

# EARLY ROENTGEN DIAGNOSIS OF RETROPERITONEAL DUODENAL RUPTURE DUE TO BLUNT ABDOMINAL TRAUMA

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## ABSTRACT

*Retroperitoneal duodenal rupture due to blunt abdominal trauma is relatively uncommon. Diagnosis is difficult because the physical signs are subtle or they are difficult to interpret. A case of retroperitoneal duodenal rupture due to blunt abdominal trauma in whom the diagnosis was delayed is reported. Radiographic features are discussed. The role of early roentgen diagnosis is stressed in order to reduce the very high mortality which is associated with delay in diagnosis and treatment.*

*Keywords: blunt abdominal trauma, retroperitoneal duodenal rupture, roentgen diagnosis.*

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## INTRODUCTION

Retroperitoneal duodenal rupture occurs in less than 10% of intestinal rupture that results from blunt abdominal trauma<sup>(1)</sup>. It is often not readily apparent clinically and does not produce free intraperitoneal air. The lack of early clinical signs in these patients often result in delaying definitive treatment which is associated with high mortality<sup>(2)</sup>. Early diagnosis is possible only with good quality abdominal radiographs and an acute awareness of the occurrence of this injury.

## CASE REPORT

A 25-year-old man was involved in an automobile accident in which he fell from his motorcycle and received a blow over his back. He was admitted to the hospital the same day. He complained of pain in the left loin.

On examination he was afebrile. The pulse was 80/min and the blood pressure 110/70 mmHg. He had superficial abrasions and haematoma over the left loin. There was no evidence of penetrating injury. The right side of the abdomen was mildly tender and guarded. Bowel sounds were diminished. Investigations done were:

Hb = 15.1 g/dl.

Urine analysis was normal.

Chest X-ray: normal.

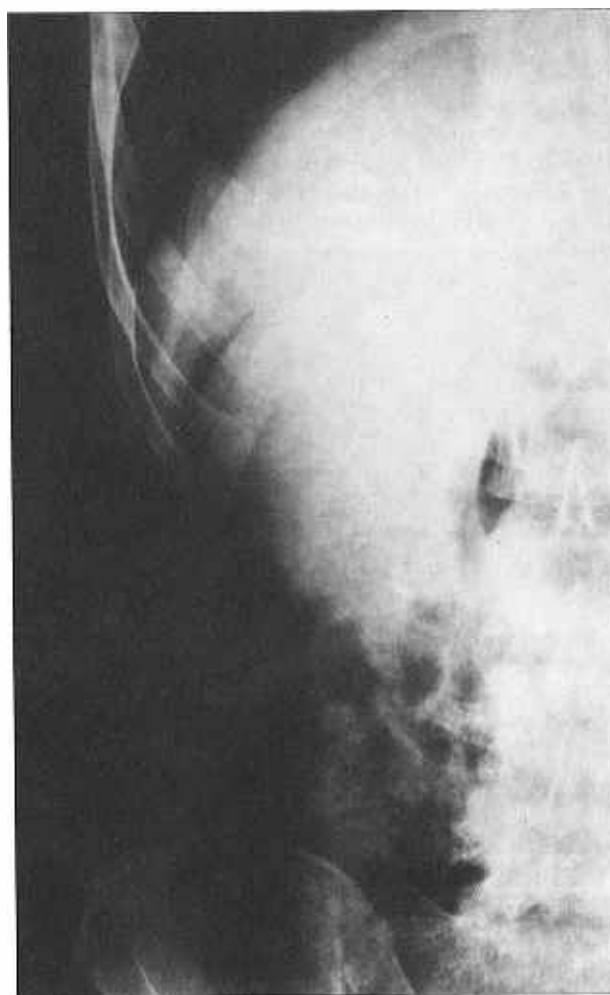
Plain abdominal X-ray: no free gas in the peritoneal cavity.

A curvilinear streak of gas was present around the right kidney but this sign was missed initially (Fig 1).

An intra-abdominal injury was suspected and the patient was kept under close observation. At laparotomy performed the following day some fluid was detected in the right paracolic gutter and in the retroperitoneum on the right side. No organ injury was detected. Post-operatively the bowel sounds remained sluggish and large amounts of aspirate was obtained from the stomach.

Contrast examination of the upper gastrointestinal tract done on the 5th post-operative day revealed perforation of the duodenum at the junction of the second and third parts with leakage of contrast into the retroperitoneum (Fig 2). Immediate re-exploration was performed.

Fig 1 - Plain abdominal radiograph on day of admission demonstrating a curvilinear streak of gas around the right kidney.



The perforation was identified and closed using a jejunal patch. The patient had developed a pelvic abscess which was drained. After a stormy post-operative period, he was discharged well six weeks after admission.

## DISCUSSION

It is important to recognise retroperitoneal duodenal rupture because of its high mortality in patients treated inadequately. Mortality rises from 5% to 65% if treatment is delayed for more than 24 hours<sup>(2)</sup>. Complications include duodenal fistula

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**Fig 2 - Contrast examination of the upper gastrointestinal tract. There is perforation of the duodenum at the junction of the second and third parts with leak of contrast into the retroperitoneum. Note the bubbles of air in the retroperitoneum.**



(6-13%), pancreatic fistula (7-8%) and abdominal sepsis (11-13%)<sup>(3)</sup>.

Diagnosis is difficult because it is often not readily apparent clinically and does not produce free intraperitoneal air. In some cases the clinical findings may warrant immediate exploratory laparotomy. In others it may be difficult to decide. In such situations plain abdominal radiographs and contrast studies of the upper gastrointestinal tract are important aids to the diagnosis. In 15% of patients retroperitoneal duodenal rupture is not recognised even at laparotomy<sup>(4)</sup>. The case reported clearly illustrates the diagnostic difficulty. The duodenal rupture was not recognised at the initial laparotomy. The diagnosis was made on the 5th post-operative day with the aid of contrast

studies.

#### **Mechanism of Injury**

Crush injury to the upper abdomen including severe blow from a steering wheel is the usual cause. Crush injury to the back may also be causative factor as in the present patient. The pylorus closes the proximal end of the duodenum. The third portion can be compressed over the spine or pressure may cause acute angulation and obstruction of the fourth part. In any of these situations the duodenum is converted into a closed loop. Increase in intraluminal pressure results in rupture<sup>(4,5)</sup>. Rupture commonly occurs at the junction of the second and third parts of the duodenum. This was indeed the site of rupture in the case reported.

#### **Clinical features**

The patient complains of upper abdominal pain which is deep seated and may go through to the back. Vomiting may be associated.

Physical examination may reveal external bruising, tenderness and guarding of the upper abdomen and diminished peristalsis.

#### **Roentgen findings**

The following appearances may be seen:

1. Bubbles, streaks or pockets of air surrounding the right kidney or both kidneys.
2. Air along the psoas muscle on one side or both sides.
3. Retroperitoneal air in the infradiaphragmatic and pelvic regions.
4. Subcutaneous emphysema in the right flank.
5. Mediastinal and cervical emphysema.

Toxopeus et al (1972) reviewed the X-rays of 12 patients with blunt retroperitoneal duodenal rupture and found a positive diagnosis based on retroperitoneal air, usually around the right psoas and kidney in 33% of the cases. Non specific findings include scoliosis, obliteration of psoas margins and ileus.

In conclusion, good quality radiographs play an important role in the early diagnosis of retroperitoneal duodenal rupture, thereby reducing the high mortality which is associated with delay in diagnosis and treatment. Early diagnosis is possible only with an acute awareness of the occurrence of this injury in patients with blunt abdominal trauma.

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