

Morgagni hernia presenting with lung consolidation unresponsive to antibiotics

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Congenital diaphragmatic hernia (CDH) is a congenital malformation of the diaphragm that allows the abdominal organs to push into the chest cavity. We report the case of a 15-month-old patient who presented with a non-resolving opacity on a chest radiograph despite extensive antibiotic treatment. A large anterior mediastinal mass was seen on the chest radiograph with effacement of the right cardiac border and accompanying diminution of the liver shadow, suggesting intrathoracic herniation of abdominal contents. A computed tomography (CT) scan confirmed the presence of abdominal contents in the right hemithorax. Congenital diaphragmatic hernias can cause uncertainty in diagnosis and difficulty in subsequent treatment. Non-resolving chest opacities warrant further investigation by cross-sectional imaging such as a CT scan.

Case report

A 15-month-old girl was referred to the paediatric clinic at Polokwane Hospital for a non-resolving right basal lung consolidation. Symptoms of coughing and intermittent mild shortness of breath had started at the age of 8 months. She had been treated with antibiotics and also received a 6-month course of anti-tuberculosis treatment because of the unresolving consolidation. Her HIV status was negative.

On clinical examination the child's weight and length were 8.7 kg and 74 cm, respectively, with a head circumference of 47 cm. Both weight and length measurements corresponded to just above the -2 standard deviation scores. She had no lymphadenopathy, pyrexia or digital clubbing. Her pulse and respiratory rate were normal. The trachea was slightly shifted to the left with the cardiac apex beat far to the left. Heart sounds were normal and there were no murmurs. There was dullness to percussion at the right lung base. Auscultation revealed decreased breath sounds within the right basal region but no crackles or wheezes in either lung. The findings on abdominal examination were normal with no palpable liver.

A repeat plain chest radiograph taken at our hospital revealed an enlarged mediastinum. A very large anterior mediastinal mass was seen with effacement of the right cardiac border and accompanying diminution of the liver shadow, suggesting intrathoracic herniation of abdominal contents (Fig. 1).

The cardiac apex was displaced to the left. Multiple tubular lucencies were identified overlapping the right hemithorax. The lateral chest radiograph confirmed extension of the tubular lucencies from the right aspect of the abdomen into the ipsilateral hemithorax through an interrupted anterior segment of the right hemi-diaphragm (Fig. 2).

A contrast-enhanced axial chest and upper abdominal computed tomography (CT) scan confirmed the presence of abdominal contents in the right hemithorax, causing compression and displacement of the heart to the left (Fig. 3).



Fig. 1. Frontal chest radiograph, supine, showing widened mediastinum, obscuration of the right hemidiaphragm, left displacement of the heart, and linear lucencies overlying the liver, left hemidiaphragm and left lower zone.

The herniated organs included the liver, proximal ascending colon, proximal transverse colon, hepatic flexure and omentum (Fig. 4). No radiographic signs of bowel obstruction or strangulation were identified. The final diagnosis was a right-sided Morgagni hernia.

Discussion

The most common forms of congenital diaphragmatic hernias present in the neonatal period with severe respiratory distress, which is associated with a high mortality rate.¹ Late-presenting patients like ours may present with mild respiratory symptoms. Patients with right congenital diaphragmatic hernia (CDH) usually present with respiratory symptoms, while left-sided CDH presents with both respiratory and gastro-intestinal symptoms.¹



Fig. 2. Lateral chest radiograph. Loss of retrosternal lucency consistent with a Morgagni hernia.

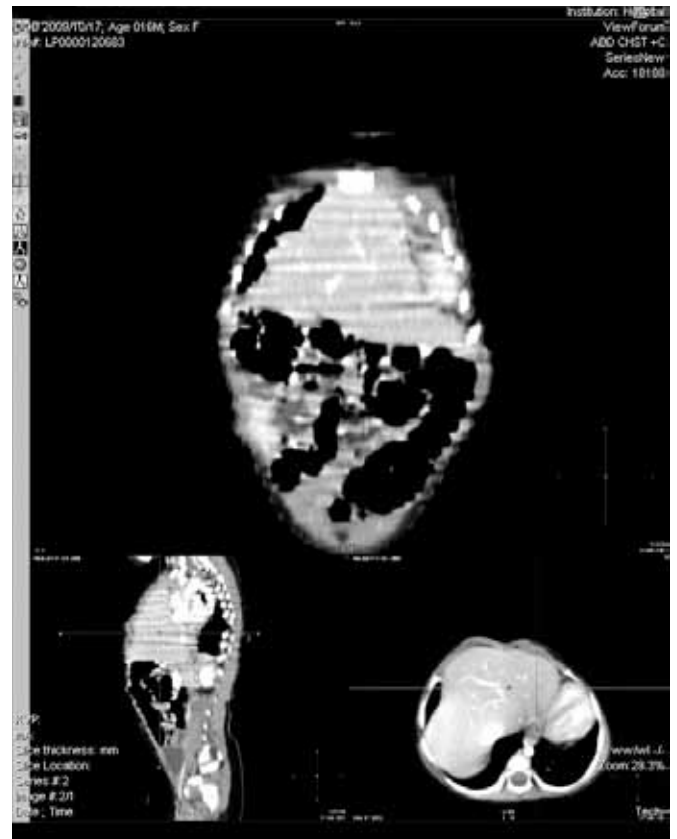


Fig. 4. Reconstructed multiplanar CT scan of the chest and abdomen. Herniated abdominal organs noted in the chest.



Fig. 3. Axial CT scan of the lower chest at the level of the heart showing intrathoracic liver herniation.

Late presentation is rare and takes place after an asymptomatic period that may range from a month to 15 years in some instances.^{1,2} Although pneumonia is frequently the initial incorrect diagnosis in these cases, it is usually not associated with severe morbidity. In contrast, an incorrect diagnosis of tension pneumothorax or pleural effusion is associated with inappropriate chest tube insertion and subsequent gastro-intestinal perforation.¹

Our patient was found to have a Morgagni hernia, which comprises only 2 - 3% of all diaphragmatic hernias.³ Hernias through the foramen of Morgagni are not usually diagnosed until adulthood.⁴ The underlying developmental defect allows herniation of abdominal

contents between the fibrotendinous elements of the sternal and costal portions of the diaphragm. The defect is anterior and retrosternal in location and is a right-sided process in 90% of cases.⁵ The contained abdominal contents may include, in order of decreasing frequency, the omentum, colon, stomach, liver and small intestine.³ Morgagni hernia can also be associated with trauma, severe effort and obesity.

On routine chest radiography, the hernia usually appears as a rounded mass in the right cardiophrenic angle, adjacent to the anterior portion of the chest wall. The radiographic differential diagnosis may include a pericardial fat pad, pericardial cyst or solid tumour.

A fluoroscopic examination may be used to ascertain or define the type and location of herniated organs. Furthermore, incongruent paradoxical diaphragmatic movements may be seen. Further evaluation and diagnosis can be performed with a CT scan or magnetic resonance imaging (MRI). Sagittal and coronal reformatted images are often helpful in demonstrating the diaphragmatic defect and identifying the contents of the hernia.

Hernias through the foramen of Bochdalek are developmental defects in the posterior part of the diaphragm. These hernias are usually diagnosed in infants who present with clinical symptoms of pulmonary insufficiency.⁶ The herniated contents contain fat and omental tissue in the majority of cases, but other retroperitoneal and

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 An illustration showing a family of four (two adults and two children) holding hands in a circle. Below them are two black silhouettes: one of a person with a hernia protruding from the upper abdomen (Morgagni hernia) and another of a person with a hernia protruding from the lower back (Bochdalek hernia).

intra-abdominal structures can infrequently be involved. Bochdalek hernias have a reported prevalence of 6% in the adult population.⁷ Many cases go undiagnosed because affected adults are commonly asymptomatic.⁸ Late-manifesting hernias may be due to congenital herniation, trauma, physical exertion, pregnancy, sneezing or coughing. Left-sided Bochdalek hernias comprise about 70 - 90% of cases, presumably owing to the protective effects of the liver.⁸

On conventional radiographs, the hernia may appear as a lung-base soft-tissue-opacity lesion seen posteriorly on lateral images. CT usually demonstrates fat above the diaphragm and is extremely beneficial in revealing organ entrapment. Coronal and sagittal reformat images show the defect to best advantage. The majority of infants with CDH are now diagnosed prenatally by ultrasound examination, which demonstrates herniated viscera with or without liver in the fetal thorax and an abnormal position of stomach below the diaphragm. Although not specific for CDH, polyhydramnios is often detected.⁸

Colour flow Doppler can be used to demonstrate abnormal positioning of the umbilical and portal veins indicating liver herniation, and identify right-sided hernias, which can be difficult to detect on ultrasound examination because of the similar echogenicity of lung and liver. Fetal MRI is increasingly being used to confirm the diagnosis of CDH, as well as to better define the internal anatomy.⁹

When CDH is found on routine prenatal ultrasound examination, both a high-resolution ultrasound examination and fetal MRI to determine the presence of additional structural anomalies are indicated. All fetuses with CDH should be evaluated for the presence of syndromes and/or additional major malformations. Involvement of a medical geneticist in the evaluation of these families can be helpful.⁹

Conclusion

Non-resolving opacities on a chest radiograph despite antimicrobial cover warrant further investigations to exclude the presence of congenital anomalies like our patient's. When such lesions are detected, identification of their location and imaging characteristics may often allow a definitive radiological diagnosis to be made.

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