Overlooked diagnosis of infected paratracheal air cysts in patients with respiratory symptoms

Case report

Kyungsoo Bae, MDa, Kyung N. Jeon, MD, PhDa,∗, Mi J. Park, MDa, Seung J. Lee, MDa, Ho C. Kim, MDa,∗, Mi J. Park, MDa, Seung J. Lee, MDa, Ho C. Kim, MDa

Abstract

Rationale: Infected paratracheal air cysts as the focus of respiratory symptoms can be overlooked in practice because of nonspecific symptoms and physician’s scant knowledge for this entity. We report 2 cases of infected paratracheal air cyst diagnosed at chest computed tomography (CT) and bronchoscopy/endobronchial ultrasound.

Patient concern: Two patients visited our hospital with respiratory symptoms, including cough, sputum, and fever.

Diagnoses: Chest CT showed paratracheal cystic lesions with air-fluid level in the thoracic inlet. In the first patient, endobronchial ultrasound revealed a right paratracheal hypoechoic mass corresponding to the lesion on CT scan. In the second patient, bronchoscopy revealed purulent discharge from a dimpling at posterolateral wall of trachea, which was the opening of communication between the trachea and infected paratracheal air cyst.

Interventions: Both patients received antibiotic treatment.

Outcome: After medical treatment, the patients’ symptoms were improved. Follow-up chest CT scans showed air-filled paratracheal air cysts without internal fluid or rim enhancement.

Lessons: A physician should pay attention to paratracheal air cyst in patients with respiratory symptoms when their lungs are clear on CT scan.

Abbreviation: CT = computed tomography.

Keywords: bronchoscopy, computed tomography, cyst, paratracheal air cyst, trachea

1. Introduction

Paratracheal air cysts are collections of air adjacent to the trachea. Most paratracheal air cysts are asymptomatic and discovered incidentally on neck or thoracic computed tomography (CT) scans.[1] As they act as a reservoir for respiratory secretions, secondary infections can occur.[2,3] However, infected paratracheal air cysts are rarely diagnosed as a cause of respiratory symptoms in clinical practice because of less attention and scant knowledge about this entity. Here, we report 2 cases of infected paratracheal air cysts overlooked at first but diagnosed later through chest CT scans with bronchoscopic examinations.

2. Case report

Our institutional ethical committee approved this study. Obtaining informed consent from these patients was waived. A 56-year-old female with underlying bronchial asthma presented with cough, sputum, and fever for 10 days. Chest x-ray and CT taken in an outside clinic were told to be normal. She received symptomatic treatment. However, her symptoms did not improve. On admission, peripheral blood examination revealed leukocytosis (12,230/mm3) and increased C-reactive protein level (41.9 mg/L). Review of chest CT transferred from outside hospital revealed a small paratracheal cystic lesion with air-fluid level and rim enhancement in the thoracic inlet (Fig. 1A and B). A small lymph node was seen in the adjacent area (not shown here). Zenker’s diverticulum or infected paratracheal air cyst was suspected. Esophagography showed no evidence of diverticulum. Endobronchial ultrasound revealed about 15-mm-sized right paratracheal hypoechoic mass corresponding to the lesion on CT scan (Fig. 1C). However, a communicating track between trachea and cystic mass was not found. Only intratracheal secretion material was seen near the lesion site. Smear of the bronchial aspirate showed many neutrophils, but it failed to identify the specific pathogen. Based on the findings of CT, endobronchial ultrasound, and bronchial aspirate, an infected paratracheal air cyst was diagnosed.
the patient’s symptoms were improved. Follow-up CT scan showed an air-filled paratracheal air cyst (Fig. 1D).

A 74-year-old man presented with cough, sputum, and chilling sense. Chest CT scan showed a multi-lobulated right paratracheal air cyst with intracystic fluid (Fig. 2A). Three-dimensional volume rendered image provided comprehensive information about the relationship between the trachea and the lesion (Fig. 2B). Paratracheal air cyst was ignored as the cause of infection at first. Review of the patient’s chest CT performed a year earlier demonstrated a right paratracheal air cyst without internal fluid content. Bronchoscopic examination revealed purulent discharge from a dimpling at the junction of right lateral wall and posterior membrane of the trachea which was the orifice of infected paratracheal air cyst (Fig. 2C). Smear and culture of the bronchial aspirate showed Haemophilus influenzae. After antibiotic treatment, the patient’s symptoms were improved. Follow-up CT scan clearly showed the connection between the trachea and the air cyst (Fig. 2D).

3. Discussion

Paratracheal air cysts are collections of air adjacent to the trachea. Although various pathological entities such as tracheal diverticulum, lymphoepithelial cyst, and tracheocele comprise paratracheal air cysts, all are covered with ciliated columnar epithelium. A few studies have suggested that majority of paratracheal air cysts are tracheal diverticula. Reported incidence of paratracheal air cysts ranges from 0.3% to 8.1% depending on diagnostic tools used. They are prevalent near the thoracic inlet at the junction of the right tracheal wall and posterior membrane, a point in the trachea with the least resistance. Most paratracheal air cysts are asymptomatic and discovered incidentally on routine radiologic examination. Some authors have reported the relationship between paratracheal air cysts and chronic lung disease such as emphysema and upper lung fibrosis. Paratracheal air cysts can become infected and cause respiratory symptoms such as cough, sputum, fever, and hemoptysis. However, infected paratracheal air cysts as the focus of respiratory symptoms can be overlooked in practice because of nonspecific symptoms, their small size, and scant knowledge for this entity. In our patients, infected paratracheal air cysts were not suspected as the cause of respiratory symptoms initially because of underlying bronchial asthma in the first patient and relatively subtle findings in the second patient. When infection became chronic or recurrent, it might mimic pulmonary tuberculosis or tumors clinically. Differential diagnosis of paratracheal air cysts includes Zenker’s diverticulum that can be excluded through esophagography or upper esophageal endoscopy.

Infected paratracheal air cysts can be successfully managed conservatively. Frequently, endobronchial ultrasound-guided transbronchial fine needle aspiration can be useful for the confirmation of infection and treatment by draining the infected content. Surgery remains an important option for patients who have recurrent infections or who do not respond to medical treatment. When establishing a diagnosis for paratracheal air cyst, CT plays a fundamental role because it provides information concerning the location, size, and internal content of the lesion. Communication channel between the air cyst and the trachea has been seen in about 35% and 55% of subjects on thin-section CT scans. Because of their small size, bronchoscopy can miss
the communication channel without prior information through CT scan. Therefore, a physician should pay attention to paratracheal air cyst in patients with respiratory symptoms when their lungs are clear on CT scan.

Acknowledgements

The authors would like to thank Keunyoung Bae for the English language review.

References

[1] Tanaka H, Mori Y, Kurokawa K, et al. Paratracheal air cysts communicating with the trachea: CT findings. J Thorac Imaging 1997;12:38–40.
[2] Teh BM, Hall C, Kleid S. Infected tracheocele (acquired tracheal diverticulum): case report and literature review. J Laryngol Otol 2011;125:540–5.
[3] Charest M, Sirois C, Cartier Y, et al. Infected tracheal diverticulum mimicking an aggressive mediastinal lesion on FDG PET/CT: an interesting case with review of the literature. Br J Radiol 2012;85:e17–21.
[4] Han S, Dikmen E, Aydin S, et al. Tracheal diverticulum: a rare cause of dysphagia. Eur J Cardiothorac Surg 2008;34:916–7.
[5] Goo JM, Im JG, Ahn JM, et al. Right paratracheal air cysts in the thoracic inlet: clinical and radiologic significance. Am J Roentgenol 1999;173:63–70.
[6] Unlu EN, Balbay EG, Boran M, et al. Is there a relationship between paratracheal air cysts and upper lobe fibrosis? J Comput Assist Tomogr 2016;40:236–60.
[7] Infante M, Mattavelli F, Valente M, et al. Tracheal diverticulum: a rare cause and consequence of chronic cough. Eur J Surg 1994;160:315–6.
[8] Takhar RP, Bunkar M, Jain S, et al. Tuberk Toraks Tracheal diverticulum: an unusual cause of chronic cough and recurrent respiratory infections 2016;64:77–82.
[9] Kuo CH, Chung FT, Kuo HP. Infected bronchogenic cyst diagnosed by endobronchial ultrasound-guided transbronchial needle aspiration. J Formos Med Assoc 2013;112:436–7.
[10] Casal RF, Jimenez CA, Mehran RJ. Infected mediastinal bronchogenic cyst successfully treated by endobronchial ultrasound-guided fine-needle aspiration. Ann Thorac Surg 2010;90:e52–3.
[11] Bunterbaugh JE, Erly WK. Paratracheal air cysts: a common finding on routine CT examinations of the cervical spine and neck that may mimic pneumomediastinum in patients with traumatic injuries. Am J Neuroradiol 2008;29:1218–21.
[12] Cheng HM, Chang PY, Chiang KH, et al. Prevalence and characteristics of paratracheal air cysts and their association with emphysema in a general population. Eur J Radiol 2012;81:2673–7.