CASE Reports

Delayed Presentation of Diaphragmatic Rupture after Blunt Abdominal Injury

*Ratha-Korn Vilaichone, M.D., Ph.D.**
*Varocha Mahachai, M.D., F.R.C.P.(C)***

ABSTRACT

We report a case of delayed presentation of diaphragmatic rupture following 2 weeks of motorcycle accident. A 31 year old woman presented with nausea, vomiting, upper abdominal pain and respiratory distress. Chest radiography showed "double bubble" gas in the left hemithorax with marked mediastinal shift to the right. The diagnosis of diaphragmatic rupture was suspected and she underwent thoracotomy. There was tearing of the left diaphragm parallel to the costal insertion measuring 8 centimeters with herniation of the whole stomach, spleen and transverse colon into the left chest. The hernia was reduced and the left diaphragm was repaired. She started to improve after surgery and was discharged on day 9. It was suspected that the initial tear of the diaphragm was small and unrecognized. It probably enlarged with time and active vomiting. Diaphragmatic rupture may be caused by blunt abdominal injury and a high index of suspicion with early surgical treatment is the mainstay of successful management.

Key words : Diaphragmatic rupture, abdominal injury

[Thai J Gastroenterol 2004; 5(1):76-78]

INTRODUCTION

Diaphragmatic rupture was first described by Sennertus in 1541 and Ambroise Pare in 1579. They reported the first cases found at autopsy[1]. Successful diaphragmatic repair was reported by Riolfi in 1886[2]. This condition affects predominantly males[3,4] in the third decade of life[3] and is often caused by blunt trauma[3,5-7] in the presence of multiple injuries[8-10]. Automobile accidents caused 65% of cases (4). Minor abdominal injury has been previously reported as a rare cause of diaphragmatic rupture[8]. We present our recent experience with a patient found to have delayed presentation of diaphragmatic rupture after a minor abdominal injury.

CASE REPORT

A 31 year old Thai woman was admitted with a 2 days history of worsening dyspnea, vomiting immedi-

* *Gastroenterology Unit, Department of Medicine, Thammasat University Hospital, Pathumthani*
** *Gastroenterology Unit, Department of Medicine, Chulalongkorn University Hospital, Bangkok 10330, Thailand*

ately after eating, upper abdominal pain and constipation. Two weeks previously she had a motorcycle accident with only minor blunt abdominal trauma. The physical examination by the physician and the chest x-ray at that time was normal except only a mild contusion of her right hip. Her temperature was 37˚C and BP 120/80 mmHg with a respiratory rate of 30 per minute. The left chest wall was dull on percussion with decreased breath sounds. The bowel sound was also heard over the left chest. The upper abdomen was mildly tender without masses or hepatosplenomegaly. Chest radiography demonstrated double bubble gas in the left chest and marked mediastinal shift to the right as seen in Figure 1A. A diagnosis of left diaphragmatic rupture was suspected. The patient underwent thoracotomy and found to have tearing of the left diaphragm parallel to the costal insertion about 8 centremeters in diameter. There was herniation of the whole stomach, spleen and transverse colon into the left chest. The stomach was dilated causing a marked mediastinal shift. The contents were reduced with repairing left diaphragm and a left chest drain was inserted. The patient started to improve after surgery and was discharged on day 9.

DISCUSSION

Traumatic rupture of the diaphragm is not an uncommon entity[11] and occurs in 3-8% of patients who sustained blunt abdominal injury[12]. Previous reports noted a greater preponderance of left sided rupture due to the right side being protected by the liver[7,13]. However, later studies demonstrated more injuries to the right side (from 20-50%). It may be due to greater awareness of the condition and severe injuries associated with automobile accidents[12,14]. Traumatic diaphragmatic rupture is usually associated with multiple injuries[8-10].

Grimes, in 1974, divided presentations of diaphragmatic rupture into 3 phases, the acute, latent and late[15]. The diagnosis of ruptured diaphragm is frequently delayed[16] and can present up to 16 years later[5]. In the acute phase, the diagnosis is often delayed because it mimics symptom from associated injuries[3]. Furthermore, the delayed diagnosis may be caused by initial sign was subtle and consisted only in slight alteration of the diaphragmatic contour[6]. The mechanism of injury is thought to be compression of the upper abdomen resulting in sudden rise of

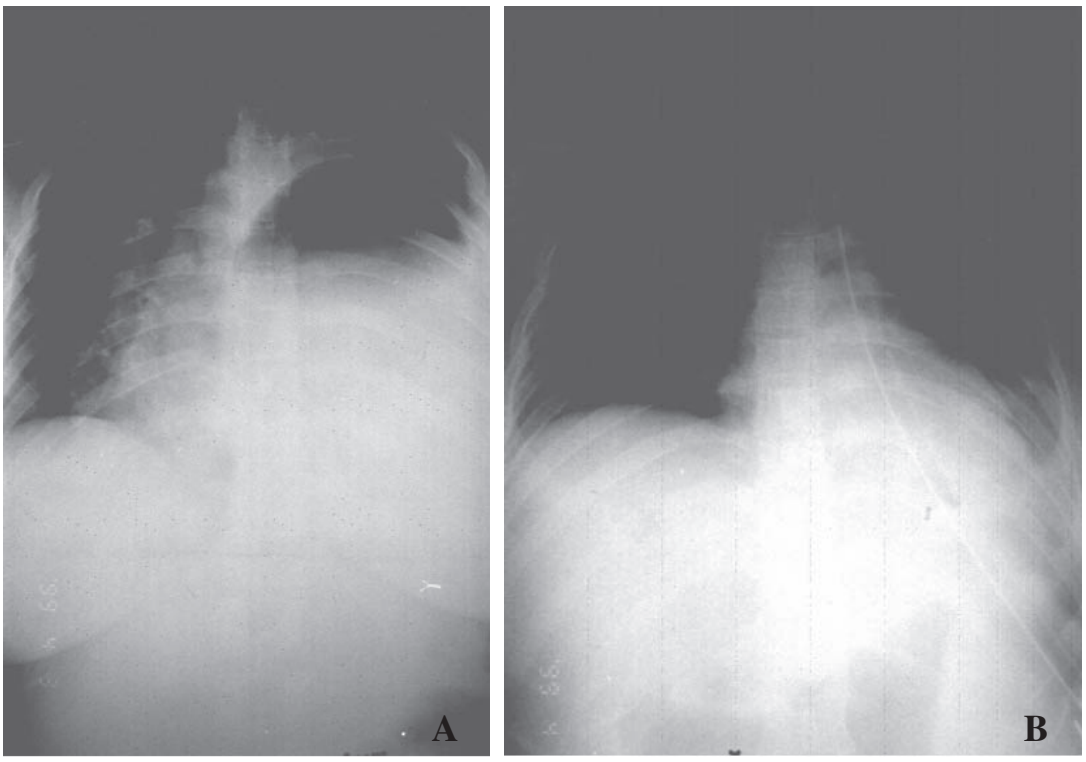

Figure 1 A Double bubble gas in the left chest causing marked mediastinal shift to the right.
B Postoperative chest radiography.

intraabdominal pressure and the diaphragm was unable to resist the pressure[12,17]. In our case, the patient presented with progressive nausea and vomiting which may have been caused by gut obstruction from a diaphragmatic hernia. Vomiting may further increase intraabdominal pressure[12] causing worsening of the diaphragmatic hernia. Tear of the diaphragm from its costal attachments may also occur[18] as in our patient. The other possibilitiy is that our patient had an unrelated attack of gastroenteritis cause severe vomiting, thus making a small diaphragmatic tear worse. The immediate management should be evaluation and stabililization of cardiorespiratory status. Chest radiography is a useful diagnostic study, particular if the nasogastric tube can be inserted before radiograph is performed. Chest radiography may demonstrate bowel gas or loop of intestine above the diaphragm, the presence of the tip of nasogastric tube above the diaphragm or elevated of obscured hemidiaphragm. Management of diaphragmatic rupture was usually achieved by surgical repair[4]. Pulmonary complications were the major problem in patient underwent operation[11]. Overall mortality rate varies from 1% to 28% in the literature[3].

In summary, the possibility of diaphragmatic rupture must be considered in all patients with blunt abdominal injury. The classic description of physical examination is that bowel sound can be heard in the chest. A high index of suspicion with early surgical treatment is the mainstay of successful management.

REFERENCES

1. Hariby WB. The case reports and autopsy records of ambroise pare. Springfield, IL: Thomas; 1968. p. 50-1.
2. Hedblom CA. Diaphragmatic hernia. JAMA 1925; 85: 947-53.
3. Shah R, Sabanathan S, Meams AJ, *et al*. Traumatic rupture of the diaphragm. Ann Thorac Surg 1995; 60: 1444-9.
4. McCollum C, Anyanwu CH, Umeh BUO, *et al*. Management of traumatic rupture of the diaphragm. Br J Surg 1987; 74: 181-3.
5. McHugh K, Ogilvie BC, Brunton FJ. Delayed presentation of traumatic diaphagmatic hernia. Clin Radiol 1991; 43: 246-50.
6. Johnson CD. Blunt injury of the diaohragm. Br J Surg 1988; 75: 226-30.
7. Deluca SA, Rhea JT. Rupture of the diaphragm. Am Fam Physician 1983; 28: 127-8.
8. Humphreys TR, Abbuffi S. Massive bilateral diaphragmatic rupture after an apparently minor automobile accident. Am J Emerg Med 1991; 9: 2246-9.
9. Rodriguez-Morales G, Rodriguez A, Shatney CH. Acute rupture of the diaphragm in blunt trauma: analysis of 60 patients. J Trauma 1986; 26: 438-44.
10. Somers JM, Glesson FV, Flower CDR. Rupture of the right hemidiaphragm following blunt trauma: the use of ultrasound in diagnosis. Clin Radiol 1990; 42: 97-101.
11. Sharma OP. Traumatic diaphragmatic rupture: not an uncommon entifly personal experience with collective review of the 1980's. J Trauma 1989; 29: 678-82.
12. Johnson CD. Blunt injuries of the diaphragm. Br J Surg 1988; 75: 226-30.
13. Hood RM. Traumatic diaphargmatic hernia. Ann Thorac Surg 1971; 12: 311-21.
14. Waldschmidt ML, Laws HL. Injuries of the diaphargm. J Trauma 1980; 20; 587-92.
15. Grimes O. Traumatic injuries of the diaphragm. Am J Surg 1974; 128: 175-81.
16. Henzler M. Delayed diagnosis of traumatic diaphragmatic hernia during pregnancy. Ann Emerg Med 1988; 17: 350-3.
17. McElwee TB, Myers RT, Pennell TC. Diaphragmatic rupture from blunt trama. Am Surg 1984; 50: 143-9.
18. Ward RE, Flynn TC, Clark WP. Diaphragmatic disruption secondary to blunt abdominal trauma. J Trauma 1981; 21: 35-8.