Chondroma of the Diaphragm — Report of a Case

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Summary
A rare case of chondroma of the diaphragm is reported. The patient was a 23-year-old female who had had recurrent upper abdominal pain for 4 years. Her symptoms and physical findings on admission suggested an intra-abdominal tumor. Roentgenological study disclosed a mass with a thick calcified wall in the upper abdomen. Laparoscopy revealed a multinodular white mass protruding from the left hemidiaphragm. The mass was surgically enucleated from the diaphragm. The resected tumor had a thick, calcified wall and a narrow lumen containing colorless fluid. Microscopic examination disclosed a hyaline chondroid matrix with mature chondrocytes, as well as extensive ossification.

Primary tumor of the diaphragm is an uncommon disease. Only one case of chondroma of the diaphragm has been reported in the literature. Laparoscopy was useful in confirming the tumor’s location and in speculating on its nature.

Key words
Laparoscopy — Chondroma — Diaphragm

Case report
A 23-year-old female was admitted to the Tokai University Tokyo Hospital with recurrent upper abdominal pain. The onset of her symptom had been 4 years previously, when she had experienced vague epigastric pain. She visited a local medical doctor and was told that she had a calcified abdominal mass. From that time onward she frequently suffered from upper abdominal pain that radiated to the left chest wall. The pain became worse with movement, deep inspiration, and changes in position. She continued to have a normal appetite, and her weight was stable over these years. The pain, however, gradually worsened recently over a period of several months. Her past history was negative, and her family history was not contributory. She denied alcohol abuse. On admission she was neither anemic nor jaundiced; no skin rash was noted. There was no cervical lymphadenopathy. Physical examination of the chest showed no significant abnormality. The abdomen was soft and flat. Bowel movements were normoactive. A firm, tender, fist-sized mass was palpable in the epigastrium. It was not clear where the mass was located within the abdominal cavity, as even gentle palpation of her abdominal wall brought on muscle guarding. Neither the liver nor the spleen were palpable, and there was no peripheral edema.

A roentgenograph of the abdomen taken 4 years previously had disclosed a localized calcification in the upper abdomen (Fig. 1). The calcification was multiloculated, and its outer margin showed a thick calcified wall. A plain x-ray film obtained on admission to our hospital showed a similar calcification at the same site in the upper abdomen. It was also similar in size, but the calcification was denser and the wall was thicker. Admission laboratory data showed absence of inflammatory reaction. Several tumor markers were all negative, and a serological test for echinococcus was also negative. Tomography of the chest disclosed no significant abnormality of lung architecture. A computed tomography of the upper abdomen disclosed a calcified mass that was attached to the left lobe of the liver (Fig. 2). The lumen of this mass showed a fluid density. It was not clear, however, whether this mass lesion was located in the liver or extrahepatically adjacent to the liver. Upper GI endoscopy showed no significant abnormality.

Laparoscopy revealed a multinodular white mass protruding from the left hemidiaphragm (Fig. 3). The surface of the mass was covered with peritoneum and a thin muscle of the diaphragm. No definite proliferation of abnormal vessels was noted. The mass was completely separate from the liver surface, and an area of depression was noted at the surface of the left lobe of the liver where the mass was (Fig. 4). Even gentle touching of the mass with a probe produced pain similar to that complained of.

A laparotomy was performed, and a large tumor was found to be protruding from the diaphragm. The tumor was covered with a muscle of the diaphragm, but could readily be peeled off. No daughter lesion was found. The tumor was enucleated and the diaphragm sutured. The patient experienced an uneventful postoperative course.

The resected tumor measured (8 x 5 x 5 cm). The gross appearance of the tumor was that of a lobulated white mass. A cut through the tumor showed a thick, hard wall with calcification (Fig. 5). There was a small amount of colorless fluid in the lumen of the
tumor. Histologically, the lesion showed confluent lobules in a hyaline chondroid matrix, with mature chondrocytes accompanied by extensive ossification (Fig. 6). No malignant features were observed.

**Discussion**

The unusual site of the tumor caused some difficulties in the diagnosis. As roentgenological studies, including computed tomography, failed to show the exact location of the calcified tumor, a laparoscopy was performed. It showed that the tumor was not located in the liver or in any other abdominal organ. The laparoscopic appearance of the tumor, which was observed through extended muscles of the diaphragm, strongly suggested that the location of the tumor was not in the pleural cavity, but in the diaphragm. Reported cases of primary diaphragmatic tumor are equally distributed between males and females, and the tumors occur in a wide range of ages. The ratio of benign tumors to malignant neoplasms is 2:1. Among benign tumors, cysts (mainly bronchogenic) and lipomas are most frequently encountered. Most malignant neoplasms in the diaphragm are fibrosarcomas. About 80% of the patients with primary diaphragmatic tumor had some kind of symptoms, regardless of the degree of malignancy of the tumor. The patients frequently complained of chest pain, abdominal pain, and occasionally of shoulder pain (6). In this case, epigastric pain had been noted for a long while, with a gradual increase in intensity, the pain mimicked that found in intra-abdominal diseases. Diagnosis of the tumor of the diaphragm is usually accomplished by roentgenological studies of the chest, which will show a localized convexity of the diaphragm. Bronchography is also useful to differentiate the tumor from lung tumor. In this case, however, the tumor pro-
traded into the peritoneal cavity instead of the pleural cavity, probably because of its greater weight due to ossification. On the roentgenograph, the tumor appeared to be in the peritoneal cavity. This is why laparoscopy was very useful in confirming the location and nature of the tumor. The procedure is also helpful for surgical treatment.

Soft tissue chondroma arises predominantly in the hand and foot. It is most often found as a slowly growing hard tender mass in the finger. As the site of the tumor is often in the extremities, it can be easily found and treated. In rare cases, chondroma of the tongue (5) and the cheek (2) are reported. But chondroma of the diaphragm is extremely rare, and only one case of chondroma arising from the diaphragm has been reported in the literature (3). Usually, soft tissue chondroma is closely associated with tendons, tendon sheaths, periostea or joint capsules. So tendons or tendon sheaths in the diaphragm are the most probable site of origin in this patient.

Fig. 5 Cut surface of the resected tumor. Thick calcified wall and colorless fluid in the lumen were noted

Fig. 6 Histological findings of the tumor showed a hyaline chondroid matrix, with mature chondrocytes enclosed by ossification

References

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