



## Clinical case

### A case of traumatic diaphragmatic rupture in a child

Cas de rupture diaphragmatique traumatique chez l'enfant

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#### Résumé

La rupture diaphragmatique post traumatique (RDT) est une lésion rare chez les enfants. Elle survient dans un contexte de polytraumatisme. Elle peut passer inaperçue avec un diagnostic difficile et parfois tardif. L'imagerie est un élément clé du diagnostic.

Nous rapportons le cas d'un enfant de 10 ans présentant une rupture diaphragmatique gauche post-traumatique suspectée par la radiographie thoracique et confirmée par la tomodensitométrie thoraco-abdominale.

Mots-clés : Rupture diaphragmatique, post traumatique, Enfant.

#### Abstract

Traumatic diaphragmatic rupture (TDR) is a rare injury in children. It occurs in a context of polytrauma. It can go unnoticed with a difficult diagnosis that can be late. Imaging is a key element of diagnosis.

We report the case of a 10-year-old child with post-traumatic left diaphragmatic rupture suspected by chest X-ray and confirmed by thoraco-abdominal computed tomography.

Keywords: Traumatic, diaphragmatic rupture, Child

#### Introduction

Traumatic diaphragmatic hernia (TDH) is a serious injury [1]. It is rare in children and adolescents with a low incidence of 0.8 to 1.6%. It results from high energy mechanisms and occurs in a context of polytrauma [2]. It can be discovered immediately in the early phase of the accident or late. The diagnosis can be difficult to make due to non-specific clinical symptoms and/or an uncontributory paraclinical assessment [1,2]. It can be life-threatening and its management poses the problem of the surgical approach.

#### Clinical case

It was a 10-year-old pupil, admitted for polytrauma following a road accident.

The pedestrian patient was hit by a vehicle with trauma supported by anteroposterior compression against an electric pole. The impact was at the level of the thorax, abdomen, pelvis and lower limbs, without initial loss of consciousness.

The admission examination showed a Glasgow

score of 15/15, pale conjunctivae with hemodynamic instability.

He was polypneic with a capillary oxygen saturation of 90% in ambient air.

Examination of the pleuropulmonary system found right and left basi-thoracic dermabrasions, a left pleural fluid effusion syndrome. The abdomen was soft and painless.

On examination of the musculoskeletal system:

- At the level of the left hip: The presence of a deteriorating wound of 12 cm long axis with exposed dislocation and exposure of the left femoral head
- On the level of the left knee: A wound of 4 cm of major axis on the external face.
- At the level of the right thigh: a wound measuring 7 cm on the long axis on the posterior face with exposed bone without vasculo-nervous complications.
- There were no urinary problems

A chest X-ray was taken showing an ascent of the left diaphragmatic dome. Thoraco-abdominal CT showed a left diaphragmatic rupture with herniation of the stomach into the thorax [Figure 1]

In total, it was a polytrauma associating: a left diaphragmatic rupture, an anterior open dislocation of the left hip, a type 2 open fracture of Gustillo and Anderson of the right femur and an articular wound of the left knee.

The indication of a laparotomy was posed and made it possible to confirm the diagnosis.

The lesion assessment concluded with an 8 cm left diaphragmatic rupture with herniation of the greater curvature of the stomach [Figure 3]. The left lung was healthy and there was no hemothorax.

The stomach was reintegrated into the abdominal cavity and the diaphragmatic breach was sutured with separate stitches of non-absorbable suture [Figure 3] associated with drainage.

- concerning the exposed dislocation with exposure of the left femoral head, and the open fracture of the right femur, reduction was performed with suture trimming, drainage and traction of the 2 lower limbs.
- For the articular wound of the left knee, trimming + suturing and drainage were done.

Postoperatively, the patient showed no respiratory problems.

Control chest X-rays were normal.

The patient was discharged 2 months 13 days postoperatively due to delayed healing of the open lesions of the lower limbs.

The consequences of the open dislocation of the left hip, at the follow-up of 2 years, were marked by necrosis of the femoral head which will be the subject of a subsequent prosthetic replacement [Figure 4b].

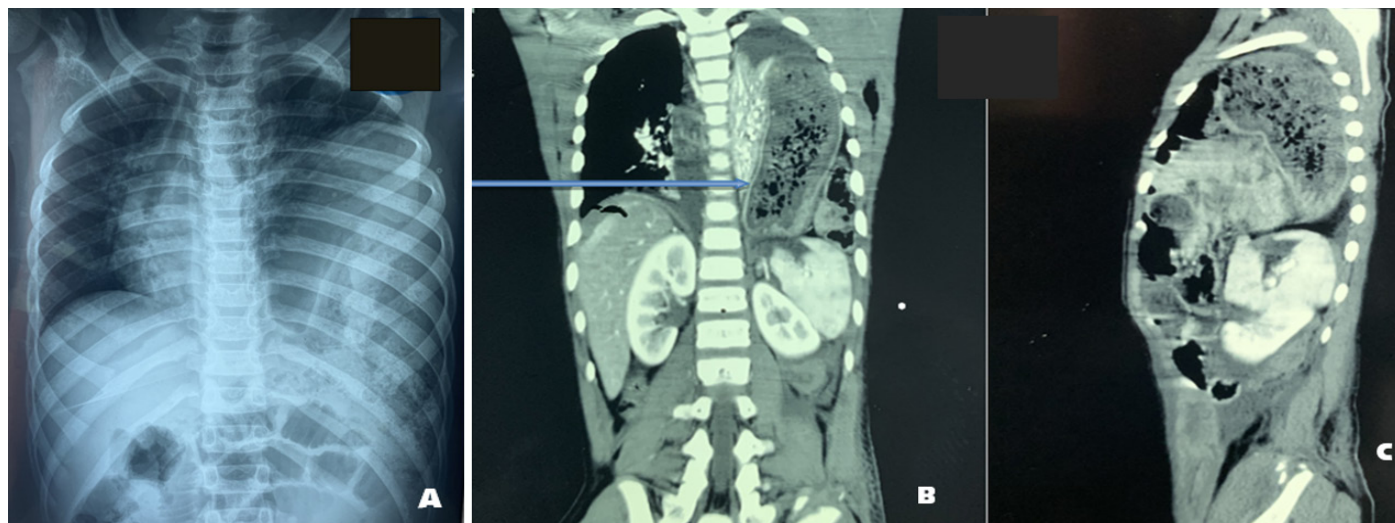


Figure 1: frontal chest X-ray. (1a), thoraco-abdominal computed tomography in frontal 1b and sagittal 1c section

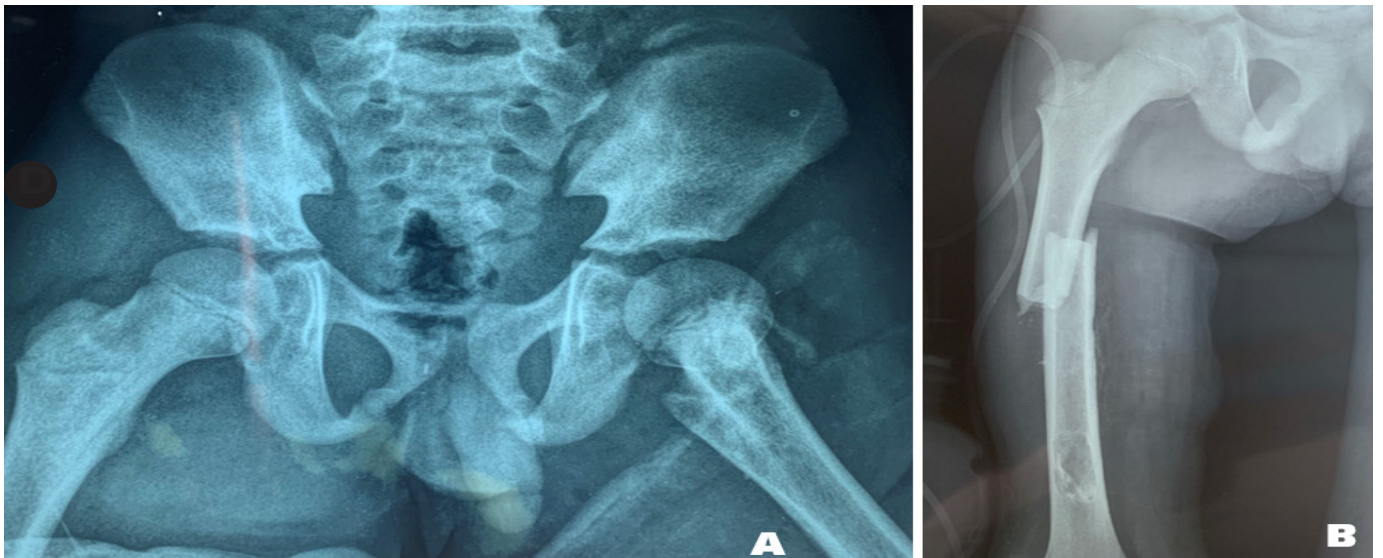


Figure 2: Anterior pelvic x-ray showing rotation of the left femur (2a), right thigh x-ray showing a diaphyseal fracture of the right femur (2b)

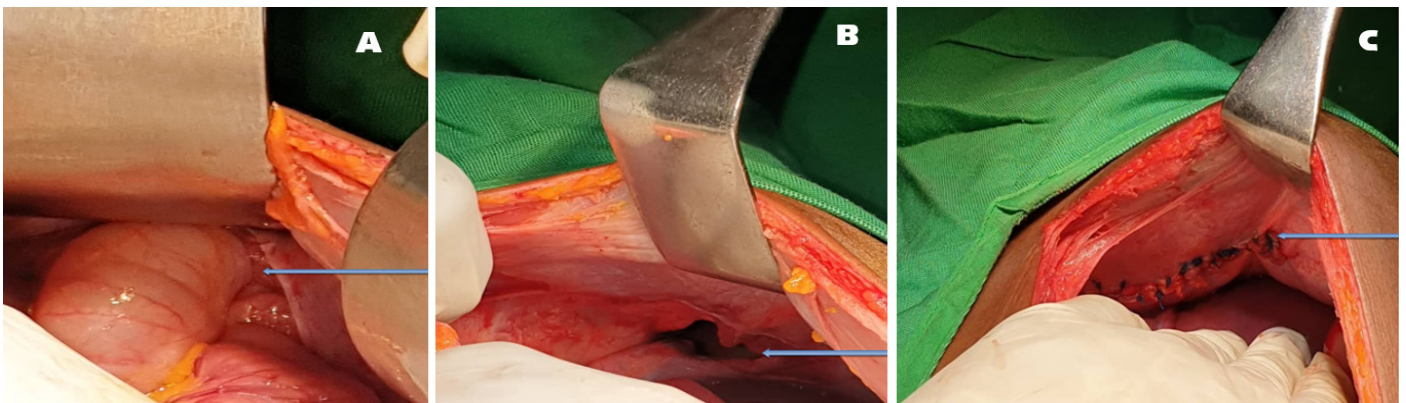


Figure 3: Intraoperative image showing the diaphragmatic breach with gastric hernia (3a), the diaphragmatic breach after reintegration of the stomach (3b), after suture of the diaphragmatic breach (3c)

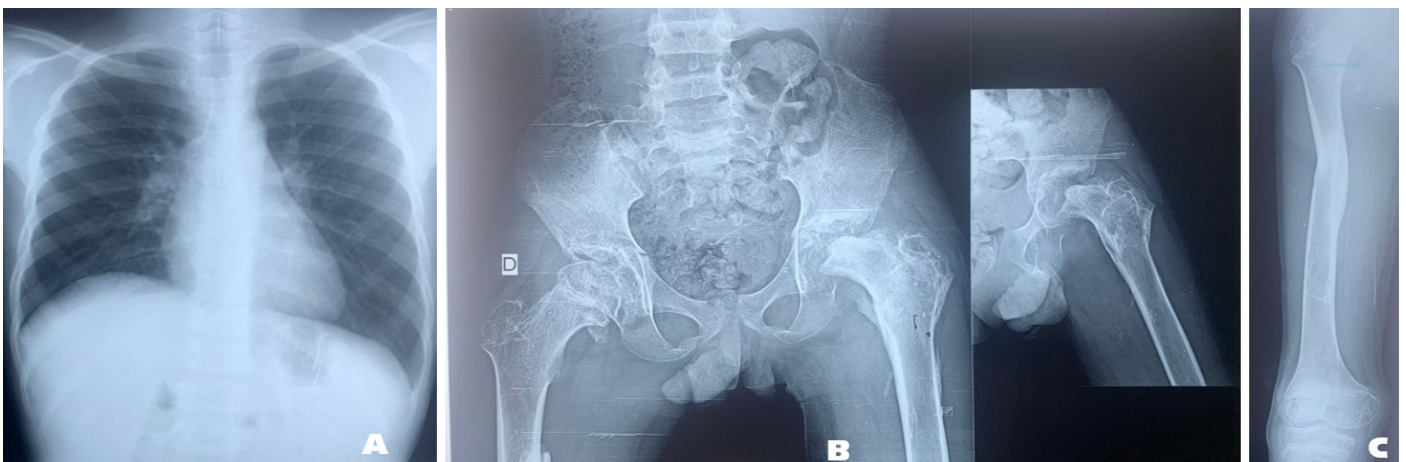


Figure 4: X-ray control at 02 years post traumatic: frontal lung (4a), front pelvis (4b) and right femur (4c)

## **Discussion**

TDR is an injury caused by high-energy thoraco-abdominal trauma [1,3]. This is a mechanism of intra-abdominal hypertension.

Road accidents are the most commonly found causes [1].

The diagnosis is often late and can be made several days after the trauma. There is a diagnostic delay of 25% [1,4].

The patient is often seen in a context of polytrauma with more spectacular lesions in the foreground that can make the diagnosis difficult [1,2,3].

These lesions may go unnoticed if CT scans are unavailable, or if the abdominal contents have not yet herniated through the defect [5,6].

The clinical symptomatology is dominated by signs of respiratory distress [7, 8,9].

Thoraco-abdominal CT scan with a sensitivity of 65.8% confirms eventration [1].

RDT is frequent on the left because of the protection of the right diaphragmatic dome by the liver [1].

Associated lesions can be intra abdominal dominated by hepatic (44%), splenic (21%) lesions. Limb fractures and head trauma are frequently described [7].

In cases of herniated organs, the stomach is found in the majority of cases [1].

The treatment of post-traumatic diaphragmatic ruptures is surgical. Regarding the approach, laparotomy and laparoscopy have the advantage of allowing exploration of the abdominal cavity [1,2]. Thoracotomy is performed in case of intrathoracic lesion and in certain right diaphragmatic ruptures [1,2,3].

Diaphragmatic repair can be done by suturing with non-absorbable thread, silk thread or by using a synthetic prosthesis [1].

The prognosis is essentially linked to the occurrence of respiratory failure and paresis of the diaphragm [1]. Mortality is high (16.6% to 33.3%) due to associated lesions and hemorrhagic shock [1, 3,10].

Faced with the difficult diagnosis of this lesion, it

must be suspected in high-energy thoraco-abdominal trauma.

## **Conclusion**

Post-traumatic diaphragmatic hernia in children is a rare condition. Diagnosis is often difficult and late due to poor signs. Respiratory disorders, oxygen desaturation after change of position in a polytraumatized child should raise suspicion of a diaphragmatic lesion. Standard X-ray and/or thoraco-abdominal computed tomography should be performed in the slightest doubt. The treatment is surgical and the abdominal route is the most common. The prognosis is favorable in the absence of complications and associated lesions.

## **Consent**

Prior written informed consent was obtained from the child's parents for the publication of this case report and accompanying images.

## **Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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**Conflict of interest :** None

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