Congenital Diaphragmatic Hernia with Pleural Hydrocele*

Report of a Case

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Developmental defects of the diaphragm are not rare. Herniation of abdominal viscera through embryologic defects almost always requires immediate surgical intervention. The elements of the intestinal tract and other solid abdominal organs which occupy the left thoracic cavity prevent proper expansion of the lung. Intestinal gas begins to accumulate and the venous return to the heart is compromised by the ever-increasing shift of the mediastinum of the unaffected side. The viscera protrude through the diaphragmatic defect and lie in the chest without being enclosed in a hernia sac.

The case to be presented is of particular interest in that the stomach had herniated through a congenital defect of the dome of the diaphragm and was enclosed by a well-formed hernia sac. A large fluid-filled cystic mass lay superiorly and joined the uppermost part of the true hernia sac in exactly the same fashion that exists in an inguinal hernia accompanied by a hydrocele.

Case Report

A baby girl was born in April, 1962 after normal gestation. Shortly before birth, fetal bradycardia (80 per minute) was noted and the child was delivered approximately 11 minutes later. At birth, she was severely depressed, had poor respiratory movements and quickly became cyanotic. Endotrachial intubation was accomplished, the tracheobronchial tree was suctioned to remove bronchial secretions, and oxygen was delivered into the lungs under pressure. Shortly thereafter the child began to breathe quite well spontaneously. Numerous râles were heard bilaterally in the lung fields. She was observed for several hours, during which time heart sounds were more distinct on the right side than on the left and dullness and absent breath sounds were noted in the left hemithorax. The child was un-
able to tolerate removal from the oxygen tent and developed peripheral cyanosis within a few moments after being taken from the oxygen atmosphere.

The appearance of a portable chest x-ray film suggested the possibility of herniation of the fundus of the stomach into the left hemithorax through a defect in the diaphragm. Above the gastric air-bubble, a homogeneous mass was seen which was thought initially to represent sequestration of the lung. The heart and mediastinal structures were displaced to the right side. A barium study of the esophagus and stomach confirmed the fact that approximately one-half of the stomach lay above the diaphragm. The defect in the diaphragm appeared to be quite small (Fig. 1). A barium enema demonstrated that the colon was entirely within the abdomen.

The child's condition deteriorated in spite of vigorous resuscitative measures and it became more difficult to maintain sufficient oxygenation of the blood even by using high concentrations of oxygen. In spite of the generally poor condition of the child, an operation to relieve mediastinal compression was considered to be necessary. The operative procedure was performed 12 hours after birth. When she was placed on the operating table in the lateral position with the left hemithorax uppermost, her condition became immediately worse. The thorax was then quickly opened while positive-pressure anesthesia was being administered. Immediately after the chest was opened, the reason for the child's deterioration while being positioned on the table became apparent. Within the left pleural cavity a large fluid-filled mass was found, which appeared to be a thin-walled cyst slightly larger than a baseball (Fig. 2). It contained orange-colored watery fluid. The heavy mass lay on the mediastinum and on the root of the left lung, which was almost totally atelectatic. When the cyst was grasped and brought up out of the thoracotomy wound away from the mediastinum, the baby's condition improved immediately.

Further exploration of the left thorax revealed a circular defect, measuring approximately 2.5 cm. in diameter, in the dome of the diaphragm. Through this defect emerged a thin-walled hernia sac which contained approximately one-half of the proximal portion of the stomach. The large, spherical cystic structure took its origin from the uppermost portion of the hernia sac in the same manner that a hydrocele accompanies an inguinal hernia. Scar tissue was noted at the point where the hernia sac joined with the cyst.

On the outer aspect of the cystic structure near its junction with the hernia sac, a triangular mass of reddish, firm tissue measuring 1.5 x 1.0 cm. was seen. This mass had the appearance of atrophic liver. When the hernia sac was opened a similar, although smaller, mass (1.0 x 0.3 cm.) of reddish tissue lay on its inner surface. Abdominal examination through the diaphragmatic defect showed that the liver was entirely normal.

The hernia sac, cystic mass and the two fleshy excrescences were excised and the herniated stomach was replaced into the abdominal cavity. The diaphragmatic defect was closed with interrupted cotton sutures.

Although the two lobes of the left lung were anatomically normal, they appeared to be somewhat hypoplastic from the compression caused by the large intrapleural cystic mass. Postoperative chest x-ray film showed that the left lung, although appearing hypoplastic at the time of operation, had completely expanded to fill the left thorax. The mediastinum had returned to the midline.

Pathologic study of the flesh-colored excrescences within and outside the hernia sac showed them to be atrophic, extensively fibroed hepatic tissue. They appeared to be congenital implantations of embryonic liver carried upward by the hernia sac.

The child tolerated the operative procedure well. The postoperative course was uneventful and she was discharged on the eighth postoperative day.

POSTERIOR MEDIASTINAL LINE ON CHEST ROENTGENOGRAMS

Along with the esophageal-pleural stripe and the anterior mediastinal line, the posterior mediastinal line may be demonstrated on the standard chest roentgenogram, especially when high voltages (120 kv and more) and a fine-line grid of high quality are employed. The posterior mediastinal line, divisible anatomically and radiographically into upper and lower segments, is formed by the pleural surfaces of each lung and intervening mediastinal connective tissue, contrasted bilaterally by the air in each lung. Demonstration of the upper segment is common; of the lower, rare. Pathologic states may thicken or displace the upper segment.