

## 症 例 報 告

## A case of delayed traumatic diaphragmatic hernia

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## ABSTRACT

We report a case of delayed traumatic hernia that manifested following sudden thoracodorsal pain five months after a traffic injury. A 66 year-old man broke ribs and ischial bones in a traffic accident five months previously. At the time of injury, no chest symptoms were recognized, but in five months, a sudden thoracodorsal pain appeared and he consulted the internal medicine department of our hospital and then was introduced via the Radiology Department to the Department of Surgery. The chest X-ray examination revealed elevation of the left diaphragm and compression from the right side of the mediastinum. Examinations including chest X-ray, magnetic resonance imaging (MRI) and retrograde colonography revealed displacement of a portion of the stomach and colon to the left thoracic cavity. A delayed traumatic diaphragmatic hernia was suspected from the medical records and operation was performed. The operative approach was via an abdominal median incision. After celiotomy, the abdominal section showed a hernia orifice of 10 × 8 cm in the left diaphragm, through which eventration of a part of the stomach and colon into the thoracic cavity had occurred. There was no hernia sac. After reduction of the stomach and colon into the abdominal cavity, the diaphragm was compound sutured, the anterior gastric wall was fixed to the peritoneum, and the abdomen was closed. There are cases of delayed traumatic diaphragmatic hernia that progress for a long time without manifestation of symptoms after injury, which is then followed by a sudden superacute manifestation of symptoms therefore it is necessary to be aware of this possibility in cases of thoracoabdominal external injuries and multiple injuries. MRI was most effective for preoperative diagnosis.

## INTRODUCTION

Although traumatic diaphragmatic hernia is regarded as a comparatively rare condition, it has been increasing in frequency along with

the increase of traffic accidents and industrial accidents<sup>1)</sup>. Moreover, not only those manifesting symptoms upon injury but also those manifesting sudden superacute symptoms after a long period following trauma have

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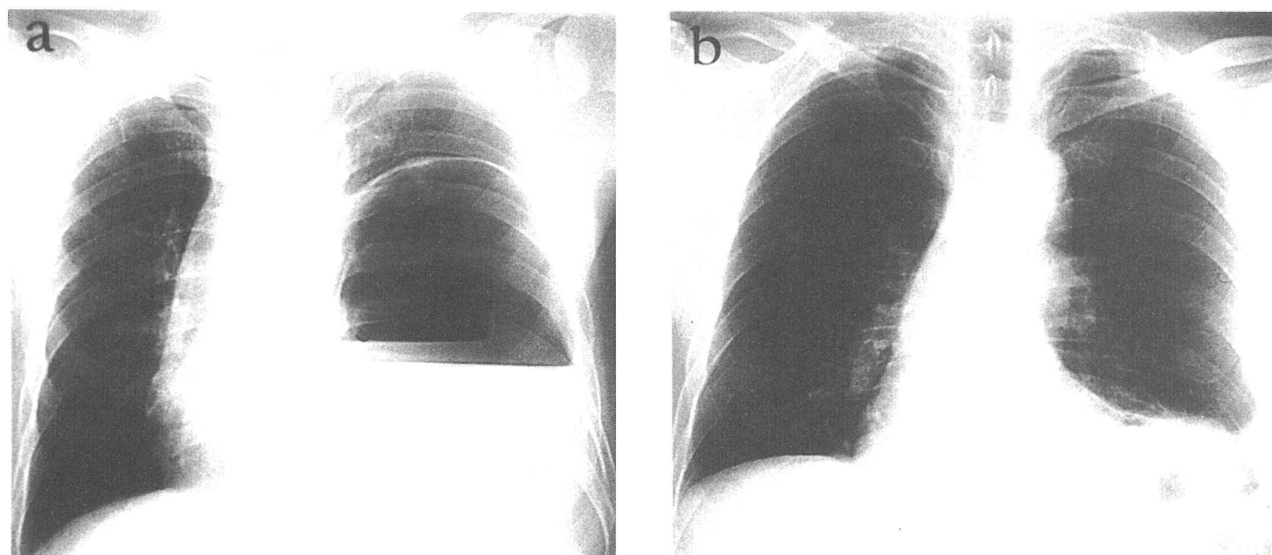


Fig. 1 Chest X-ray film on manifestation of dorsalgia (a). Chest X-ray film two months before the manifestation of dorsalgia (b).

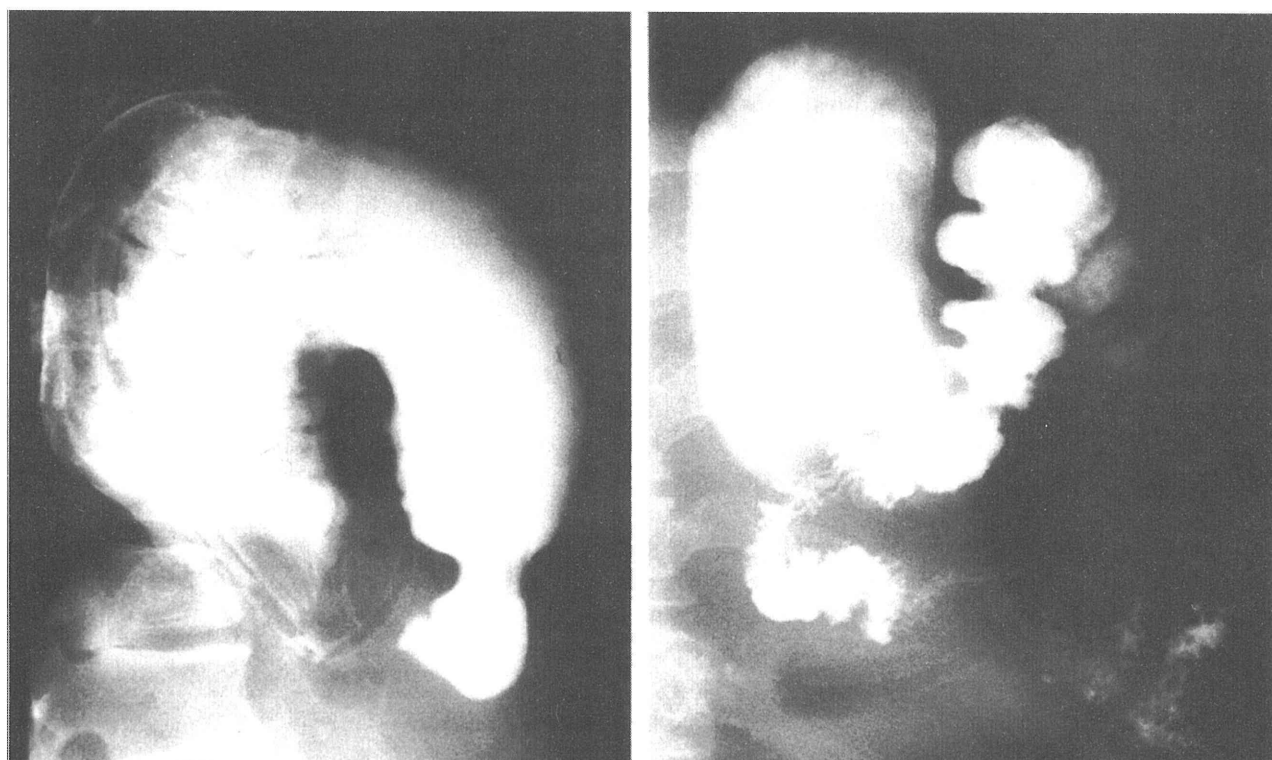


Fig. 2 Upper gastrointestinal tract contrast radiography and retrograde colonography using gastrografin.

been reported. One must be well aware of the possibility of this condition when diagnosing injuries due to thoracoabdominal external trauma. We report a case of delayed traumatic diaphragmatic hernia in which symptoms manifested five months after a traffic accident.

### CASE REPORT

Patient: 66-year-old man  
Chief complaint: Dorsalgia  
Family medical history: Not contributory  
Past history: Under treatment for diabetes since age 52. At the age of 62, he had a cere-

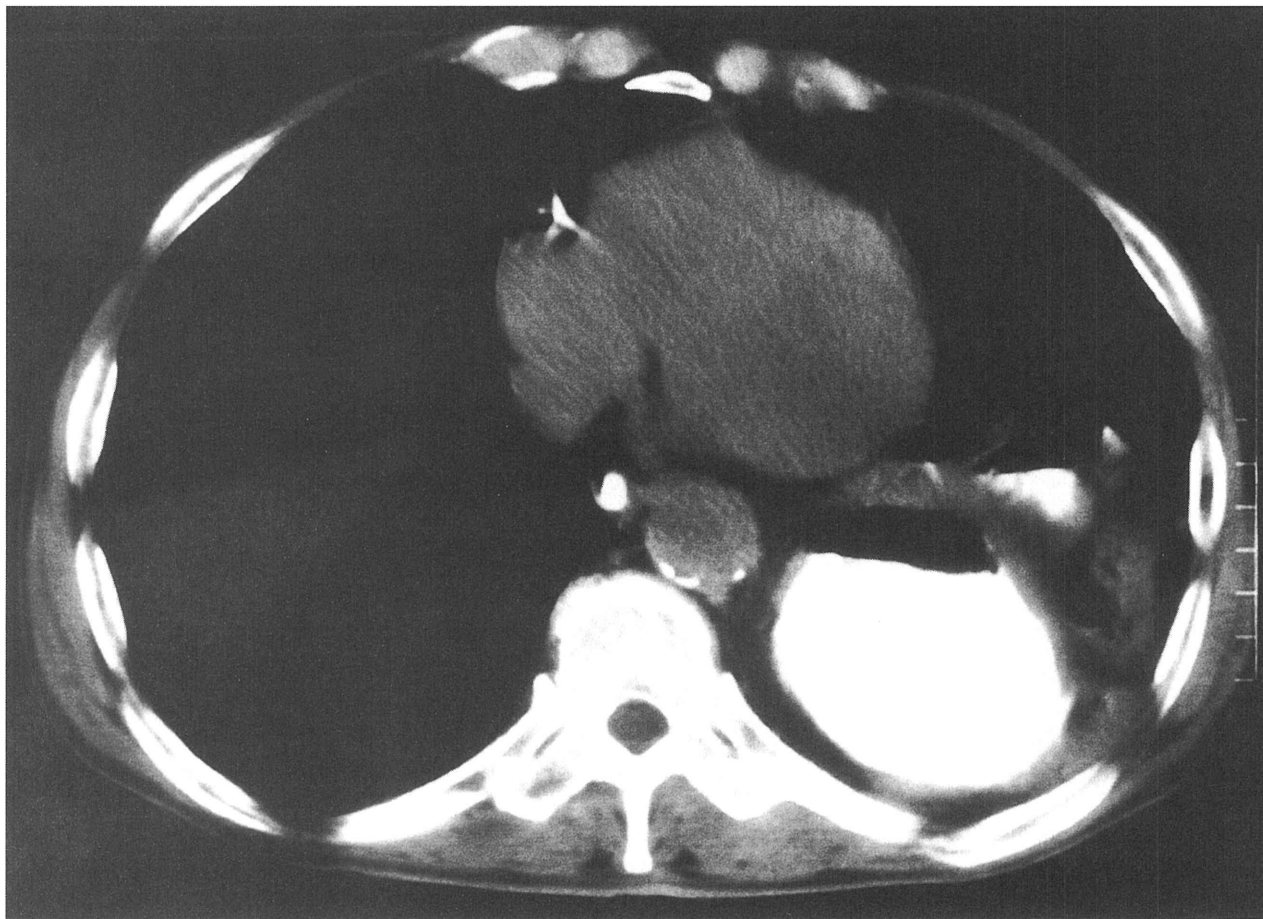


Fig. 3 Chest CT

bral hemorrhage. He had been hospitalized for treatment of broken ribs and ischial bones caused by a traffic accident five months previously, in May 1997.

History of present illness: He presented with sudden dorsalgia and chest X-ray suggested diaphragmatic hernia.

Status on admission: Height 1.5 m, body weight 44 kg, blood pressure 142/90 mmHg, body temperature 34.4°C, pulse 82/min., respiratory rate 21/min. Facial pallor and attenuated breath sounds were recognized. However, no abnormal abdominal findings were seen.

Test results on admission: Increase of CRP to 7.15 and slight respiratory acidosis was shown by arterial blood gas tests (pH 7.375, pCO<sub>2</sub> 251.4 mmol/L, pO<sub>2</sub> 268.7 mmol/L, HCO<sub>2</sub> 329.6 mmol/L and BE 3.3 mol/L).

Chest X-ray examination: Exclusion in the left pulmonary area and a mediastinal shift to the right were clearly recognized (Fig. 1a). Even on the chest X-ray examination two

months before the manifestation of dorsalgia (Fig. 1b), a slight elevation of the left diaphragm was recognized. When gastric content aspiration was performed the dorsalgia disappeared and exclusion in the left pulmonary area and mediastinal shift to the right improved, allowing stabilization of his eneral condition.

Digestive tract contrast radiography examination: Upward displacement of the stomach from the fornix was confirmed by upper gastrointestinal tract contrast radiography (Fig. 2). The retrograde colonograph confirmed that the colon was elevated with the stomach.

Chest CT: The presence of the stomach in the left pulmonary area was confirmed (Fig. 3). However, the diaphragm could not be identified.

Chest-abdominal MRI (Fig. 4): On low intensity MRI by T1 enhanced sagittal section, the stomach was seen above the diaphragm and an 8 cm defect in the diaphragm was observed.

On a diagnosis of delayed traumatic dia-

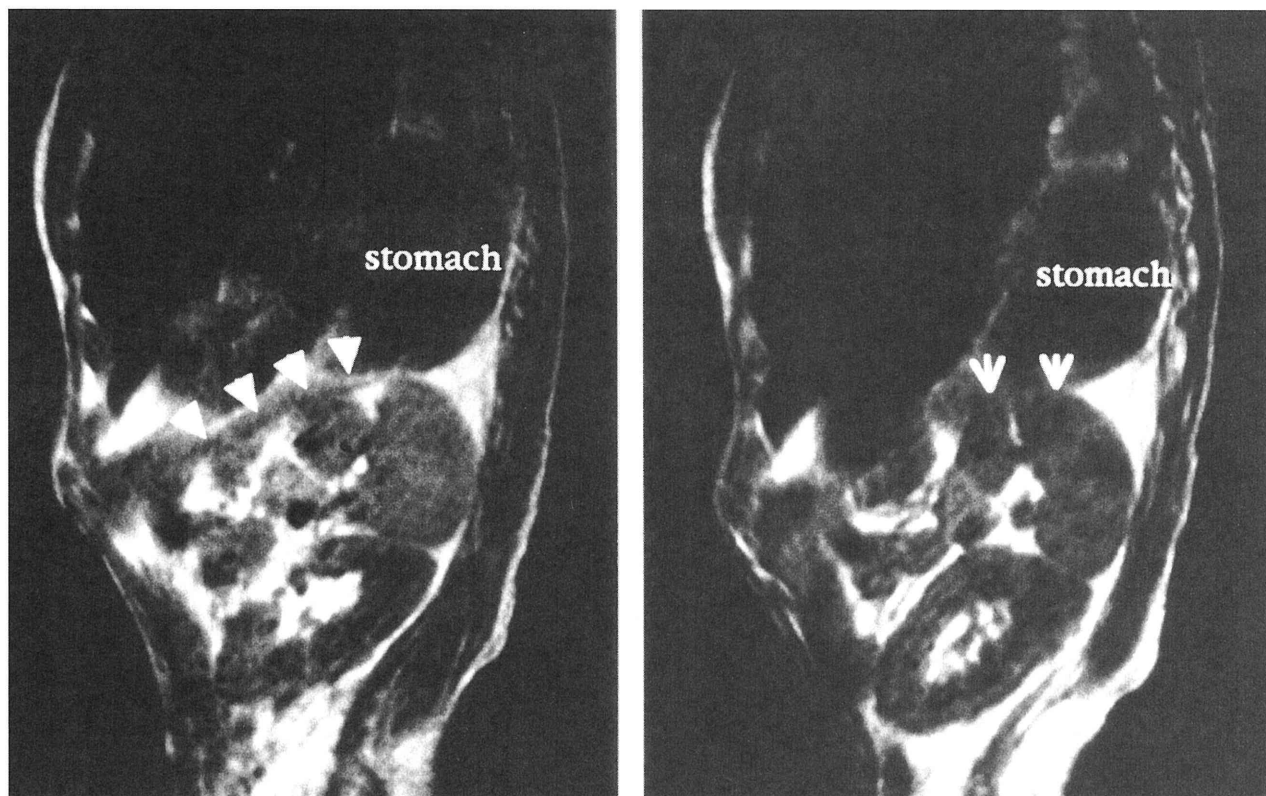


Fig. 4 Chest-abdominal MRI: On low intensity MRI on T1 enhanced sagittal section (▼), the stomach is above the diaphragm and an 8 cm diaphragm defect is observed (↓).

phragm hernia an operation was performed on November 4, 1997, two weeks after the manifestation of symptoms.

Operative findings: On abdominal celiotomy a  $10 \times 8$  cm hernia was recognised in the posterior area of the diaphragm, through which eventration of a part of the stomach, colon and small intestine into the thoracic cavity was observed. There was no hernia sac. After reduction of the eviscerated structures into the abdominal cavity and fixation of the anterior wall of the stomach to the anterior peritoneum, the diaphragm was compound sutured and the abdomen was closed.

After the operation, temporary dysphagia due to decreased gastric peristaltic movement was observed, but the symptoms gradually improved. The chest X-ray examination confirmed satisfactory inflation of the lung (Fig. 5) and the patient was discharged.

#### DISCUSSION

Traumatic diaphragmatic hernia manifest thoracic and abdominal symptoms caused by the eventration from the orifice of the damaged diaphragm into the thoracic cavity, due

to distortion or shock<sup>2)</sup>. In normal respiratory movement, the difference in pressure between the thoracic cavity and abdominal cavity is 7-20 cmH<sub>2</sub>O, and the maximum expiratory pressure is as high as 100 cmH<sub>2</sub>O<sup>3)</sup>. It is thought that the difference in pressure between the thoracic cavity and the abdominal cavity causes gradual eventration through the cleavage in the diaphragm<sup>4)</sup>.

From 3 to 4% of all thoracic and abdominal injuries are traumatic diaphragmatic hernias which account for 10-20% of all diaphragmatic hernias<sup>4-6)</sup>. Most cases of traumatic diaphragmatic hernia are caused by traffic accidents<sup>1-7)</sup>, and they usually manifest one month later<sup>8)</sup>. However, there are many cases manifesting after a long duration, and the report by Suguro et al. says that 13.5% of such cases manifested 10 years after the injury. Accordingly, when examining patients with a history of thoracic and abdominal injuries, especially following traffic accidents, it is necessary to be aware of the possibility of this condition. Complications are generally due to broken ribs and innominate bones<sup>7, 8)</sup>, as in this case.

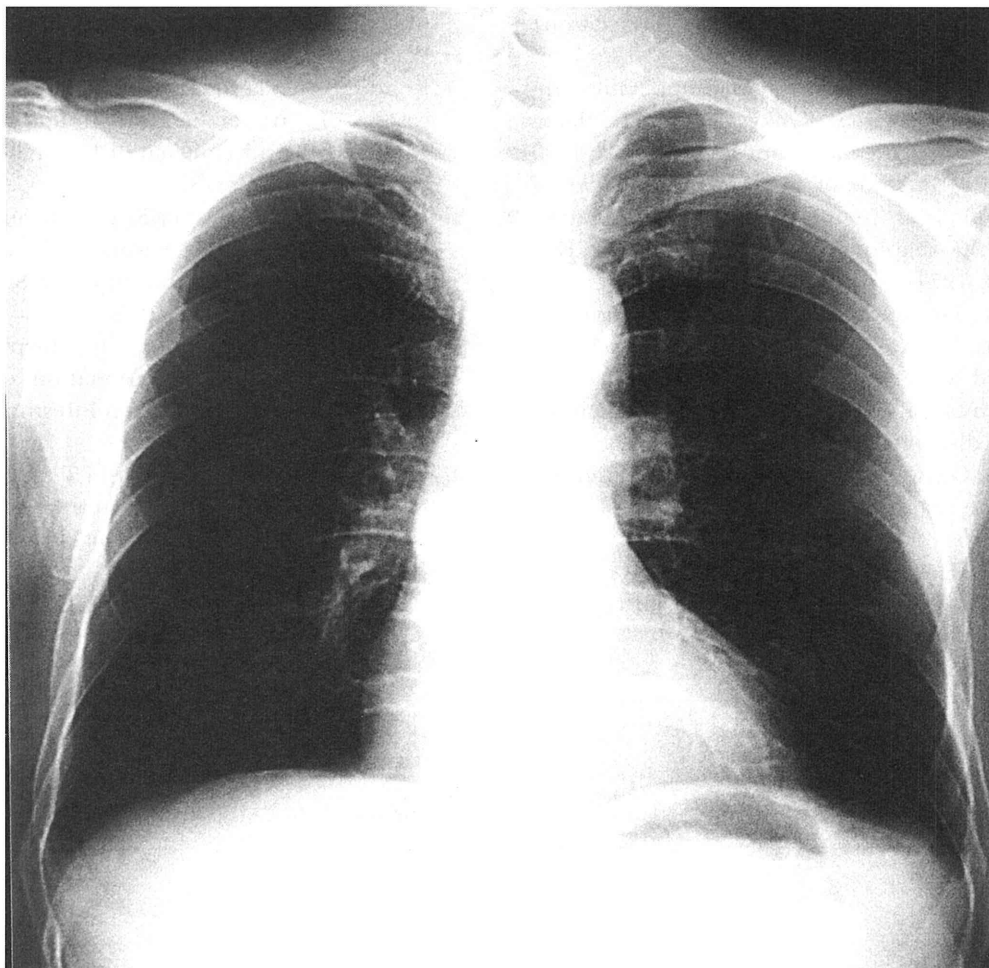


Fig. 5 Chest X-ray film after the operation

Generally the diagnosis is made on the basis chest X-ray examination, CT and digestive tract contrast radiography MRI has recently been shown to be especially effective<sup>4~10</sup>). The diaphragm was visualized by the T1 enhanced image of MRI as a low signal region and the sagittal section identified the diaphragm defect. The eventration through the hernia orifice into the thoracic cavity was clearly shown and the positional relation between the diaphragm and the thoracoabdominal internal organs was clarified.

For treatment, conservative therapy is not generally recommendable and an operation is necessary. The manifestation of symptoms is superacute and intense, and often emergency operations are performed without a satisfactory preoperative diagnosis. In this case, however, a suction tube was inserted into the stomach to aspirate gastric contents, allowing some time before the operation. There may be times when emergency operations are necessary,

but if not, it is better to wait for improvement of the general condition of the patient and confirmation of the pathology whenever possible. An abdominal approach is best in view of the possibility of complications regarding internal organs in the abdominal cavity, although it has been reported that thoracotomy is better when in the chronic stage, for organs are often elevated into the thoracic cavity<sup>1, 5, 8</sup>). Be that as it may, a safe and minimally invasive approach should be chosen according to the individual case.

This case was reported at the First General Meeting of the Japanese Society for Emergency Medicine (1998: Kurashiki).

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## 遅発性外傷性横隔膜ヘルニアの一例

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交通外傷5ヶ月後に突然の胸背部痛を伴って発症した遅発性外傷性横隔膜ヘルニアの一例を経験したので報告する。症例は66歳男性。5ヶ月前に交通事故により肋骨、坐骨等を骨折した。受傷時胸部症状認めなかったが、5ヶ月後に突然の胸背部痛が出現したため当院内科受診し、当科紹介となった。胸部X線上、左横隔膜の挙上と縦隔の右方への圧排を認めた。胸腹部CT、MRI、注腸等により、胃、結腸の一部が左胸腔内へ偏位していることが認められた。病歴から遅発性外傷性横隔膜ヘルニアを疑い手術を施行した。手術は腹部正中切開にてアプローチした。開腹すると左横隔膜に10×8cmのヘルニア門を認め、同部より胃、結腸の一部が胸腔内に脱出していた。ヘルニア嚢は存在しなかった。胃、結腸を腹腔内へ還納した後、横隔膜を縫縮し胃前壁を腹膜へ固定して閉腹した。外傷性横隔膜ヘルニアは受傷後無症状下に長期間経過し突然激的な症状を発現する症例があり、胸腹部外傷、多発外傷患者に対しては本疾患の存在を考慮しておく必要があると思われた。また術前診断には特にMRIが有効であった。