Key words: bronchogenic cyst, intradiaphragmatic calcification, computerized tomography.

Bronchogenic cysts are usually located in the mediastinum or lung parenchyma, but infrequently may be intradiaphragmatic or entirely below the diaphragm. We report an unusual case of bronchogenic cyst in the left hemidiaphragm without connection to any other structure and describe the imaging findings on chest roentgenogram and computerized tomography (CT).

**Case Report**

A 34-year-old man was referred to our hospital due to the incidental discovery of a left posterior mediastinal mass on chest roentgenogram during a routine physical check-up. Medical history, physical examination, and routine laboratory tests were unremarkable. Upper gastrointestinal barium study was normal.

Posteroanterior chest roentgenogram revealed a smooth, well-circumscribed, bulging mass over the mediastinal region (Fig. 1). The lateral projection showed a posterior location of the mass. Non-enhanced chest CT showed a 4 x 5 x 7 cm smooth, well-defined, homogeneous mass of soft-tissue density (61 Hounsfield units, HU) in the left posterior mediastinal region. The mass, which contained multiple linear and nodular calcifications along the...
Intradiaphragmatic Bronchogenic Cyst

Discussion

Bronchogenic cysts result from separation of an aberrant bud from the tracheobronchial tree between the 26th and 40th days of intrauterine life [1]. They are frequently located in the mediastinum or lung parenchyma. When complete separation from the primitive foregut occurs, a cyst may migrate to an atypical location, such as the skin or parasternal subcutaneous tissue, pericardium, abdominal cavity, or diaphragm [2–5].

Intradiaphragmatic bronchogenic cysts are exceedingly rare and only 13 cases have been reported [2, 6, 7]. Intradiaphragmatic and subdiaphragmatic cysts are thought to be the result of envelopment of the cysts by the growing pleuropertitoneal membranes at the time of closure of the pericardio-peritoneal canal [2, 3]. Men and women are equally involved, as are the right and left hemidiaphragm. Symptoms are frequently nonspecific, although epigastric pain is the most common clinical presentation [7].

Imaging findings of intradiaphragmatic bronchogenic cyst from chest roentgenogram, sonography, CT, and magnetic resonance (MR) imaging have rarely been described (Table). Among the three reported cases with imaging findings, one underwent chest roentgenography, which failed to show the lesion [6]. In our patient, chest roentgenography showed a smooth, well-circumscribed, bulging mass over the medial aspect of the left lower posterior hemithorax. On abdominal sonograms in three previously reported cases, the lesion presented as a well-defined, hypoechoic solid mass or cystic lesion [2, 6, 7]. Non-enhanced CT showed a well-defined, homogeneous, soft-tissue or fluid density mass with wall calcification in all three cases. Our patient showed similar CT findings with a density of 61 HU before contrast administration. The lesion was not enhanced after contrast administration, suggesting a cystic component. Abdominal MR imaging study in a previous case report showed that the mass was of intermediate signal on T1-weighted images and very high signal intensity on T2-weighted images [2]. Typical imaging findings of an intradiaphragmatic bronchogenic cyst include smooth margin, homogeneous soft-tissue density, or cystic mass and punctate calcifications.

Cystic lesions of the diaphragm are rare [2]. The differential diagnosis of intradiaphragmatic cyst includes congenital and acquired cysts. Types of congeni-
Table. Chest roentgenography, sonographic, computerized tomography (CT), and magnetic resonance (MR) imaging findings in patients with intradiaphragmatic bronchogenic cyst

<table>
<thead>
<tr>
<th>Author/Year</th>
<th>Chest roentgenogram</th>
<th>Sonography</th>
<th>CT</th>
<th>MR imaging (signal intensity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rozenblit/ 1998 [2]</td>
<td>NA</td>
<td>Hypoechoic lesion</td>
<td>Well-defined, soft-tissue density mass (42 HU) with calcification</td>
<td>T1: intermediate signal; T2: very high signal</td>
</tr>
<tr>
<td>Dagenais/ 1995 [6]</td>
<td>No gross abnormality</td>
<td>Hypoechoic solid mass</td>
<td>Well-defined, probably solid mass with calcification</td>
<td>NA</td>
</tr>
<tr>
<td>Hoang/ 1999 [7]</td>
<td>NA</td>
<td>Hypoechoic cyst</td>
<td>Well-defined, cystic mass (32 HU)</td>
<td>NA</td>
</tr>
<tr>
<td>Liou/ current</td>
<td>Small, well-circumscribed, bulging mass</td>
<td>NA</td>
<td>Well-defined, homogeneous, soft-tissue density mass (61 HU) with calcification and without contrast enhancement</td>
<td>NA</td>
</tr>
</tbody>
</table>

NA = not available; HU = Hounsfield units.

tal cyst include cystic teratoma, cystic pulmonary sequestration, and mesenchymal (mesothelial-lined) cysts. Acquired cysts include simple cysts, post-traumatic cysts, hydatid cysts, fibroblast-lined cysts, and cystic endometriosis. In our patient, because the cystic lesion was in contact with the esophagogastric junction on CT scan, the differential diagnosis should include cystic lesions arising from the esophagogastric junction, such as esophageal duplication cysts, enteric cysts, and pancreatic pseudocyst.

In our patient, the lesion showed punctate calcifications and a homogeneous density of about 61 HU, which was significantly higher than water on non-enhanced CT. The lesion showed no enhancement after contrast administration, suggesting it to be cystic [8]. Bronchogenic cysts are usually filled with viscous mucoid materials, with CT attenuation values from 0 to more than 100 HU, that may mimic soft tissue mass [9].

Although bronchogenic cysts are almost invariably benign, surgical excision is indicated to establish diagnosis, alleviate any symptoms, and to prevent complications such as inflammation, infection, compression of adjacent structures, and intracystic carcinoma and fibrosarcoma [2, 7, 10]. The prognosis after surgical excision is excellent.

In summary, intradiaphragmatic cystic lesions are difficult to demonstrate on axial views using any imaging modality because the diaphragm is a thin and curved structure, which causes any mass lesion to protrude toward either the thoracic or abdominal cavity. Intradiaphragmatic bronchogenic cyst should be included in the differential diagnosis of a cystic mass bulging from the diaphragm, especially in masses that blend with the diaphragm and can be well seen anteriorly and posteriorly to the lesion, suggesting an intradiaphragmatic location.

References