Diaphragmatic Hernia Associated with Accessory Lung*

Report of Three Cases

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Since Rokitansky* described the first case of accessory lung in 1861 there have been a number of patients reported, although the finding is still considered rare. In subsequent years various authors8,1,12,13 have emphasized the association of diaphragmatic hernia in a significant percentage of these persons. We have three patients in whom these anomalies were associated.

**Case Reports**

**Case 1**

S.I., 26-month-old boy, was admitted to another hospital in February, 1959 because of recurrent bronchitis. An x-ray film disclosed an elevation of the right diaphragm and two round shadows in the base of the right lung. Eosinophilia of 27 per cent and a weakly positive Casoni test were present. The child was transferred to Tel-Hashomer Hospital for surgical treatment with a tentative diagnosis of echinococcosis of lung. He was in good general condition. Dullness to percussion on the right side of the chest and diminished breath sounds were the only physical findings. X-ray film examination revealed a large shadow at the base of the right lung. A smaller shadow was noted above the large one (Fig. 1).

On April 19, 1959 right thoracotomy revealed the following: (a) two egg-sized masses were palpated in the basal medial segment of the lower lobe. The masses contained purulent yellow viscid fluid. (b) A hard triangular shaped mass 4 cm. x 2 cm. was found in the mediastinum. Small blood vessels ran through a pedicle to this mass. The anatomic relationship of these vessels could not be determined. (c) The diaphragm was thinned and almost without muscular fibers. It was pushed by the liver high into the hemithorax. The right lower lobe and the above-mentioned triangular mass were excised and the diaphragm repaired by suture in two layers. The postoperative course was uneventful.

Severe bronchiectatic changes were found in the lower lobe, most marked in the basal segments. On microscopic examination, the triangular mass was composed of many cavities surrounded by loose connective tissue rich in blood and lymphatic vessels. The smaller cavities were similar to alveoli and were disposed around larger ones, which resembled bronchi. The former were lined by a discontinuous layer of cuboid or flattened epithelial cells, the latter by an almost continuous layer of cylindrical cells, many of which were ciliated. The epithelial layer was surrounded by a layer of connective tissue and a few smooth muscle fibers. Two small islands of cartilaginous tissue were found in the wall of the largest cavity. Numerous desquamated cells, macrophages and mucoid material were found in the lumen of these cysts. The loose connective tissue between the cysts was remarkable for the presence of a number of dilated lymphatic vessels.

**Case 2**

G.S., three and one-half-month-old girl, one of twins, was admitted to another hospital because of severe vomiting after meals, which began at two weeks of age. A diaphragmatic hernia was diagnosed. After failure of nonoperative therapy to improve her condition, the infant was transferred to Tel-Hashomer Hospital for surgery. She was in poor general condition and her weight was 3 kg. Shortness of breath and seizures of coughing were prominent findings. Dullness over

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The left hemithorax was found. On x-ray film examination, the stomach and a part of intestine were seen in the left thoracic cavity, displacing the heart and the mediastinum to the right (Fig. 2).

On September 15, 1960, laparotomy revealed a large defect in the diaphragm between the edges of the crura and the lateral costal arch. The stomach, transverse colon and the left lobe of the liver protruded through this defect into the thoracic cavity. The defect was thought to be a Bochdalek-type of diaphragmatic hernia. The lung could not be seen through the defect. The organs were replaced into the abdominal cavity and the diaphragm was repaired in two layers. Immediately after the operation, left pneumothorax was found. After aspiration of air from the pleural cavity normal breath sounds reappeared. However, on lateral x-ray film an ovoid cystic structure was seen, which was assumed to be an air-containing cyst. The cyst diminished in size. The child put on weight and was discharged in excellent condition. She was readmitted a few days later with symptoms of intestinal obstruction. After an unsuccessful trial of conservative treatment, the abdomen was reopened and the intestines freed of adhesions. The postoperative course was complicated on the fifth day by disruption of the wound. Disruption recurred three times despite closure with wire sutures. Two days after the last disruption, the child expired.

There was purulent generalized peritonitis. On opening the thorax, the anterolateral part of the left diaphragm was found to be a thin aponeurotic empty sac covered by a smooth parietal pleura. The inferior (abdominal) part of the sac was closed by interrupted sutures. The other zones of diaphragm were unremarkable.

A triangular mass 3 cm. x 4 cm. completely covered by pleura was discovered in the base of the left pleural cavity. The mass was attached to the posterior part of the diaphragm by a long and thin pedicle. There was no obvious relationship between the pedicle and the diaphragmatic defect. Dissection of the pedicle revealed a 6 cm. long artery. The artery took origin from the abdominal aorta at a point near the celiac artery and crossed the diaphragm posterior to and far from the relaxed part of the diaphragm. Veins could not be dissected out in the pedicle (Figs. 3 and 4). On microscopic examination the triangular mass revealed a striking similarity to the mass found in the first case.

![Figure 2: Preoperative barium examination of upper gastrointestinal tract.](image1)

![Figure 3: Accessory lung in situ. 1. Accessory lung; 2. Atypical vessel; 3. Aorta; 4. Diaphragmatic defect (relaxation).](image2)
CASE 3

K.A., a man, 53 years old. Routine examination demonstrated a large shadow in the base of the left lung, close to the diaphragm. X-ray film examination with pneumoperitoneum showed the shadow to be above the diaphragm. Casoni and Weinberg tests were negative as were all routine examinations of blood and urine. At thoracotomy on January 1, 1961, the latero-posterior part of the diaphragm was found to be weakened and protruded into the chest. Upon opening this protrusion the mass within it was identified as the left kidney. A cut across the layers of this pleura-covered membrane revealed escaping mucus. No viscus or cyst could be found to explain this finding. Two pieces of this mucus-secreting tissue (thought at operation to be diaphragm) were excised for examination. This part of the "diaphragm" was repaired by suture in two layers. The chest was drained and closed. A postoperative intravenous pyelogram revealed no obstruction to excretion on both sides. The patient was discharged nine days after the operation. The histologic examination of the excised tissue revealed the presence of accessory lung tissue only. No muscular structures could be identified.

DISCUSSION

The above reported cases of accessory lung were associated with defects of the diaphragm. The association of these two anomalies does not seem to be a casual finding, as the occurrence of three cases in a short time and the reports of other authors establish well the association between the two anomalies. It is assumed that the two anomalies are causally related.

On the basis of the present information it cannot be decided if the one anomaly is responsible for the presence of the other, or if there is a common cause for both. The notion that traction of an atypical vessel is a common cause of both anomalies does not seem to be justified. Dissection of the atypical vessel in case number 2 showed that it traversed the fibers of the diaphragm along the posterior chest wall in a region where the diaphragm appeared normal. The defect in the diaphragm was found in a distant place from the vessel. The absence of the relationship between the pedicle of the accessory lung and the diaphragmatic defect was also shown in Talalak's third case (Arch. Dis. Child., 35:57, 1960). It is improbable that traction of a vessel could produce a defect in a region which is distant from the vessel. It seems that further anatomic studies of new cases are necessary.
We would like to stress the special type of the associated diaphragmatic defect which was found to be present in our cases. In two of them a part of the dome of the diaphragm was elevated, thinned and its muscles replaced by a thin aponeurotic membrane. A similar finding was already pointed out by Bergman.

There is clinical significance to these associated findings for the surgeon who uncovers this finding unknowingly during surgery for diaphragmatic hernia is likely to fall into technical difficulties following an inadvertent injury to the atypical vessel."

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REFERENCES

TOPICAL DIAGNOSIS OF MYOCARDIAL INFARCTION

The author carried out a comparative study of vector and electrocardiographic data in 80 patients in whom 38 had sustained myocardial infarction of the anterior wall and 22 myocardial infarction of the posterior wall of the left ventricle. The investigations disclosed that in the differential diagnosis of posterior diaphragmatic and posteriolateral infarctions, vectorcardiography affords more distinct criteria than electrocardiography. Vectorcardiographic changes in the aforementioned localizations of myocardial infarction prove to be more stable than electrocardiographic alterations. In the topical diagnosis of myocardial infarctions of the anterior wall, the advantages of the electrocardiographic method were quite obvious.