



# CT findings of anomalous systemic artery to the left lower lobe: Comparison with pulmonary sequestration in the left lower lobe



J. Qin<sup>a,c,\*</sup>, S.-H. Huang<sup>b,c</sup>, R.-H. Yan<sup>a</sup>, Y.-X. Dong<sup>a</sup>, H. Shan<sup>a</sup>

<sup>a</sup>Department of Radiology, The Third Affiliated Hospital of Sun Yat-sen University, Guangzhou, China

<sup>b</sup>Division of Cardiothoracic Surgery, The Third Affiliated Hospital of Sun Yat-sen University, Guangzhou, China

## ARTICLE INFORMATION

### Article history:

Received 22 March 2014

Received in revised form

4 August 2014

Accepted 7 August 2014

**AIM:** To analyse and compare CT findings of anomalous systemic artery to the left lower lobe (ASALL) and pulmonary sequestration (PS) in the left lower lobe (LLL).

**MATERIALS AND METHODS:** The present study cohort comprised 16 patients with ASALL and 25 patients with PS in the LLL confirmed by surgical and pathological findings. Medical records and CT images were reviewed retrospectively.

**RESULTS:** Cough and sputum were more common in PS (84% and 60%, respectively) than in ASALL (25% and 12.5%, respectively;  $p < 0.05$ ). Haemoptysis was more common in ASALL (100%) than in PS (24%;  $p < 0.05$ ). The frequency of ground-glass opacity (GGO), normal bronchial distribution, dilated left inferior pulmonary veins, and absence of the interlobar artery distal to the origin of the superior segmental artery in the LLL differed significantly between ASALL and PS. A mass was less common in ASALL (0%) than in PS (88%;  $p < 0.01$ ). The mean diameters of the anomalous artery ( $12.10 \pm 1.49$  mm) and left inferior pulmonary veins ( $13.20 \pm 2.19$  mm) in ASALL were significantly larger than those ( $6.73 \pm 2.59$  mm,  $10.04 \pm 1.55$  mm) in PS. The threshold diameters of the anomalous artery and left inferior pulmonary vein for ASALL were 9.75 and 11.75 mm, respectively. The presence of an anomalous artery arising from the thoracic aorta was not different between ASALL (100%) and PS (72%).

**CONCLUSION:** The following imaging features favour ASALL over PS in the LLL: a larger anomalous systemic artery arising from the thoracic aorta, dilated left inferior pulmonary veins, absence of the interlobar artery distal to the origin of the superior segmental artery, normal bronchial distribution, and GGO in the LLL.

© 2014 The Royal College of Radiologists. Published by Elsevier Ltd. All rights reserved.

## Introduction

Anomalous systemic artery to the left lower lobe (ASALL) in the absence of a normal pulmonary arterial

supply to left lower lobe (LLL) is a congenital anomaly with normal bronchial distribution.<sup>1</sup> ASALL is often confused with pulmonary sequestration (PS) in daily clinical practice.<sup>1,2</sup> PS is a mass of lung tissue separated from the tracheobronchial tree and supplied by an anomalous systemic artery, which accounts for up to 6.4% of all congenital pulmonary malformations and 1.1–1.8% of all pulmonary resections.<sup>3</sup> Extralobar PS and intralobar PS account for 14–25% and 75–86% cases of PS, respectively.<sup>3</sup> Although lobectomy or segmentectomy can be performed in most

\* Guarantor and correspondent. Department of Radiology, The Third Affiliated Hospital of Sun Yat-Sen University, Guangzhou, China. Tel.: +86 20 85253108.

E-mail address: [jason020@163.com](mailto:jason020@163.com) (J. Qin).

<sup>c</sup> J. Qin and S.-H. Huang contributed equally to this work.

cases of ASALLL and PS, other less invasive procedures, such as anastomosis between the anomalous artery and pulmonary artery, or embolization or ligation of the anomalous artery, can be performed in patients with ASALLL.<sup>4,5</sup> These procedures could shorten the hospitalization time.<sup>4–6</sup> Saida et al.<sup>6</sup> reported that satisfactory clinical results were obtained in patients after 6 years of observation. It is essential to distinguish ASALLL from PS because the outcome of ligation, anastomosis, and embolization was not different from that of lobectomy.<sup>4–6</sup> To the authors' knowledge, few studies have compared ASALLL and PS, and therefore, the present study was undertaken to analyse the CT and clinical findings of ASALLL and PS in the LLL.

## Materials and methods

### Patient population

The present retrospective study included 16 patients with ASALLL and 25 patients with PS in the LLL confirmed by pathological findings after surgery. The patients were 26 men (11 cases of ASALLL, 15 cases of PS) and 15 women (five cases of ASALLL, 10 cases of PS), and their ages ranged from 21–61 years (mean age  $23 \pm 5$  years in ASALLL and  $27 \pm 7$  years in PS). Forty-one patients were admitted to the Third Affiliated Hospital of Sun Yat-sen University for surgery. The patients were selected by a review of the medical records and came from a population of 857 patients who underwent lobectomy or segmentectomy at the Third Affiliated Hospital from January 2005 to December 2013. Of these 857 patients, 435 patients had documented lobectomy or segmentectomy of the lower lobe. Of these, 16 and 25 patients were diagnosed as ASALLL and PS, respectively. The symptoms in all patients completely resolved after surgery. No mortality was encountered. Ethics approval was waived for this retrospective study by the institutional ethics committee. Informed consent was obtained from all inpatients.

### CT data acquisition

Chest CT studies were obtained using a 320-detector CT system (Aquilion ONE; Toshiba Medical Systems, Ottawa, Japan;  $n = 29$ ) or a HiSpeed Advantage scanner (General Electric Medical Systems, Milwaukee, WI, USA;  $n = 12$ ). Imaging parameters were as follows: 120 kV, 160–250 mAs. The reconstructed section thickness and intersection interval were 3 mm. The routine chest CT images were obtained from the lung apices to the bases. The images were viewed on standard lung windows (level,  $-700$  HU; width, 1500 HU) and mediastinal windows (level, 40 HU; width, 400 HU). Iodinated non-ionic contrast medium (iopromide; 300 mg iodine/ml; Schering Pharmaceutical, Guangzhou, China) was administered at a rate of 2.5 ml/s with a mechanical injector. Multiplanar curve reconstructions (MCR), maximum intensity projection (MIP), and three-dimensional (3D) volume-rendered (VR) images were generated.

### Data analysis

The chest CT images and clinical findings were analysed in consensus by two experienced radiologists (J.Q. and Y.X.D. with 10 and 15 years of experience in chest imaging, respectively) individually. Chest pain, cough, sputum, fever, and haemoptysis were evaluated in all patients. CT images were assessed for the following patterns of abnormality: ground glass opacity (GGO) or mass, bronchial distribution, dilated left inferior pulmonary veins, absence of the interlobar artery distal to the origin of the superior segmental artery, origin and mean diameter of the anomalous artery. The diameter of the anomalous artery was measured at its origin. The pulmonary veins were measured based on the technique reported by Kim et al.<sup>7</sup> The short-axis diameter of the left inferior pulmonary vein was measured at a workstation using oblique reconstructions. The vein was measured at six locations, 5 mm apart, starting at the atrial ostium. Each measurement was performed three times by an experienced thoracic radiologist, and the mean value was recorded. The threshold diameters of the anomalous artery and left inferior pulmonary vein were assessed by receiver operating characteristic curve (ROC) analysis.

### Statistical analysis

The statistical software package SPSS version 20.0 for Windows was used for data analysis (SPSS, Chicago, IL, USA). Comparison of patient data between the two diseases was performed by using the *t*-test for continuous covariates, such as diameter, and by using Fisher's exact test for categorical variables, such as chest pain. Differences were considered to be significant when the *p*-value was  $<0.05$ .

## Results

### Clinical findings

The main symptoms in 16 cases of ASALLL and 25 cases of PS were cough, sputum, fever, and haemoptysis (Table 1). Recurrent cough and sputum were more common in PS (84% and 60%, respectively) than in ASALLL (25% and 12.5%, respectively) ( $p < 0.05$ ). There was a statistically significant difference in the occurrence of haemoptysis, having been seen in all 16 (100%) patients with ASALLL and six (24%) of 25 patients with PS ( $p < 0.05$ ). The frequency of chest pain, fever, and lack of symptoms in the two lung abnormalities showed no significant difference ( $p > 0.05$ ).

**Table 1**

Clinical findings of anomalous systemic artery to the left lower lobe (ASALLL) and pulmonary sequestration (PS) in the left lower lobe.

	Chest pain	Cough	Sputum	Fever	Haemoptysis	Lack of symptoms
ASALLL ( $n = 16$ )	0(0)	4(25)	2(12.5)	0(0)	16(100)	0(0)
PS ( $n = 25$ )	2(8)	21(84)	15(60)	8(32)	6(24)	3(12)
<i>p</i> -Value	1.00	$<0.01$	0.04	0.15	$<0.01$	0.56

Data are numbers of patients, and data in parentheses are percentages.

Download English Version:

<https://daneshyari.com/en/article/3981659>

Download Persian Version:

<https://daneshyari.com/article/3981659>

[Daneshyari.com](https://daneshyari.com)