Article published online: 2021-04-10

Case Report

Particle and Coil Arterial Embolization of Intralobar Sequestration for the Treatment of Hemoptysis and Chronic Productive Cough

Abstract

We present a case of a 33-year-old male who presented with hemoptysis for 12 days and productive cough for 6 months. Computed tomography and digital subtraction angiography showed an aberrant artery arising from the infradiaphragmatic aorta supplying the medial segment of the right lower lobe. Particle and coil arterial embolization of the aberrant artery resulted in complete resolution of hemoptysis and chronic cough at 1-year follow-up.

Keywords: *Aberrant artery, coil embolization, hemoptysis, intralobar sequestration*

Saud H. Alawad, Khalid F. Alkhamis, Tauqir Ahmed Rana[1], Shagran M. Binkhamis[2]

College of Medicine, King Saud University Medical City, [1]Department of Radiology, King Faisal Specialist Hospital and Research Center, [2]Department of Radiology, College of Medicine, King Saud University Medical City, Riyadh, Saudi Arabia

Introduction

Pulmonary sequestration is a rare congenital malformation accounting for 0.15%–6.4% of all congenital pulmonary malformations.[1] It is characterized by abnormal nonfunctional lung parenchyma being separated from the tracheobronchial tree receiving blood supply from systemic circulation.[2] Pulmonary sequestration is classified into two major types.[3] Intralobar type is enclosed by the normal pulmonary visceral pleura and presenting mainly in adults and older children as recurrent pneumonia. The other type is extralobar which is completely separated from any surrounding lung tissue by its own pleura presenting usually in early infant life.[3,4] The conventional management is resection of the sequestered lung tissue. However, coil embolization has been proven to be an effective definitive treatment for adults with intralobar type.[5]

Case Report

A 33-year-old male soldier presented to the emergency department with hemoptysis for 12 days. He had a history of productive cough for 6 months. He denied having shortness of breath, orthopnea, or chest pain. Preprocedure chest X-ray revealed no significant abnormality. Subsequent computed tomography (CT) scan revealed an enlarged, hypertrophic, torturous aberrant vessel arising from the infradiaphragmatic aorta adjacent to the celiac access supplying the medial basal segment of the right lower lobe with areas of ground-glass opacity consistent with pulmonary sequestration [Figure 1].

The patient refused any surgical options, and interventional radiology was consulted for possible embolization. The procedure was performed under moderate sedation through a right common femoral artery access. Selective arteriography was performed in several projections and demonstrated the enlarged, hypertrophic artery supplying the medial aspect of the right lower lobe which drains through the right inferior pulmonary vein. The venous drainage was seen after the parenchymal phase, suggesting no direct arterial venous shunt. The right phrenic artery arises from the proximal aspect of the artery [Figure 2a]. The distal portion of the artery near the diaphragm was then selectively catheterized using a microcatheter (Rebar 18, ev3, Irvine, CA, USA). Initially, we embolized the distal portions using one vial of polyvinyl alcohol (Boston Scientific, FL, USA) particles (500–700 μ) up to the level of pruning of the peripheral vessels. Following that, the distal to midportion of the artery at the level of its major branches was coil embolized using a total of four detachable densely packed coils (Axium coils, ev3, Irvine, CA, USA; one 10 mm × 30 cm, one 16 mm × 30 cm, and two 7 mm × 30 cm) with good anchoring into several branches. Postembolization

How to cite this article: Alawad SH, Alkhamis KF, Rana TA, Binkhamis SM. Particle and coil arterial embolization of intralobar sequestration for the treatment of hemoptysis and chronic productive cough. Arab J Intervent Radiol 2017;1:72-4.

Address for correspondence:
Dr. Shagran M. BinKhamis, Department of Radiology, King Saud University Medical City, P.O. Box 7805, Riyadh 11472, Saudi Arabia. E-mail: sbinkhamis@ksu.edu.sa

Access this article online

Website: www.arabjir.com

DOI: 10.4103/AJIR.AJIR_4_17

Quick Response Code:

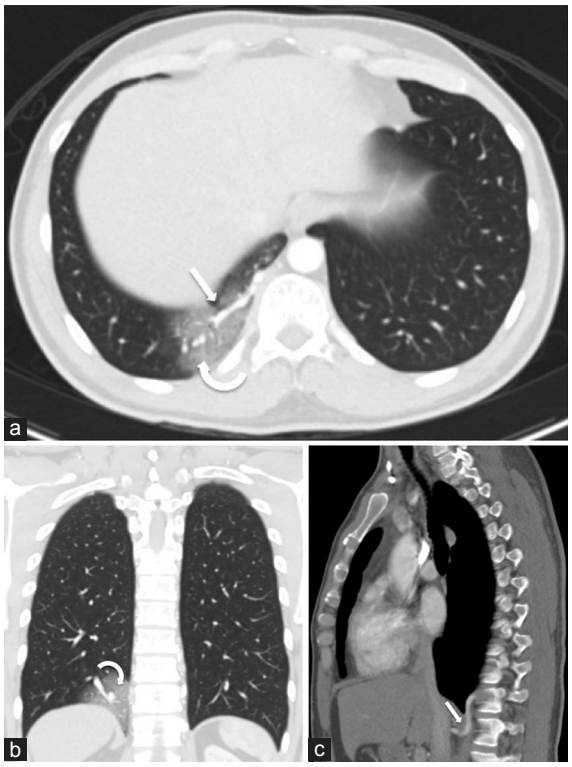

Figure 1: (a) Axial. (b) Coronal viewed in lung window. (c) Sagittal viewed in soft-tissue window showing an aberrant, tortuous, hypertrophied artery (straight arrows) supplying the medial segment of the right lower lobe with areas of ground-glass opacity (curved arrow)

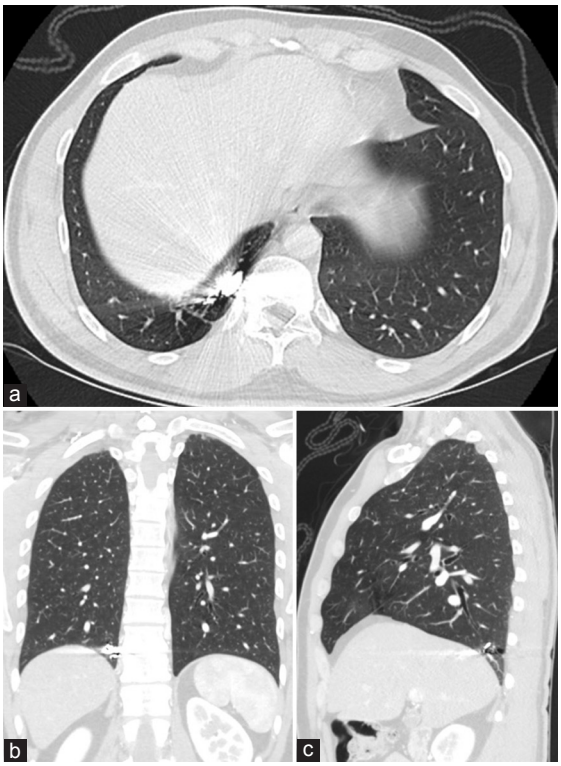

Figure 3: (a) Axial. (b) Coronal. (c) Sagittal showing almost complete resolution of the ground-glass opacity in the right lower. The patient was asymptomatic at this point

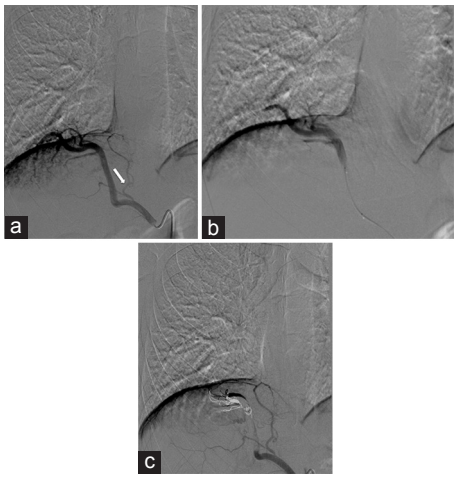

Figure 2: (a) Preembolization showing the aberrant artery supplying the medial segment of the right lower lobe with no direct venous shunting. Note the right inferior phrenic artery (straight arrow) arising from the proximal aspect of the artery. (b) Postparticulate embolization showing the absence of pulmonary parenchymal blush. (c) Final postcoil embolization showing complete occlusion of the aberrant artery with patency of the inferior phrenic artery

revealed good visual results with complete occlusion of the distal portion of the artery without further parenchymal opacification [Figure 2b].

Follow-up CT done 10 months later revealed significant decrease in the sequestered parenchyma with almost complete resolution of the ground-glass opacities [Figure 3]. Clinically, there was complete resolution of hemoptysis and no recurrence of chronic cough at 1-year follow-up.

Discussion

Pulmonary sequestration is a nonfunctioning lung tissue with an abnormal connection to the tracheobronchial tree and receiving systemic blood supply. It is a rare congenital disease that accounts for 0.15%–6.4% of all congenital pulmonary malformations.[2] Morphologically, pulmonary sequestration is divided into extralobar sequestration (ELS) and intralobar sequestration (ILS). ELS is characterized by having its own pleural envelop constituting 25% of all pulmonary sequestrations and is usually discovered in early 1st week of life whereas ILS is lying within the visceral pleura constituting 75% of all pulmonary sequestrations and is usually discovered in early adulthood.[3,4] In ILS, 73% of the arterial supply is from the thoracic aorta and 21% from the upper abdominal aorta, celiac trunk, or splenic artery. In majority of the cases, venous drainage is carried by pulmonary veins to the left atrium.[4] Patients with ILS usually present with chronic productive cough, mucopurulent sputum, and recurrent pneumonias. Chest pain, pleuritic pain, or asthma may also be the first presenting complaint. Hemoptysis is also a common symptom found in ILS patients.[3]

Coil embolization is considered to be an established less invasive treatment of pulmonary sequestration in the pediatric age group as it avoids surgical complications and results in shorter hospital stay.[2] Nevertheless, in the adult age group, surgical resection is the standard treatment.[6] In the pediatric age group, complete involution of the sequestered parenchyma has been reported frequently after endovascular treatments.[2,7,8] Still, such an approach can carry a greater benefit as a sole or an adjuvant treatment of pulmonary sequestration. The endovascular intervention before surgical resection plays a significant role as it makes the surgery safer by reducing the risk of intraoperative hemorrhage and aids in early identification of the aberrant artery.[6,9]

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Savic B, Birtel FJ, Tholen W, Funke HD, Knoche R. Lung sequestration: report of seven cases and review of 540 published cases. Thorax 1979;34:96-101.
2. Chien KJ, Huang TC, Lin CC, Lee CL, Hsieh KS, Weng KP. Early and late outcomes of coil embolization of pulmonary sequestration in children. Circ J 2009;73:938-42.
3. Frazier AA, Rosado de Christenson ML, Stocker JT, Templeton PA. Intralobar sequestration: radiologic-pathologic correlation. Radiographics 1997;17:725-45.
4. Felker RE, Tonkin IL. Imaging of pulmonary sequestration. AJR Am J Roentgenol 1990;154:241-9.
5. Ganeshan A, Freedman J, Hoey ET, Steyn R, Henderson J, Crowe PM. Transcatheter coil embolisation: a novel definitive treatment option for intralobar pulmonary sequestration. Heart Lung Circ 2010;19:561-5.
6. Aldosary B, Aljehani Y, Algubaisi N, Sabaah Y, Alkattan K. Management of adult intralobar pulmonary sequestration: A novel approach. Saudi J Med Med Sci 2014;2:49-51.
7. Leoncini G, Rossi UG, Ferro C, Chessa L. Endovascular treatment of pulmonary sequestration in adults using Amplatzer® vascular plugs. Interact Cardiovasc Thorac Surg 2011;12:98-100.
8. Ojha V, Samui PP, Dakshit D. Role of endovascular embolization in improving the quality of life in a patient suffering from complicated intralobar pulmonary sequestration - A case report. Respir Med Case Rep 2015;16:24-8.
9. Barua A, McPherson S, Chaudhuri N. Endovascular intervention in thoracic surgery. Asian Cardiovasc Thorac Ann 2015;23:722-5.