

Case report

Calcium within a bronchogenic cyst with a fluid level

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Abstract. A 38-year-old man presented with a bronchogenic cyst which showed a high calcium content. The calcium precipitate layered in the dependent part of the cyst to form a fluid level. The CT and MRI findings of this rare case are discussed.

Bronchogenic cysts are developmental anomalies of the bronchopulmonary foregut. They are frequently located in the mediastinum along the tracheobronchial tree, most commonly near the carina. Bronchogenic cysts account for about 40–50% of all congenital cysts of the mediastinum [1–3]. It has been established that fluid within these cysts sometimes has a high calcium content [4, 5]. Radiologically, bronchogenic cysts rarely show fluid–fluid levels [4–7] and the dependent fluid within the cyst, more rarely still, has a high calcium content [5]. We present the radiological findings of a mediastinal bronchogenic cyst showing a fluid level, the dependent layered portion of which contained a large amount of calcium. This is the first report of CT and MRI findings in this condition.

Case report

A 38-year-old man presented with vague chest pain. Posteroanterior and left lateral chest radiographs showed a mediastinal mass containing a fluid level, the dependent portion of which was radio-opaque (Figure 1). CT displayed a mass with smooth margins, situated at the aortopulmonary window, extending to the left perihilar region and measuring approximately 7 × 6 × 5 cm (Figure 2). The mass contained dense fluid (approximately 54 Hounsfield units) with a much denser component (approximately 445 Hounsfield units) which layered to its dependent portion in supine, left lateral decubitus and prone positions (Figure 2). On MRI, both T_1 and T_2 weighted sequences showed most of the cyst contents to be hyperintense, whereas the dependent fluid within the mass was of intermediate intensity on T_1 weighing and markedly hypointense on T_2 weighted images (Figure 3).

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12 ml of light brown, viscous fluid was obtained on transbronchial needle aspiration of the cyst. Chemical analysis of the aspirate yielded high amounts of calcium (39.7 mg dl⁻¹, approximately four times the average level of serum calcium), cholesterol (1473 mg dl⁻¹), glucose (264 mg dl⁻¹) and protein (2.2 g dl⁻¹). Microscopic examination of the aspirate did not reveal any blood cells. No microorganisms grew on cultures of the cyst fluid.

Discussion

Bronchogenic cysts result from separation of an aberrant bud from the tracheobronchial tree between the 26th and 40th days of intrauterine life [3]. Their thin walls are lined with respiratory epithelium. As in our case, mediastinal bronchogenic cysts typically become large without causing significant symptoms, and are often an incidental finding on routine chest radiographs, appearing as well-circumscribed masses near the carina. Bronchogenic cysts are typically of low attenuation on CT, while MRI shows them as hypointense on T_1 weighted images and markedly hyperintense on T_2 weighted images [4]. These imaging characteristics represent a cyst content in the range of serous fluid. However, bronchogenic cysts commonly have high CT numbers [8, 9]. This is attributed to the presence of mucoid material or calcium within the cyst [4, 8, 9]. Infection of the cyst, which was not present in our case, may also contribute to the relatively high attenuation. A significant portion of the contents of the mediastinal cyst in our patient had a high CT number (50–60 Hounsfield units), probably reflecting the high levels of cholesterol and protein which were subsequently detected in the chemical analysis.

Moreover, this cyst displayed a fluid level, the dependent portion of which had a very high CT attenuation of 440–450 Hounsfield units. This is attributable to a colloidal suspension of calcium crystals, confirmed by the high amount of calcium

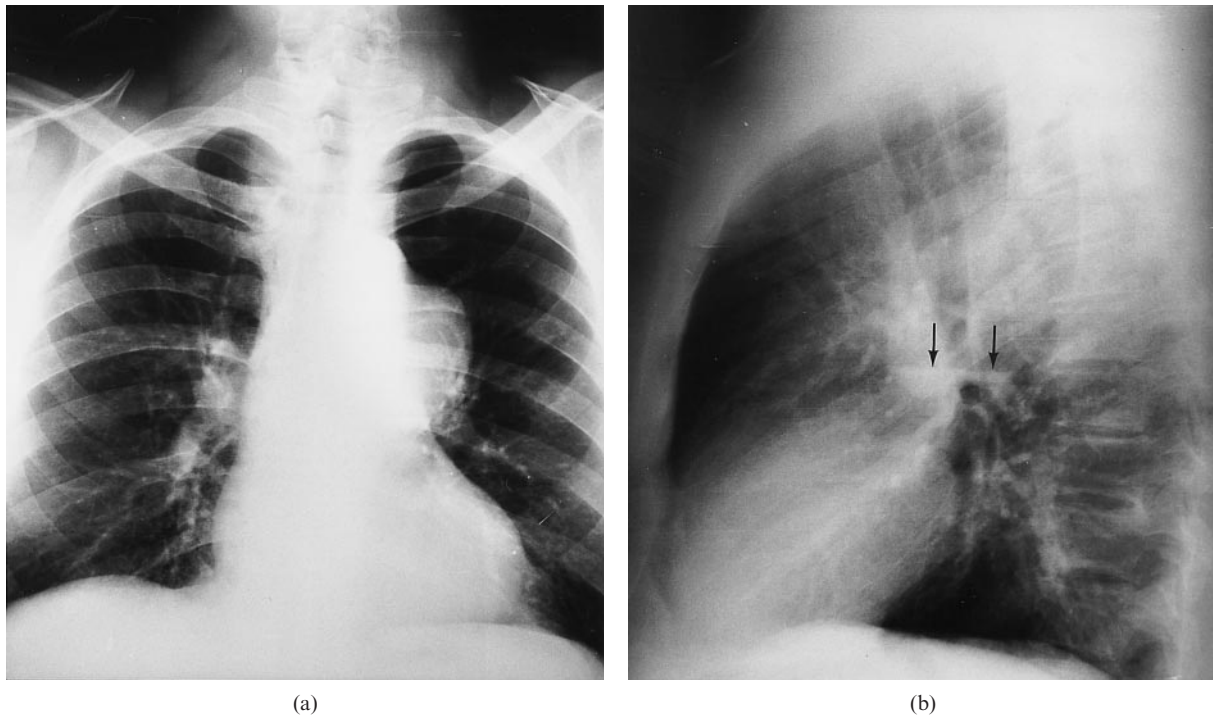


Figure 1. Posteroanterior (a) and left lateral (b) chest radiographs show the left sided mediastinal mass with a fluid level (arrows).

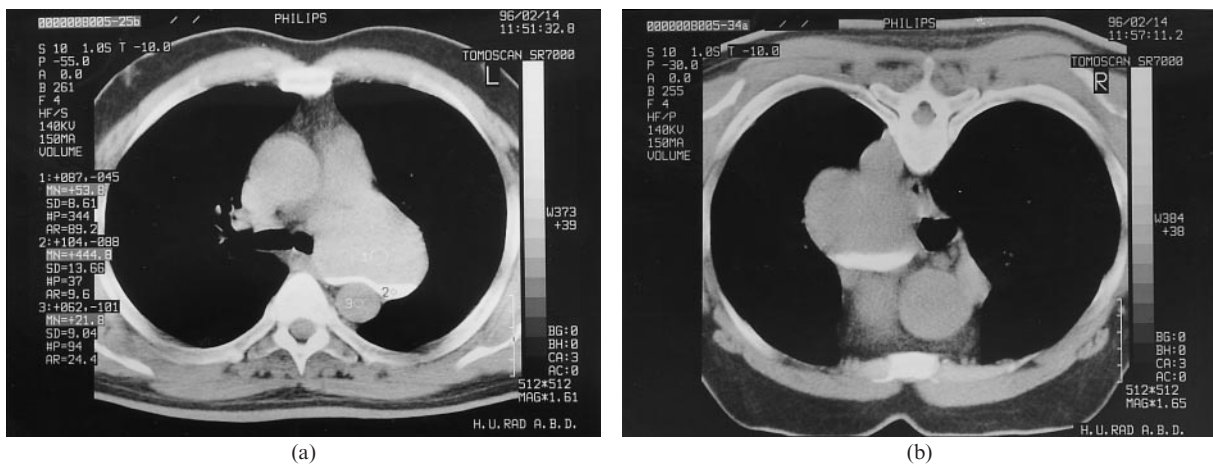


Figure 2. Transverse CT images in supine (a) and prone (b) positions display the mediastinal cyst within which a denser fluid component gravitated to the dependent side.

in the chemical analysis of the cyst fluid [4]. Calcium in the fluid of a mediastinal bronchogenic cyst was first reported in 1965, with radiographic findings very similar to those in our case, although there was no chemical analysis of the cyst fluid as in the present case [5]. The mechanism of calcium accumulation in a bronchogenic cyst is uncertain, although a mucoid fluid containing calcium may be secreted from the epithelium lining the cyst wall [4]. Ours is the first reported case to display a fluid level with a very dense precipitate layer on CT. There has been a report of a mediastinal bronchogenic cyst with a high CT number in which chemical analysis of the cyst fluid revealed the

presence of calcium [4], although the cyst was homogenous at CT and no fluid level was detected.

Fluid levels in bronchogenic cysts have previously been described on MRI in two cases in whom, unlike in our case, the dependent fluid layer was hyperintense compared with the overlying layer, especially on T_1 weighted sequences and was presumably due to proteinaceous material [6, 7]. The high protein and cholesterol content is probably the cause of high signal intensity from the upper layer within the cyst in our patient. Bronchogenic cysts with shorter T_1 relaxation times are being reported with increasing frequency [10]. Our case also shows that the calcium suspension

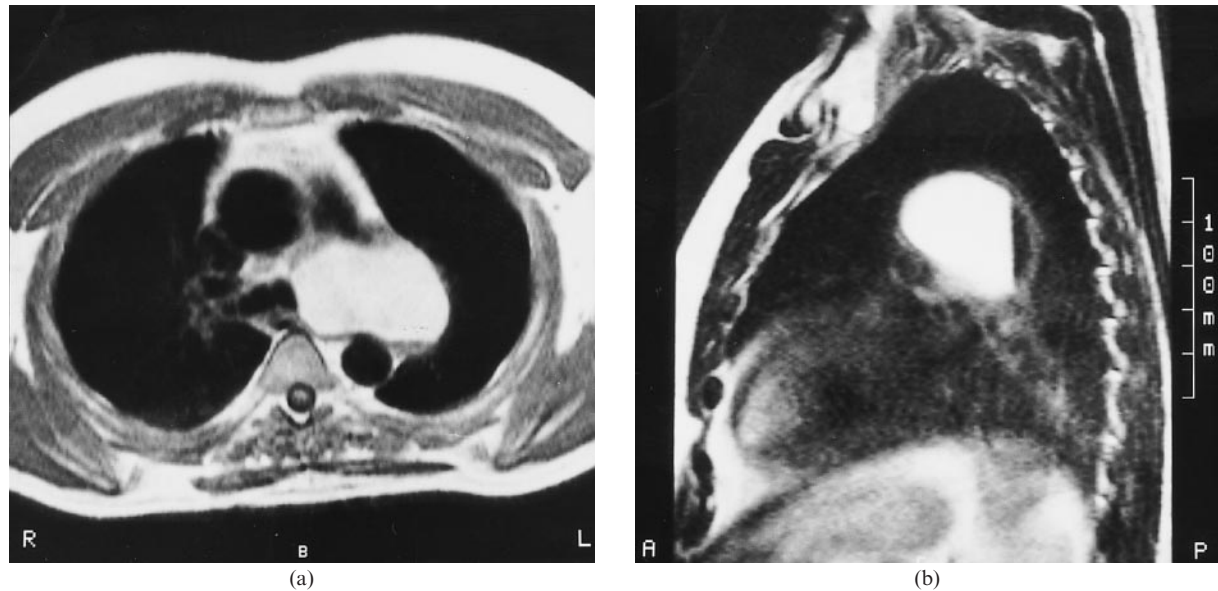


Figure 3. Most of the cyst fluid is hyperintense on transverse T_1 weighted spin echo (a) and sagittal T_2 weighted fast spin echo (b) MR images, while the gravitating fluid component is of intermediate intensity on T_1 weighted and markedly hypointense on T_2 weighted imaging.

within a bronchogenic cyst has distinct MRI features, *i.e.* intermediate intensity on T_1 weighted sequences and marked hypointensity on T_2 weighted images.

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