Case Report / Olgu Sunumu

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Is the Opacity on the Chest X-ray Pathological? "Azygos Lobe"

Akciğer Grafisindeki Opasite Patolojik mi? "Azygos Lobu"

Elif Nur Köse[1], Yasemin Duman[1], Ayla Akça Çağlar[2], Merve Yazol[3], Okşan Derinöz Güleryüz[2]

[1]Gazi University Faculty of Medicine, Department of Pediatrics Ankara, Türkiye
[2]Gazi University Faculty of Medicine, Department of Pediatric Emergency, Ankara, Türkiye
[3]Gazi University Faculty of Medicine, Department of Radiology, Ankara, Türkiye

Abstract

Chest radiography (chest X-ray) is one of the most frequently used radiological examinations in the pediatric emergency departments (PEDs). It is helpful in the diagnosis of infections, including malignancy, foreign bodies, and bone structure deformities. Chest X-rays should be interpreted in a particular order, and all anatomical structures should be evaluated. Here, three cases in which the opacity detected in the chest X-ray was evaluated as the azygos lobe are presented, and this rare condition is discussed. Three patients were admitted to university hospital's PED and incidentally diagnosed with azygos lobe. Case 1, a 16-year-old male patient, presented with chest pain on the left side of the sternum. Case 2, a 9-year-old male patient, presented with dyspnea. Case 3, a 16-year-old female patient, presented with fever and abdominal pain. The tear-shaped opacity detected on the chest X-ray of all three cases was evaluated to be an azygos lobe. Although many cases of the azygos lobe are described, knowledge of it among clinicians is still insufficient. We presented these three cases to raise awareness of the azygos lobe, and remind physicians that its typical appearance on chest X-ray can be easily recognized.

Keywords: Azygos lobe, child, chest radiography, anatomical variant

Öz

Akciğer grafisi çocuk acil servislerinde en sık kullanılan radyolojik tetkiklerden biridir. Enfeksiyon tanısının yanı sıra malignensi, yabancı cisim ve yapısal deformitelerin tanısında da faydalıdır. Akciğer grafilerindeki tüm anatomik yapılar sırasıyla değerlendirilmelidir. Burada, akciğer grafisinde opasite saptanan ve azigos lobu tanısı alan 3 hasta ve bu varyasyon tartışılmaktadır. Üç hasta Gazi Üniversitesi Çocuk Acil servisine başvuran ve insidental olarak azigos lobu saptanmıştır. Birinci olgumuzda 16 yaş erkek hasta sternum sol yanında göğüs ağrısı ile, 2. olgumuzda 9 yaş erkek hasta dispne ile, 3. Olgumuz ise 16 yaş kız hasta ateş ve karın ağrısı şikayeti ile başvurmuş. Üç hastanın da akciğer grafisinde damla şeklinde opasite saptanmış olup azigos lobu olarak değerlendirilmiştir. Azigos lobu hakkında çok fazla olgu tanımlanmış olsa da, klinisyenler arasında bilgi henüz yetersizdir. Biz bu 3 olguyu azigos lobu hakkında farkındalık yaratmak ve doktorlara akciğer grafisindeki görünümü tanıtarak bu lobun tanınmasını kolaylaştırmaktır.

Anahtar Kelimeler: Azigos lobu, çocuk, akciğer grafisi, anatomik varyasyon

Introduction

The azygos lobe is a rare congenital anatomical lung variation. It was first described was first described as an anatomical feature of the right upper lobe by the German anatomist Heinrich Wrisberg in 1778.[1] During embryogenesis, the azygos vein forms by penetrating the lung's upper lobe and advancing along the parietal and visceral pleura. The two pleural layers migrate across the right upper lobe, forming a fissure called the azygos fissure. It is not a true accessory lobe, as it has no bronchus or specific bronchopulmonary segment.[2] The incidence in the population is reported to be approximately 0.2-1.2%.[3] It is often detected incidentally on chest radiography (chest X-ray) and computed tomography (CT) of the thorax. A typical finding of the azygos lobe on the chest X-ray is a convex line and associated teardrop appearance. The azygos lobe is usually detected incidentally by a chest X-ray or CT during examination for another reason.[2] A chest X-ray usually has a typical appearance as a convex line due to the azygos fissure, extra pleural tissue on the fissure, and

Address for Correspondence/Yazışma Adresi: Yasemin Duman, Gazi University Faculty of Medicine, Department of Pediatrics Ankara, Türkiye
E-mail: yaseminduman1997@hotmail.com **ORCID ID:** orcid.org/0000-0002-4519-9688
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a trigonal area connected to the azygos vein at the bottom; this image is described as a teardrop.[4] The azygos lobe can be misdiagnosed as a neoplasm, lung abscess, or bulla.[5] This case report presents three cases admitted to the pediatric emergency department (PED) with various symptoms, who were incidentally found to have an azygos lobe. All patients have given consent to be included in this case report.

Case Report

Case-1

A sixteen-year-old male patient was admitted to the PED with a complaint of chest pain. It was revealed that he had intermittent stinging chest pain on the left side of the sternum for three days. His vital signs were stable, and the physical examination revealed no abnormalities. The laboratory findings showed that hemoglobin was 14.2 g/dL, leukocyte count was 4600/mm^3, platelet count was 200,000/mm^3, creatine kinase myocardial band (CK-MB) was 2.09 ng/mL (normal range: <4.87), and hs-Troponin T was <5 ng/L (normal range: 0-14). Liver and kidney function tests, and electrocardiogram were normal. Chest X-ray showed a vertical line and increased tear-shaped opacity in the right upper lobe (Figure 1).

The department of pediatric radiology was consulted because the opacity in the X-ray could not be identified. It was interpreted as an azygos lobe and an azygos fissure. When the patient's medical records were checked, the thorax CT taken due to previous trauma was observed, and it was identified that the azygos lobe was present in those images (Figure 2). The patient's chest pain resolved without any intervention, and his pain was evaluated as non-specific.

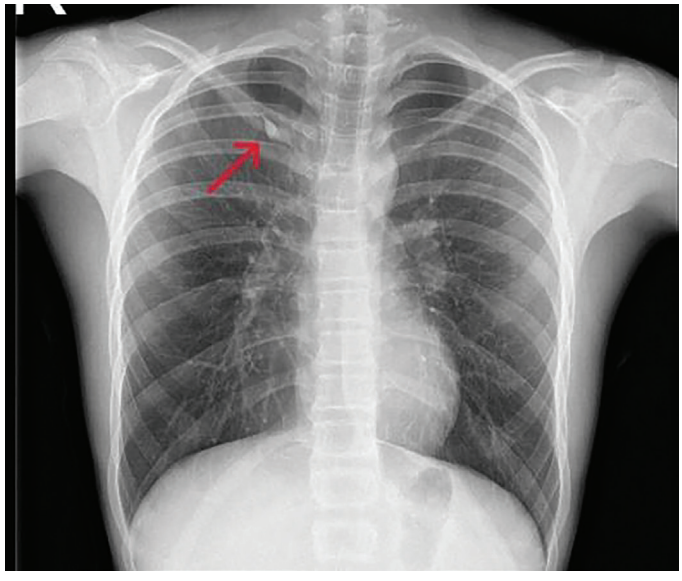

Figure 1. Azygos lobe view on chest radiography of Case 1

Case-2

A nine-year-old male patient was admitted with dyspnea. His complaints started approximately one hour before admission and were accompanied by a congested nose. The physical examination showed no abnormalities. His vital signs were stable, with a 97% oxygen saturation and a respiratory rate of 28/min. His complete blood count revealed the following: hemoglobin 13.3 g/dL, mean corpuscular volume (MCV) 78.6 fL, platelets 375,000/mm^3, and neutrophils 4100/mm^3. His venous blood gas analysis showed a pH of 7.39, CO_2 of 38.1 mmHg, pO_2 of 30.6 mmHg, lactate 0.7 mmol/L, base excess of -1.3, and HCO_3 of 22.6 mmol/L, which was non-specific. The chest X-ray showed no indication of a pulmonary pathology, except for a tear-shaped opacity near the upper sternum and a curved line extending from the opacity to the clavicle (Figure 3). Regarding our experience from the previous case, the observation was interpreted as the azygos lobe and the accompanying fissure. The patient's complaint of dyspnea, which was associated with an upper respiratory infection, was resolved in the follow-up.

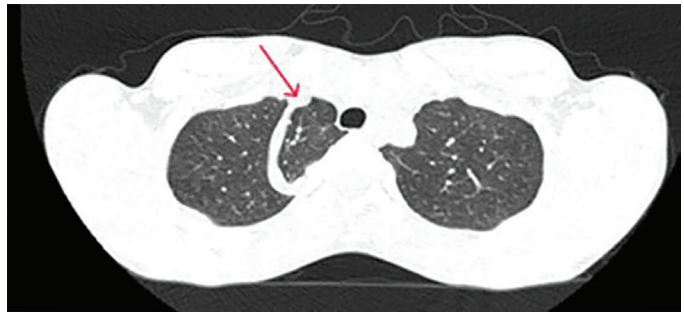

Figure 2. Azygos lobe view on chest tomography of Case 1

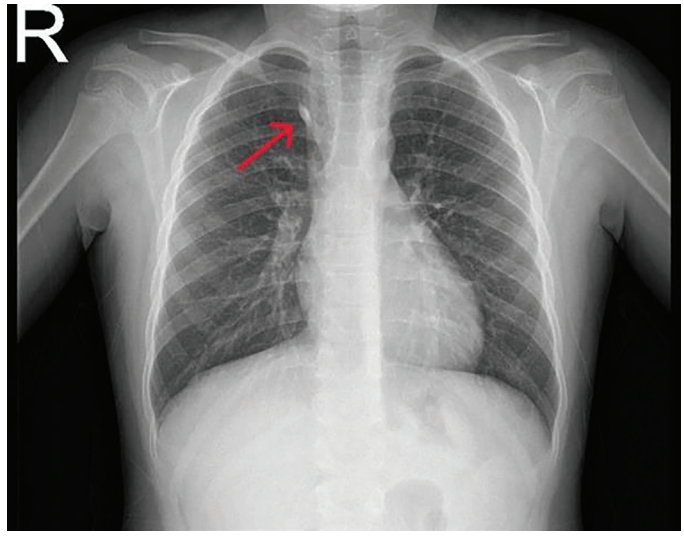

Figure 3. Azygos lobe view on chest radiography of Case 2

Case-3

A sixteen-year-old female patient presented to the PED with fever and abdominal pain. The physical examination showed no abnormalities. Her physical examination was normal, except for a heart rate of 141/min and a temperature of 37.4 °C. The laboratory findings were Hb: 12.9 g/dl, MCV: 81.2, platelets: 230,000/mm^3, neutrophils: 20,800/mm^3. Abdominal ultrasonography and chest X-ray were planned to rule out appendicitis and lobar pneumonia due to fever, leukocytosis, and abdominal pain. Abdominal ultrasonography was evaluated as normal. While no consolidation was detected on the chest X-ray, an azygos fissure was detected, along with an image compatible with the azygos lobe in the right upper lobe (Figure 4). During follow-up, the patient started to have diarrhea and she was diagnosed with acute gastroenteritis.

Discussion

The incidence of azygos lobe in the general population is low.[1] The azygos lobe, which is more commonly found in men than in women, is usually located in the right lung.[6,7] In all three cases we presented, the azygos lobe was in the right lung, and in two cases out of three, they were male. While the average age of children with azygos lobe detected, was two years, the youngest case reported in the literature was a newborn with azygos lobe detected incidentally on CT recorded during an evaluation for dyspnea and aspiration pneumonia, published by De Carolis et al.[8] Our patients' ages were higher than those reported in the literature.

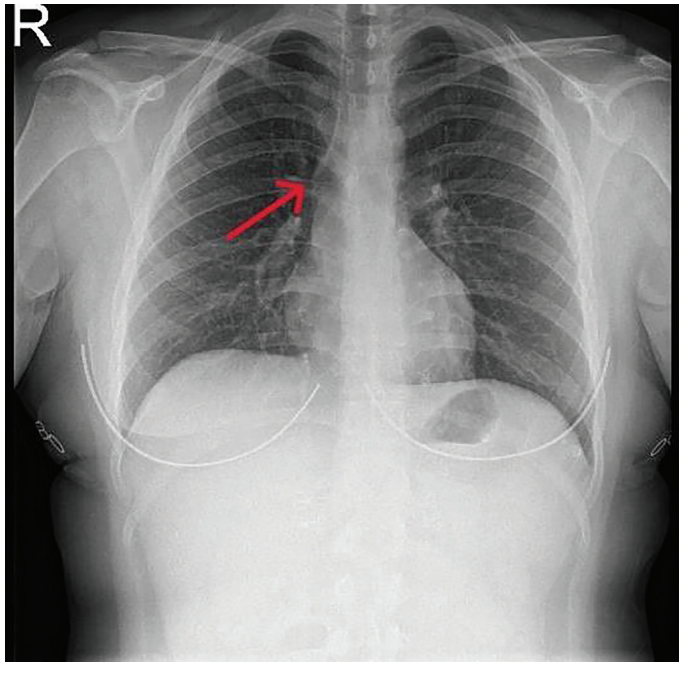

Figure 4. Azygos lobe view on chest radiography of Case 3

In the literature, the detection rate of the azygos lobe by chest X-ray was 2.6%, while the detection rate with CT was 6.7%.[9] Since CT is less frequently requested in pediatric patients due to radiation concerns, while the diagnosis of the azygos lobe can be made more easily with CT, most cases are diagnosed in adulthood.[10] In the study by Wang et al.[11], which included 50 children with azygos lobe, it was reported that 80% of the cases were diagnosed by CT, 18% were diagnosed by chest X-ray, and 2% were diagnosed by both chest X-ray and CT. In our cases, the diagnosis was made through chest X-ray, and no additional CT imaging was done. In the first case, CT images due to trauma were obtained from hospital records, and were more evident in the imaging, revealing the azygos lobe.

Most cases of azygos lobe are asymptomatic. In the study conducted by Wang et al.[11], 28% of the cases were detected incidentally, and 72% had accompanying symptoms, such as coughing and dyspnea, unrelated to the azygos lobe, as in our cases. Although the azygos lobe is not thought to cause any pathology due to its nature, it may be associated with some pathologies. In the literature, there are cases associated with the azygos lobe, such as malignancy, pneumothorax, hemothorax, extrapulmonary sequestration, vascular malformations, atelectasis, bronchiectasis, hemoptysis, and consolidation.[12] Additionally, reports indicate that the incidence of the azygos lobe increases in anomalies, such as sternal and tracheal anomalies, cystic adenomatoid malformation, congenital heart disease, and Down syndrome.[11] Since most cases do not have any symptoms at the time of diagnosis, it is appropriate to consider the azygos lobe as a benign lung variation but also to closely monitor it for complications that may develop in the long term or accompanying anomalies. It is essential to know the existence of the azygos lobe since it may pose a risk, especially during thoracic surgery.[13] No additional pathology was detected in any of our cases, but their parents were informed about the need for follow-up regarding the azygos lobe.

The azygos lobe is often detected incidentally during imaging while investigating other pathologies. However, it often cannot be diagnosed due to the omission of the azygos lobe in most textbooks and radiology atlases, as well as physicians' lack of knowledge. It is reported in the literature that the azygos lobe mimics the appearance of the bulla, the abscess, localized pneumothorax, pulmonary nodule, and neoplasm, causing patients to receive incorrect diagnoses and be exposed to unnecessary interventions.[14] In the study by Wang et al.[11], which is the largest series of children 40% of cases with azygos lobes were not diagnosed by the first imaging examination. Another study by Al-Mnayyis et al.[15], which included 227 graduate intern physicians and radiology assistants, and surgery assistants, showed that none of the

intern physicians or surgery assistants could recognize the azygos lobe image. Only 57% of the radiology assistants could identify it correctly. The diagnosis of azygos lobe can only be made by radiological imaging, so clinicians need to know its characteristic radiological features.

Conclusion

Although azygos lobe cases have been described, there is still a lack of knowledge among clinicians on this subject. We present these three cases to increase awareness of the azygos lobe. We would like to remind physicians that the azygos lobe can be easily recognized by its typical appearance on chest X-ray, thus preventing misdiagnosis and unnecessary interventions.

Ethics

Informed Consent: All patients have given consent to be included in this case report.

Footnotes

Authorship Contributions

Concept: A.A.Ç., M.Y., O.D.G., Design: A.A.Ç., Data Collection or Processing: E.N.K., Y.D., M.Y., Analysis or Interpretation: A.A.Ç., O.D.G., Literature Search: E.N.K., Y.D., Writing: E.N.K., Y.D., A.A.Ç., M.Y., O.D.G.

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