

Endobronchial Ultrasound in a Patient with Right Aortic Arch

Abdul Hamid Alraiyes, MD,¹ Khalid Alokla, MD,² Fayez Kheir, MD,² Jaime Palomino, MD²

¹Respiratory Institute, Cleveland Clinic Foundation, Cleveland, OH

²Department of Pulmonary Diseases, Critical Care, and Environmental Medicine, Tulane University Health Sciences Center, New Orleans, LA

ABSTRACT

Background: A right-sided aortic arch (RAA) is a rare anomaly of the cardiovascular system, presenting in only 0.1% of the population. In some reported cases, RAA is accompanied by another cyanotic vascular anomaly such as tetralogy of Fallot, and patients with such anomalies are usually diagnosed in fetal life or early childhood. Most patients are asymptomatic if the RAA presents individually.

Case Report: We report the case of a 27-year-old African American man who presented to urgent care with 3 weeks of progressive dry cough with mild shortness of breath, low-grade fevers, and night sweats. He was not on any medication. Radiographic examination of the chest showed a right paratracheal mass displacing the trachea to the left, suggesting a vascular anomaly with mediastinal adenopathy. Radiographic images suggested either lymphoma or chronic granulomatous disease, and the patient underwent endobronchial ultrasound bronchoscopy under general anesthesia. He was ultimately diagnosed with sarcoidosis.

Conclusion: Endobronchial ultrasound with real-time guided transbronchial needle aspiration played a significant role in obtaining a sufficient tissue sample to make the diagnosis with minimal side effects, despite the presence of the RAA anomaly.

INTRODUCTION

Right-sided aortic arch (RAA) is a congenital abnormality of the aortic arch resulting from a defect

in the unilateral disappearance of arteries of the third and fourth primary pharyngeal arches. RAA is a rare anomaly of the cardiovascular system that presents in only 0.1% of the population.¹ In some reported cases, RAA is accompanied by another cyanotic vascular anomaly such as tetralogy of Fallot,² but patients with such anomalies are usually diagnosed in fetal life or early childhood.³ Patients typically are asymptomatic if the RAA presents individually.⁴

Patients with mediastinal lymphadenopathy and RAA who require a transbronchial needle aspiration (TBNA) sample for diagnosis are ideal candidates for endobronchial ultrasound (EBUS), not only because of the high yield in diagnosis but also because EBUS plays a critical role in patient safety and in reducing the potential morbidity of TBNA, such as major blood vessel puncture, pneumothorax, pneumomediastinum, hemomediastinum, and hemopericardium.

CASE REPORT

A 27-year-old African American man presented to urgent care with 3 weeks of progressive dry cough with mild shortness of breath, low-grade fevers, and night sweats. He was well built, had never smoked, and worked as a police officer. He denied previous similar symptoms, recent travel, or other exposures. He had no significant medical history and was not on any medication. Physical examination of the chest revealed an increase of bronchial sounds in both lung fields, his heart examination was unremarkable for any extra heart sounds or murmurs, and the rest of the examination was normal. Radiographic examination of the chest showed a right paratracheal mass displacing the trachea to the left, suggestive of a vascular anomaly with mediastinal adenopathy. A computed tomography (CT) scan of the chest revealed an RAA (Figure 1A), as well as extensive mediastinal and hilar adenopathy (Figure 1B). Because the radiographic images suggested either lymphoma or chronic granulomatous disease, the patient underwent an EBUS bronchoscopy under general anesthesia.

Address correspondence to
Abdul Hamid Alraiyes, MD
Respiratory Institute
Cleveland Clinic Foundation
9500 Euclid Ave., A-90
Cleveland, OH 44195
Tel: (216) 444-6507
Email: alraiya@ccf.org

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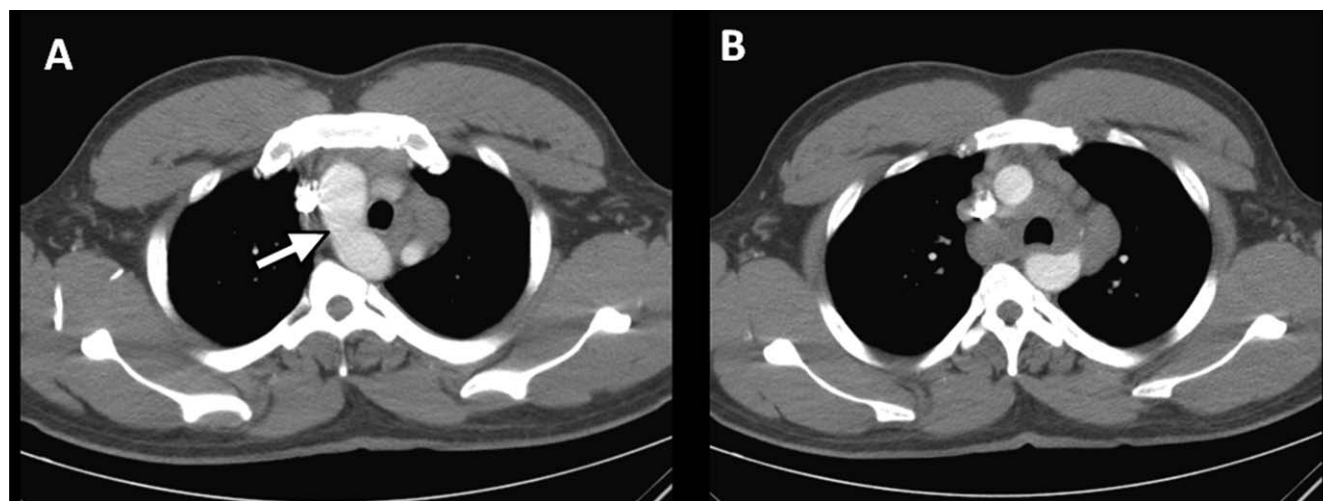


Figure 1. Computed tomography scan of the chest showing right-sided aortic arch (A) and extensive mediastinal lymphadenopathy (B).

Following induction of general anesthesia with intravenous agents, a laryngeal mask was positioned to secure the airway. General anesthesia was maintained with sevoflurane, a volatile agent, while the patient was mechanically ventilated. The bronchoscope was advanced through the lumen of the laryngeal mask and semiclosed circuit ventilation. Upon advancement of the scope, diffused cobblestone changes of the airways were observed. An EBUS bronchoscope was used for lymph node mapping. The aortic arch was identified on the right side of the tracheal wall, out-layering the superior vena cava vein (Figure 2). Multiple ultrasound-guided TBNA obtained from 4R, 4L, 11R, and 11L lymph node stations revealed multiple noncaseating granulomas. The patient was reversed from muscle blockers, the laryngeal mask was removed, and the

patient was awoken from general anesthesia via face mask with no complications.

The final diagnosis was sarcoidosis. Results were discussed with the patient, and because he had no symptoms on subsequent visit, no treatment was started. The patient agreed to follow up with the clinic if he developed any symptoms.

DISCUSSION

RAA is a rare cardiovascular anomaly caused by interruption in the development of the third and fourth pharyngeal arch in embryologic life.⁵ On plain chest x-ray, RAA is recognized as the aorta descends on the right of the air-filled trachea.⁴ CT chest angiography can visually establish the diagnosis, as the left or right sidedness of the aortic arch refers to the position of the aortic arch relative to the trachea.⁶ RAA ultrasound findings described in literature are mainly in fetal life.⁵

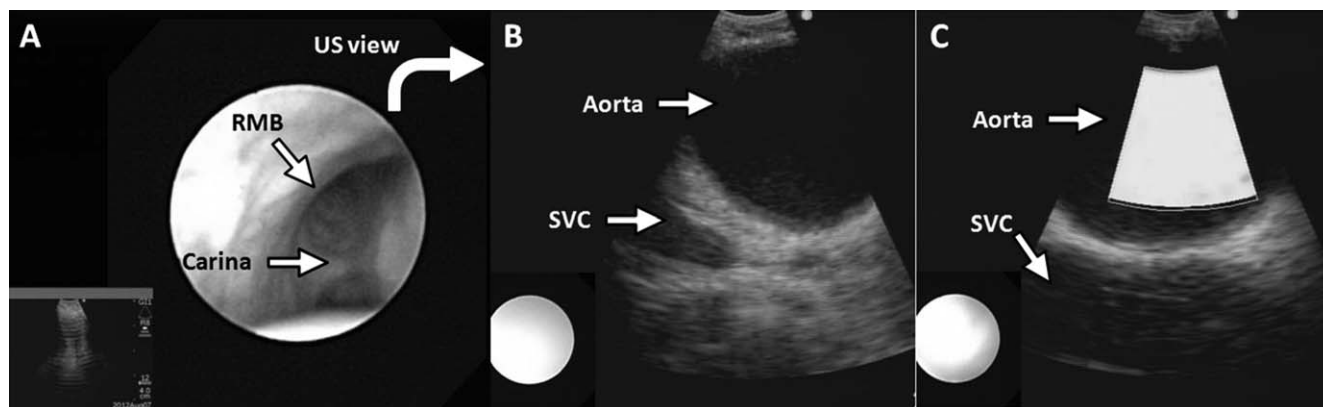


Figure 2. A: Bronchoscopic view illustrating the bronchoscope position and direction facing the lateral wall of the trachea above the right main bronchus (RMB) in which ultrasound view was obtained (curved arrow). B: Ultrasound (US) view showing a cut in the aortic arch out-layering the superior vena cava (SVC). C: Doppler ultrasound view confirming an active flow in the aorta that out-layered the SVC.

CONCLUSION

We present a case in which an EBUS established the finding of RAA with mediastinal lymphadenopathy. EBUS-TBNA was performed with no complications, emphasizing the importance of using EBUS in such cases of cardiovascular anomalies to prevent possible major complications related to blind TBNA, such as major blood vessel puncture, pneumothorax, pneumomediastinum, hemomediastinum, and hemo-pericardium.

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