217518](#)
8. Kotoulas S, Fouka E, Kontakiotis T: A case of tracheal diverticulum with an unusual cause. *Hippokratia.* 2017, 21:206.
9. Kurt A, Sayit AT, Ipek A, Tatar IG: A multi detector computed tomography survey of tracheal diverticulum.

- Eurasian J Med. 2013, 45:145-8. [10.5152/eajm.2013.31](#)
10. Yurasakpong L, Asuvapongpatana S, Weerachayanukul W, et al.: Anatomical variants identified on chest computed tomography of 1000+ COVID-19 patients from an open-access dataset. *Clin Anat*. 2022, 35:723-31. [10.1002/ca.23873](#)
 11. Zhang Y, Tan Y, Chen J, Fang C: The role of MRI in the diagnosis and management of tracheal diverticulum . *BMC Med Imaging*. 2022, 22:74. [10.1186/s12880-022-00802-9](#)
 12. Gayer G: Tracheal diverticula. *Semin Ultrasound CT MR*. 2016, 37:190-5. [10.1053/j.sult.2016.04.002](#)
 13. Thibodeau R, Warn K, Jafrudifar A, Goel A, Scalzetti E, Deshmane S: Tracheal and main bronchial diverticula simulating pneumomediastinum following a motor vehicle collision. *Radiol Case Rep*. 2021, 16:3250-4. [10.1016/j.radcr.2021.08.003](#)
 14. Cherrez-Ojeda I, Felix M, Vanegas E, Mata VL: Pneumomediastinum, tracheal diverticulum, and probable asthma: coincidence or possible association? A case report. *Am J Case Rep*. 2018, 19:1267-71. [10.12659/AJCR.911413](#)
 15. Ahn JH, Jeong JY, Suh JH, Kim KJ: A rare cause of respiratory distress: a huge tracheal diverticulum . *Ann Thorac Surg*. 2012, 93:e135. [10.1016/j.athoracsur.2011.12.072](#)
 16. Akabane S, Kawachi J, Fukai R, Shimoyama R, Kashiwagi H, Ogino H, Watanabe K: A rare case of an infected tracheal diverticulum requiring emergency intervention: a case report. *Int J Surg Case Rep*. 2016, 24:7-9. [10.1016/j.ijscr.2016.04.051](#)
 17. Allaert S, Lamont J, Kalmar AF, Vanoverschelde H: Tracheal diverticulum as a cause of subcutaneous emphysema following positive-pressure ventilation. *Can J Anaesth*. 2016, 63:1098-9. [10.1007/s12630-016-0646-6](#)