

An investigation into the prevalence of paratracheal air cysts revealed on multidetector computed tomography

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Objective

Paratracheal air cysts (PTACs) are frequently and incidentally found on computed tomography (CT) examinations of the chest, neck, and spine. Aetiology, pathophysiology, clinical and radiological relevance, and accompanying airway and parenchymal pathologies of PTACs are not known. A limited number of studies have discussed the association between PTACs and radiological or clinical abnormalities.^{1–5} Goo et al.¹ and Kim et al.² reported a relationship between emphysema and PTACs. However, Cheng et al.,³ Buterbaugh et al.,⁴ and Bae et al.⁵ found no association between emphysema and PTACs. Most patients are asymptomatic.³ The aim of this study was to investigate the prevalence of PTAC and the association between the PTACs and emphysema, bronchiectasis, pneumothorax, bullae, and sternotomies on multidetector CT (MDCT) examinations.

Design

The MDCT examinations with axial and sagittal and coronal multiplanar reformatted images were evaluated retrospectively by two radiologists by consensus. The examinations were performed using an eight-channel MDCT system (GE Healthcare, Milwaukee, WI, USA).

Setting

This study was performed at the Radiology Department of Gaziosmanpasa University School of Medicine, Tokat, Turkey.

Participants

From 1 January 2011 through 30 May 2012, a total of 2036 consecutive subjects with MDCT examinations

of the chest and MDCT angiography of the thoracic aorta or the pulmonary arteries were reviewed. Additional or follow-up examinations were excluded.

Main outcome measures

The prevalence of PTACs was calculated. The study group consisted entirely of subjects with PTACs, and the control group included subjects without PTACs who were matched according to age, gender, and MDCT examinations. Each MDCT examination in the study and control groups was evaluated for the presence of emphysema, bronchiectasis, bullae, and pneumothorax as well as whether a sternotomy had been performed, and these results were then compared.

Results

In 158 (7.7%) subjects, PTACs were observed (Figure 1). Of these subjects, 114 (72%) were male and 44 (28%) were female. The mean age of the study group with PTACs was 56.6 ± 15.4 years (range: 13–93), and the control group and study group with PTACs were comparable in terms of age and gender ($p = 1$ for all). In addition, no statistical differences were seen in the types of MDCT examinations between the two groups ($p = 1$). No statistically significant differences were seen in either group with regard to the presence of emphysema, bronchiectasis, bullae, and pneumothorax or previous sternotomies ($p > 0.05$ for all) (Table 1). PTACs were more common among the subjects who were aged between 40 and 70 years (100 subjects, 63.3%), verifying the fact that the prevalence of PTACs increases with age until subjects are in their 80s. The highest prevalence of PTACs was found in those who were in their 70s (48 subjects, 30.4%).

Figure 1. A multidetector computed tomography scan of a 71-year-old woman showing the axial image of a right paratracheal air cyst with a thick, irregular posterior wall (arrow).

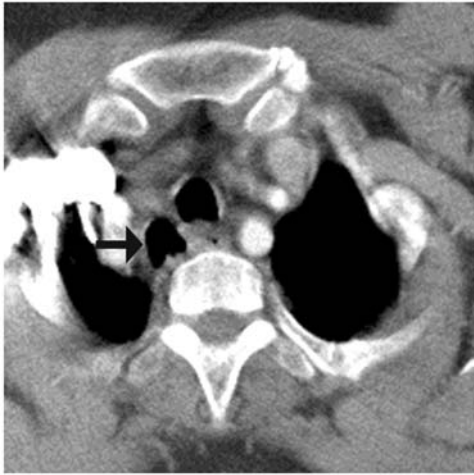


Table 1. MDCT findings of the study and control groups.

MDCT findings	Study group (n = 158), n (%)	Control group (n = 158), n (%)	p
Emphysema	63 (39.9)	52 (32.9)	0.198
Bronchiectasis	81 (51.3)	69 (43.7)	0.176
Bullea	21 (13.3)	12 (7.6)	0.141
Sternotomy	10 (6.3)	7 (4.4)	0.618
Pneumothorax	8 (5.1)	0 (0)	–

$p > 0.05$, non-significant; $p < 0.05$, significant; MDCT: multidetector computed tomography.

Conclusions

PTACs at the thoracic inlet were frequently discovered via MDCT, and there was a slight male

predilection. In addition, the prevalence of PTACs increases with age, but they do not seem to be associated with emphysema, bronchiectasis, bullae, pneumothorax, and sternotomies. Further studies are needed to evaluate the radiological findings of PTACs and other associated CT abnormalities.

Declarations

Competing interests: None declared.

Funding: None declared.

Ethical approval: This study was evaluated by Gaziosmanpasa University School of Medicine Ethics Committee, who had no objections to this study.

Guarantor: RY.

Contributorship: RY conceived of the initial idea. RY, RS, FC, MY, AY, and SC carried out the literature search. RY and RS carried out the analyses of the chest CT scans. MY and FC carried out the statistical analyses. RY, RS, MY, and FC contributed to the writing of the manuscript. All authors approved final version.

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References

- Goo JM, Im JG, Ahn JM, Moon WK, Chung JW, Park JH, et al. Right paratracheal aircysts in the thoracic inlet: clinical and radiological significance. *AJR Am J Roentgenol* 1999; 173: 65–70.
- Kim JS, Kim AY and Yoon Y. Paratracheal air cysts using low-dose screening chest computed tomography: clinical significance and imaging findings. *Jpn J Radiol* 2011; 29: 644–648.
- Cheng HM, Chang PY, Chiang KH, Huang HW and Lee CC. Prevalence and characteristics of paratracheal air cysts and their association with emphysema in a general population. *Eur J Radiol* 2012; 81: 2673–2677.
- Buterbaugh JE and 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. *AJNR Am J Neuroradiol* 2008; 29: 1218–1221.
- Bae HJ, Kang EY, Yong HS, Kim YK, Woo OH, Oh YW, et al. Paratracheal air cysts on thoracic multidetector CT: incidence, morphological characteristics and relevance to pulmonary emphysema. *Br J Radiol* 2013; 86: 20120218.