Accessory cardiac bronchus
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Section: Chest imaging
Area of Interest: Thorax
Imaging Technique: CT
Case Type: Clinical Cases

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Patient: 62 years, male

Clinical History:
A 62-year-old man was admitted to our hospital with a parahilar mass in the anterior segment of the right upper lobe, proven to be lung adenocarcinoma after transthoracic biopsy. Staging CT demonstrated mediastinal invasion and contralateral metastatic nodules (stage T4N0M1a). The patient underwent radiotherapy and chemotherapy with partial response.

Imaging Findings:
During follow-up, the patient complained of recurrent haemoptysis and bronchoscopy revealed an accessory bronchial orifice containing blood residues that arose from the medial wall of the bronchus intermedius. CT demonstrated post-therapeutic findings, as well as an accessory cardiac bronchus (ACB) arising from the medial wall of the bronchus intermedius, progressing towards the mediastinum and ending as a blind diverticulum (Figs. 1-2). There was no lung tissue surrounding the bronchus. Virtual endobronchial view (Fig. 3) and 3D-volume rendering techniques (Fig. 4) assist in clearly depicting the anatomy of the bronchial tree.

ACB was considered to be the strongest contributor to the recurrent haemoptysis, mainly based on the optical bronchoscopy findings, but a concurrent role for the radiotherapy-induced inflammatory changes cannot be neglected, although its exact importance is difficult to ascertain. Due to the frail condition of the patient, only conservative measures were undertaken, and the episodes of haemoptysis ceased spontaneously after several weeks.

Discussion:
Anomalies of bronchial anatomy are diagnosed with increasing frequency as a result of improvements in modern imaging techniques and include abnormal origin, absent branches and supernumerary branches [1].

ACB is a rare congenital bronchial anomaly first described by Brock in 1946, with the frequency ranging from 0.09% to 0.5% in the general population [2, 3]. The ACB is a developmental aberration of bronchial branching, likely occurring between the 4th and 6th weeks of embryonic life. It is lined by endobronchial mucosa and, in distinction to acquired fistulas or diverticula, there are cartilaginous rings within its walls [4].

In most cases, an ACB is incidentally detected and characteristically arises from the medial wall of the proximal third of the bronchus intermedius, almost directly opposite to the origin of the right upper lobe bronchus and before the
origin of the superior segmental bronchus to the right lower lobe and of the middle lobe bronchus [1]. It may also arise directly from the right main bronchus in a small number of cases [2]. The bronchus then progresses caudally for 1-5 cm towards the pericardium, paralleling the bronchus intermedius. The length of the ACB is variable, ranging from a short, blind-ending bronchial stump to a longer branching structure in those cases in which a cuff of lung tissue is present [4]. An enhancing soft tissue mass around the tip of the bronchus corresponds to collapsed vestigial parenchyma [2].

The ACB is not recognised in plain chest radiographs, but may be demonstrated by bronchoscopy or CT. Although the CT imaging features of ACB have been reported infrequently, its characteristic location arising from the medial wall of the bronchus intermedius allows it to be recognised; multiplanar reformations, three-dimensional reconstructions or virtual endobronchial viewing may be of value in establishing the diagnosis [2, 5].

Rarely, an ACB can become symptomatic through recurrent infections and haemoptysis (occasionally massive). These symptoms arise from the accumulation of secretions in the ACB, leading to inflammation, hypermicrovascularisation, and haemoptysis. This is especially the case when the ACB is long or has an accessory lobe. However, due to the low incidence of this anomaly, and the even lower incidence of associated clinical manifestations, recognition is a challenge [3, 5]. Failure to recognise the characteristic imaging features of ACB may result in delayed diagnosis and postponement of adequate treatment, including surgical resection when symptomatic [6].

**Differential Diagnosis List:** Accessory cardiac bronchus, Acquired bronchial fistula, Traction diverticulum, Mucus strands in the bronchus intermedius (2D cross-sectional imaging)

**Final Diagnosis:** Accessory cardiac bronchus

**References:**


**Figure 1**

Description: Image at the level of the proximal third of the bronchus intermedius shows an anomalous bronchus (arrow) arising from the medial wall. **Origin:**
**Description:** Slightly below 1a. Sequential CT images show the accessory bronchus progressing caudally towards the mediastinum.

**Origin:**
**Description:** Slightly below 1b. Post-therapeutic findings are also seen in the RUL and superior segment of the RLL, with multiple subsegmental atelectases, traction bronchiectases and pleural thickening. **Origin:**
**Description:** Slightly below 1e.
The accessory bronchus ends as a blind diverticulum (arrow) and is no longer seen. **Origin:**
**Description:** Coronal CT image shows to better advantage the position of the accessory cardiac bronchus (arrow) in the bronchial tree and its relation with the medial wall of the proximal third of the bronchus intermedius. **Origin:**
Description: Virtual endobronchial view shows the accessory cardiac bronchus (left) separated by a spur (arrow) from the middle part of the bronchus intermedius; the origin of the RUL bronchus (right) is also seen. Origin:
Description: Three-dimensional volume rendering image in the coronal plane clearly depicts the origin of the accessory cardiac bronchus from the medial wall of the bronchus intermedius, almost directly opposite to the origin of the RUL bronchus. Origin: