

Traumatic Ruptured Diaphragm: A Clinical Diagnostic DilemmaK. K. AGWUNA, G. E ANYANWU², A. I. UGOCHUKWU³¹Department of Radiology, University of Nigeria Teaching Hospital, Enugu, Nigeria.^{2,3} Department of Anatomy College of Health Sciences, Enugu State University, Enugu State, Nigeria**ABSTRACT**

Sequel to a car crash, Chief A, a 52-year old banker presented in the Orthopaedic Unit of University of Nigeria Teaching Hospital Enugu with fracture right forearm bones and minor bruises in the abdomen and buttocks. His fractured right forearm was treated surgically and patient was discharged. A month later, Chief A developed breathlessness and was therefore re-admitted in same hospital where radiological survey including plain chest radiography and tailored barium meal revealed a hitherto clinically occult rupture left hemi-diaphragm with mediastinal shift to the contra-lateral side. We present this case to highlight the pleomorphism of traumatic rupture of diaphragm with emphasis on the causes, clinical presentation, complications, model of progression and different treatment options.

Keywords: Traumatic, Rupture, Diaphragm.

CASE REPORT

Chief A, is a 52 year old male banker who was being shuffered in his 504 Peugeot salon car from Enugu to Port-Harcourt for a board-meeting when his car collided with a stationary truck along Enugu-Port-harcourt expressway. He sustained a commuted fracture of the right radius and ulna bones and also sustained minor bruises in the abdomen and buttocks. He was immediately admitted in orthopaedic unit of University of Nigeria Teaching Hospital Enugu where his fracture right forearm bones were surgically treated.

A month following discharge from hospital he presented at the surgical outpatient with a vague abdominal pain, left sided chest discomfort and breaklessness serious enough to warrant radiological investigation. A post-anterm erect chest radiograph was ordered for Chief A.

However radiological review of chest radiograph revealed a left sided diaphragmatic hernia, apparent/marked elevation of the left hemi-diaphragm and mechastinal shift to the contra-lateral side.

Tailored barium studies done with 70 gram of barium sulphate revealed herniation of fundus and body of the stomach into the left hemi-thorax. The fundus of the stomach ascended to the level of the aortic arch. There was a shift of the mechastinum to the contra-lateral side. The delayed film failed to show either colon or small gut hermation.

Clinical findings included moderate hypertension 160/100mmHg, diminished excursion of the left hemi-thorax, diminished vocal resonance of the left lung mid and lower lung zones. Coarse crepitations, were heard in both lung bases. E.C.G. showed normal sinus rhythm, heart rate of 88 heats per minute with essentially normal trace pattern.

At surgery (left posterior lateral thoracotomy incision) the herniated viscera included viable stomach, greater omentum, transverse colon and

small gut i.e. ileum. The rent in the left diaphragm was in the Fibro-muscular part and was up to 12cm in diameter. There were no adhesions or fibroses.

The lacerated diaphragm was repaired with nylon in 2 layers of continuous suture under general anaesthesia.

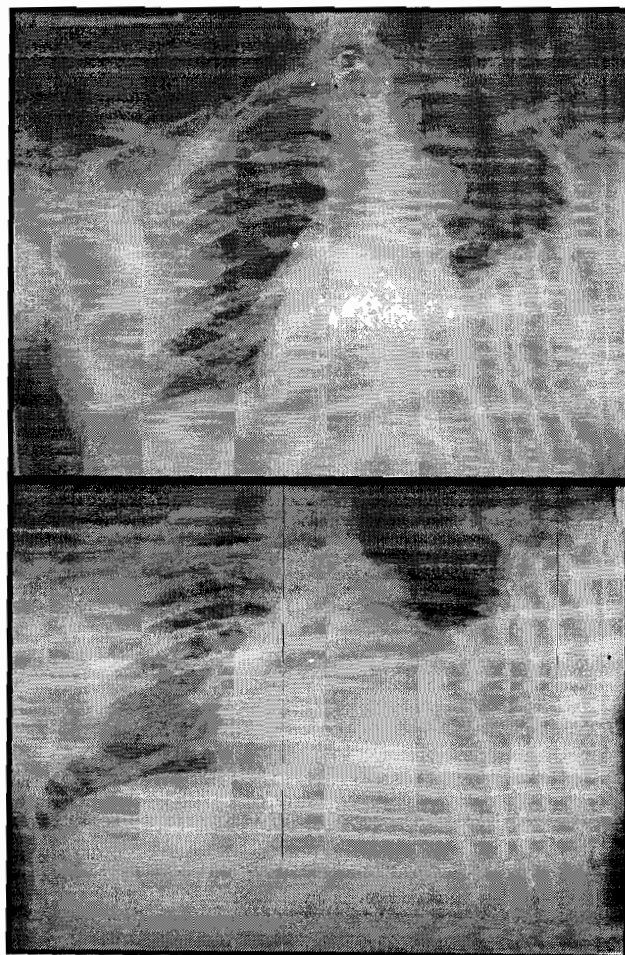


Fig 1: Tailored Barium meal exam showing stomach in the chest.

DISCUSSION

We present this case to highlight the pleomorphism of traumatic rupture of diaphragm with emphasis on the causes, clinical presentations, complications, mode of progression and different treatment options.

Our case is due blunt abdominal trauma due to high-speed motor vehicle collision. It is note worthy that victims of lateral impact motor vehicle collisions are more likely to experience rupture of diaphragm than victims of frontal collisions. Occupant exposed to left lateral impacts is at greatest risks. The side of diaphragmatic rupture correlates with the direction of impact, (Kearney 1989).

The right hemi-diaphragm is more resistant to rupture, which presupposes that the left diaphragmatic rupture is commoner, although the incidence of right diaphragmatic rupture is rising with the increase in right seat drivers, (Kearney et al, 1989; Thakores 2001).

It is a known fact that deformation shear is a more plausible mechanism for diaphragmatic rupture after lateral impacts.

Therefore the knowledge of mechanisms that produce injury combined with information regarding the victim's seat position and direction of impacting force should lead to a high index of clinical suspicion for diaphragmatic rupture (Thakores 2001).

Nevertheless, the most common cause of diaphragmatic rupture in the tropics is a fall from height, fall from trees by palm wine tapers - adults and fruit tree climbers e.g. mango tree in children. In more advanced countries, such fall, occurs in window cleaners, (Am et al, 1990).

Traumatic rupture of diaphragm could also result from blunt trauma to the trunk by motor vehicle accidents and also from penetration injuries to diaphragm from gunshot or stab wounds, (Williams, 1982.)

This case clearly showed that ruptured diaphragm can be clinically silent ab initio and need not be an acute, rapidly progressing episode with respiratory distress leading if not treated promptly to death. The progress clearly depends in the size of the rent in the diaphragm and therefore the rapidity of herniation, patient's age severity of associated injuries and subsequent complications, (Am et al, 1999).

In our patient there was 4 weeks period of silence without any restrictive pulmonary function.

An erect chest radiograph is the best clue to diagnosis and it is noted by (Kearney et al, 1989) that

chest radiography and diagnostic peritoneal lavage establish the correct diagnosis in almost 90% of patients with acute diaphragmatic disruption. Additional diagnostic studies are reserved for the remaining 10% of patients, (Kearney et al, 1989; Williams et al, 1982).

The frontal chest radiograph usually shows an apparent elevation of the diaphragm with gas filled cyst-like shadows. There may be associated contra-lateral mediastinal shift. When there is rupture on the right side there may not be cyst-like shadows but a homogenous opacity in the right hemi-thorax resulting from herniation of the liver which is the dominate organ in that region Haemotopneumothorax, free intra peritoneal air without guarding may be seen, (Estrera et al, 1985). In lateral film, diaphragmatic elevation with an abnormal outline may be seen, (Am et al, 1999).

Oral contrast studies will confirm presence of intra abdominal contents in the chest in majority of patients making the use of more sophisticated imaging modalities less imperative. Thus is very important for the tropics where these sophisticated imaging modalities are not readily available.

Laparoscopy had proved in recent times to be a very reliable, accurate and minimally invasive investigation, (Am et al, 1999)

Computerized tomography, magnetic resonance imaging and ultrasound are good ancillary tests. The later will show whether or not there is dynamic activity if the herniated gastro-intestinal tract a test which will exclude strangulation and gangrene.

The "Dependent viscera sign that was described by Bergin et al to be either "whether one third of the liver abutted the posterior right ribs or whether the bowel or stomach lay in contact with the posterior left ribs," aids CT detection of acute diaphragmatic rupture (Williams 1982. The treatment of diaphragmatic rupture is surgical repair of the rent. However, in the acute phase, the injury should be approached through laparotomy because of the need to exclude or treat other intra- abdominal injuries, but in cases where diagnosis and treatment are delayed, thoracotomy is usually the approach of choice, (Kearney et al, 1989; Williams 1982).

The complications of traumatic rupture diaphragm can be acute or chronic. Acute complication, include rupture of viscus and in cases of right side diaphragmatic rupture, there could be Laceration of juxtahepatic vena cava or hepatic vein or both and thus usually lead to an uncontrollable exanguinating haemorrhage which can claim the

patient's life, (Estrera et al, 1985).

Chronic complications of traumatic diaphragmatic rupture include incarceration of stomach, colon, perforations, infection, tension feco-pneumothorax and haemopneumo Peritoneum, Am et al.

The differential diagnosis of traumatic diaphragmatic rupture includes diaphragmatic hernia, which may be unilateral or bilateral. Eventration of the diaphragm is a likely differential, which may sometimes be difficult to differentiate (Sharma et al, 2001).

We are perplexed that with a rent of 12cm and for the age of our patient, he did not develop a rapid respiratory decompensation.

CONCLUSION

Traumatic rupture of diaphragm could be clinically latent, and the delay in diagnosis usually spells doom for most patients.

We conclude that pre operative diagnosis of traumatic rupture of diaphragm need a high index of suspicion.

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