An Unusual Case of Traumatic Diaphragmatic Hernia with Successful Operation

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Numerous classifications have been proposed for diaphragmatic hernia. Most of them are of little practical value from a clinical standpoint. Harrington's classification of diaphragmatic herniae into two main groups, nontraumatic and traumatic, is preferred because of its simplicity. He subdivides the traumatic group into: (1) hernia due to indirect injury to the diaphragm and usually the result of a severe crushing injury; and (2) hernia due to direct injury to the diaphragm which is usually the result of a penetrating wound. The following case falls into the latter group and is presented for two reasons: First, the two unusual openings in the diaphragm through which the stomach, colon and the omentum protruded, and second, the prolonged period of observation and clinical study in a hospital before the diagnosis was made.

CASE REPORT

A 42-year old Mexican male was admitted to the Santa Barbara General Hospital on November 21, 1946, complaining of intermittent cramp-like pains in the upper abdomen, nausea with occasional vomiting, cough, fever and chills. The patient had been confined to the county jail since October 4, 1946, at which time following a domestic quarrel, he stabbed himself twice with a knife in the left lower chest. One week later, the patient first began to notice intermittent pains in his epigastrium. The pains were cramp-like in nature, were not relieved by eating food, and at times were accompanied by the regurgitation of undigested food particularly when he forced himself to eat. The patient attributed the symptoms to the change in his usual diet. The complaints gradually increased in severity and the day before admission to the hospital, he developed a non-productive cough and complained of fever and chills. He did not complain of dyspnea at anytime.

The physical examination on admission revealed a well nourished male of normal development and good musculature. The temperature was 101 degrees F, pulse 88, and respirations 18. He coughed frequently during the examination and complained of pain in his left lower chest. Examination of the head, eyes, throat and neck was negative. The percussion note over the left lower chest was flat and the breath sounds were markedly depressed. There were two healed scars from the stab wounds in the left lower thorax in the anterior axillary line. The P.M.I. was slightly displaced to the right. The abdomen was negative throughout as was the remainder of the physical examination. Because of the findings on admission (Fig. 1), he was given 35,000 units of penicillin intramuscularly every three hours until December 22, 1946.
An x-ray study of the upper gastro-intestinal tract on admission (Fig. 2) showed no organic lesion and it was felt that the stomach was apparently distorted by changes at the base of the left lung.

The blood and urine on admission were within normal limits and the blood Kahn and Kline tests were negative. On November 23 he vomited undigested food about one hour after his noon meal. This was repeated several times within the next few days. He had daily bowel movements but complained of hard stools and constipation. Because of the persistent vomiting a Wangenstein suction apparatus was inserted on November 29, he was given glucose intravenously, and permitted nothing by mouth except small sips of water. It was necessary to follow this regime intermittently until December 9 before he was able to eat without nausea.

On December 10 an aspirating needle was inserted into the left pleural space in the posterior axillary line and 30 cc. of bloody fluid was withdrawn following which a diagnosis of traumatic hemothorax was made. Bacteriologic study of this fluid was negative for pathogenic organisms.

Since admission x-ray inspection suggested lung abscess, a bronchoscopy was performed by Dr. A. R. Olsen on December 24 with essentially negative result, except some distortion of the terminal left lower lobe bronchus and the possibility of some compressing lesion was suggested.

On January 6, 1947, following the report of acid-fast bacilli on one of three 24-hour sputum specimens, the patient was transferred to the General Hospital Tuberculosis Sanatorium. This finding was never confirmed and the acid-fast bacilli were not identified as tubercle bacilli.
On admission to the sanatorium 14 consecutive 24-hour sputum specimens were sent to the laboratory for concentration and culture for tubercle bacilli. All were negative. A series of gastric cultures were negative for tubercle bacilli in April, 1947. The Mantoux skin reaction was strongly positive.

Roentgenograms were taken on April 14 and July 8. The clinical diagnosis at this time was subsiding traumatic hemothorax with intense pleural reaction and elevation of the left diaphragm. During this period, the patient had been on a regime of bed rest and had improved clinically. He had gained in weight from 158 to 167 pounds. During the month of March 1947, he had two transient bouts of upper abdominal pain and vomiting. For the most part, his appetite was good and he did not complain of constipation or diarrhea. Early in the morning of July 11, he complained of severe pain in his lower abdomen and nausea. A surgical consultation was held several hours later at which time the abdomen was soft and there was no tenderness. Leucocyte counts made several hours apart were 11,700 and 6,800 per cu. mm. respectively. Clinical improvement continued and in September the patient was on outside walking exercise and considered ready for discharge.

On October 11 he had another attack of abdominal pain and vomiting, this time the pain was largely in the right upper abdomen. The complaint followed the usual pattern and subsided within a few hours. Following this, the patient was seen by one of us (F.G.P.) in the surgical clinic.

X-ray inspection of the upper gastro intestinal tract (Fig. 3) resulted in the following observation:

**FIGURE 3**

*Fig. 3:* Barium x-ray study of upper gastro intestinal tract taken October 22, 1947, revealing the stomach lying high in the left thorax.

**FIGURE 4**

*Fig. 4:* Roentgenogram taken February 17, 1948, revealing the left diaphragm in normal position and an essentially normal chest.
in a diagnosis of diaphragmatic hernia with all of the stomach and duodenal bulb above the diaphragm.

On December 12, 1947, the hernia was repaired by Dr. Joseph Robinson, chest surgical consultant. Part of the operative note follows: "The entire stomach, together with about 12 inches of large bowel and a large amount of omentum were found within the pleural cavity. There was a rent in the diaphragm measuring about four inches in length and located just mesial to the dome of the diaphragm. It extended in an antero-posterior direction, partially in line with the superior of the two scars in the chest wall. The stomach, colon and omentum were diffusely and densely adherent to the ring formed by this tear. There was also a small hole in the diaphragm measuring about one centimeter in length and located directly beneath and anterior to the two stab wound scars in the chest wall. There was about two inches of omentum protruding through this hole and it also was densely adherent to the edges... The lung was entirely free from adhesions. The adhesions between the omentum, stomach and large bowel and the edges of the two diaphragmatic herniae were freed by blunt and sharp dissection. A small amount of free omentum was resected from the large mass of omentum. The bowel, stomach and omentum were then replaced into the peritoneal cavity after controlling a few bleeds following the section of the adhesions. The diaphragm was then repaired with 00 silk, using inverted mattress sutures."

The postoperative course was uneventful. There was no effusion, and it was not necessary to aspirate air from the pleural cavity. X-ray films on December 15, 1947 revealed the left lung to be completely re-expanded with slight pleural reaction at the base.

A roentgenogram (Fig. 4) was taken February 18, 1948, following which the patient was discharged from the hospital. Six months after discharge, he was free from complaints and was leading a normal life.

Comment

R. Santello and R. Aquilar et al. describe two cases, one a diaphragmatic hernia of the stomach and the other a congenital hernia in a child, which were erroneously diagnosed as pulmonary tuberculosis. Adams and Lee analyzed the symptomatology of 34 surgically treated cases of diaphragmatic hernia. The most common chief complaint was pain in the epigastrum or lower chest which occurred in 23 cases. The pain most commonly occurred soon after the ingestion of food or during meals. Vomiting often relieved the pain. Dyspnea was the second most common complaint and occurred in five patients. The remaining common complaints in order were hematemesis, constipation and regurgitation of food. The organs most often contained in the herniae of their series were the stomach and colon. The symptoms are related to the organs which have been displaced by the hernia. Lawrence quoting from Harrington, refers to diaphragmatic herniae as the "Masquerader of the Upper Abdomen" because the condition is often wrongly diagnosed. He describes an auscultatory physical sign "Inspiratory Borborygmii," which made the diagnosis in one
case. The sound is only heard when the patient is lying down and is described as a "granting borborygmus-like sound synchronous with inspiration." The sound is produced by the increased intra-abdominal pressure and the decreased intra-thoracic pressure during inspiration forcing the fluid and gaseous contents into the herniated portion of the stomach. H. Reid\(^6\) cites a case of traumatic hernia and discusses the mechanisms by which traumatic herniae may be produced. These are direct injury, necrosis of the diaphragm by pressure from a drainage tube or rupture of a subphrenic abscess, and indirect crushing injuries. He stresses that such herniae have no sac and therefore are false herniae or eviscerations. Kiene and Copleman\(^7\) describe a right sided hernia with delayed herniation of the liver and gall bladder. Numerous authors report the rarity of right-sided herniae. Garlepy and Dempster\(^8\) emphasize the importance of properly using the x-ray to establish the diagnosis of diaphragmatic herniae in which the symptoms may not easily be distinguishable from other diseases of the abdomen or chest. They cite examples of patients with massive diaphragmatic herniae who passed from one physician to another without the diagnosis being made. They also quote Harrington's report of 161 cases of which 21 had been operated on previously without symptomatic relief and were completely relieved by operation. Previous diagnoses in this group included gastric and duodenal ulcer, intestinal obstruction, hyperacidity, heart disease, neoplasm of the esophagus and lung tumor. They also quote Hedblom who warns against depending entirely upon the Roentgen Ray for diagnosis since spontaneous reduction of these herniae may occur at any time thus causing them to escape detection. It must also be remembered that the herniated omentum and spleen are not seen roentgenologically.

Carter and Giuseffi\(^9\) reviewed the literature on 39 cases of strangulated diaphragmatic hernia including two of their own and found a striking repetition of symptoms and physical findings. These included a history of a previous thoracic injury, physical findings of displacement of the heart to the right, aspiration of bloody fluid from the left pleural cavity, roentgenologic findings of a high left diaphragm, and signs of acute gastrointestinal obstruction with absence of abdominal distention and a patent intestinal tract where the stomach alone is included. All of these criteria were present in our case. First, the symptoms were those of intestinal obstruction. Second, a penetrating wound in the chest had occurred near the diaphragm. This combination of circumstances should have suggested traumatic perforation of the diaphragm and some part of the gastro-intestinal tract caught in the rent of the diaphragm. Third, an air-containing space just
above the diaphragm should lead one to consider the possibility of diaphragmatic hernia. Finally, it must be emphasized that in studying these cases the radiologist must be asked specifically to look for a diaphragmatic hernia or the correct examination may not be made. Many of these will be missed unless the patient is placed in a Trendelenburg position at the time the barium studies are made.

**SUMMARY**

1) A case of traumatic diaphragmatic hernia with two perforations of the diaphragm involving the stomach, transverse colon and omentum is presented.

2) Although definite criteria for suspecting the diagnosis were present, the patient was observed for 11 months in a hospital before the correct diagnosis was made.

3) Clinicians should consider the possibility of diaphragmatic hernia in all cases with obscure symptoms simulating thoracic or abdominal disease.

4) In order that a correct examination will be made, the radiologist should be asked specifically to look for a diaphragmatic hernia.

5) The treatment is surgical.

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**RESUMEN**

1) Se refiere un caso de hernia diafragmática con dos perforaciones del diafragma incluyendo el estómago, el colon y el epiplón.

2) Aunque existía una base definida para que se hubiera sospechado el diagnóstico, el enfermo estuvo en observación en un hospital por 11 meses antes de que llegara a un diagnóstico correcto.

3) Los clínicos deben sospechar la hernia diafragmática en todos los casos con síntomas obsuros que simulen un padecimiento abdominal o torácico.

4) Para que un examen sea hecho correctamente, debe pedirse claramente al radiólogo que busque la hernia diafragmática.

5) El tratamiento es quirúrgico.

**REFERENCES**
