

CASE REPORT

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Post-traumatic duodenal rupture: A case report

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ABSTRACT

Post-traumatic duodenal ruptures are rare. Diagnosis remains difficult due to the anatomical characteristics of the duodenum. Medical observation: the authors report a case of post-traumatic duodenal rupture following a road traffic accident, diagnosed on computed tomography (CT) and treated surgically. Although rare, duodenal ruptures are an emergency for all radiologists. The anatomical complexity of the duodeno-pancreatic region and its proximity to vascular and mesenteric structures explain the rich semiology. Careful radiological analysis is essential to facilitate the surgical procedure. Duodenal rupture is an emergency to be aware of and investigated in all cases of road trauma, especially in the case of blunt trauma. Diagnosis is based on CT scan.

Keywords: CT scan, Duodenum, Rupture, Surgery, Trauma

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INTRODUCTION

Duodenal injuries are uncommon, accounting for 0.5–5% of abdominal traumas [1]. This low incidence is attributed to the deep and retroperitoneal location of the duodenum. Anatomical understanding and semiotic analysis through computed tomography (CT) aid in diagnosing post-traumatic duodenal perforations. We report a case of duodenal trauma following a road traffic accident.

CASE REPORT

A 32-year-old truck driver was brought to the emergency room after a road accident where he was not wearing a seatbelt, resulting in a frontal impact against the steering wheel. The clinical examination revealed diffuse abdominal tenderness. A CT scan with contrast injection showed retroperitoneal air and fluid accumulation behind the third (D3) and fourth (D4) parts of the duodenum, extending along the central retroperitoneal space (Figure 1), along with a hematoma at the mesentery root (Figure 2). Extra-digestive air bubbles outlined a sizable duodenal wall breach. The pancreas and intra-abdominal organs showed no abnormalities. No vascular or bony lesions, especially in the spine, were detected. The patient underwent exploratory laparoscopy followed by laparotomy, confirming a wall breach affecting 2/3 of the circumference of the D3/D4 angle, with a retroperitoneal collection containing bile and digestive content. Edges were trimmed, and a termino-terminal suture with gastro-entero-anastomosis was performed (Figure 3). The patient had a favorable recovery.

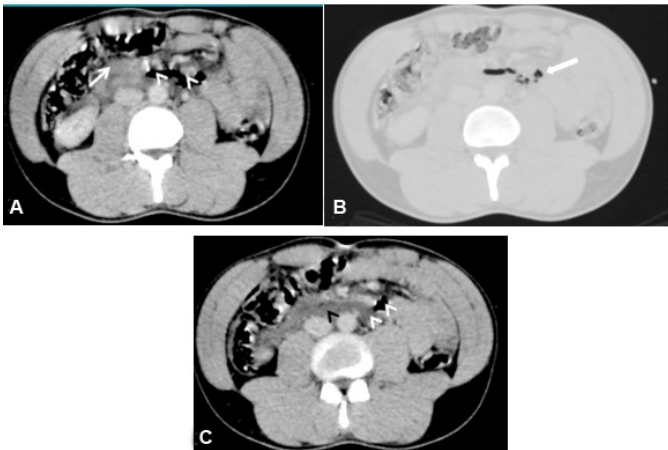


Figure 1: Axial contrast enhanced CT abdomen in soft tissue window (A, C) and lung window (B), demonstrating a clear discontinuity in the duodenal wall with fluid collection both in front and behind the duodenum (>), along with extra-digestive air bubbles (B with arrow). The wide breach is outlined by the gas bubbles (>). Take note of the mesenteric hematoma (→).

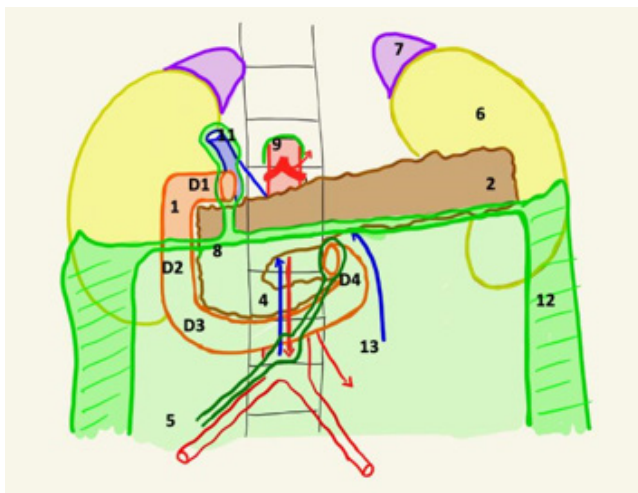


Figure 2: Anterior schematic view illustrating the duodenal configuration. The duodenum (1) consists of four segments (D1, D2, D3, and D4), framing the head of the pancreas (2), located in front of the lumbar spine (3). The D3/D4 junction is marked by the depression of the superior mesenteric pedicle (4). The duodenojejunal angle accommodates the root of the mesentery (5). In our case, the rupture point was located at the D3/D4 junction with a mesenteric hematoma near the contusion zone. Kidneys (6), adrenal glands (7), root of the transverse mesocolon (8), aorta (9), celiac trunk (10), portal vein (11), Toldt's fascia (12), and inferior mesenteric vein (13).

DISCUSSION

Post-traumatic duodenal perforations are rare and associated with an estimated mortality rate of 6–29% [2]. Diagnosis remains challenging, both clinically and radiologically, owing to the anatomical complexity of the duodenum.

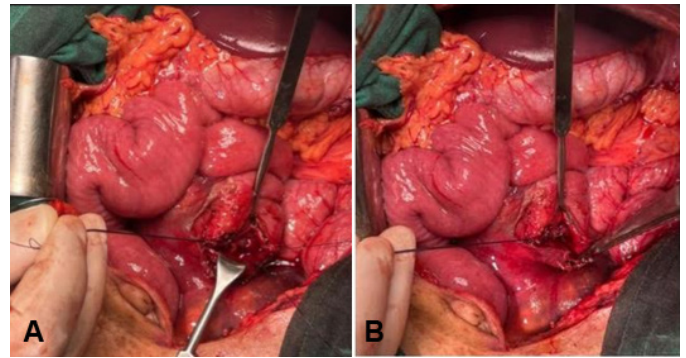


Figure 3 (A, B): Surgical view depicting the duodenal rupture at the D3/D4 junction. The breach is wide, and the mesentery is visible. Edges are trimmed, and a termino-terminal suture with a gastro-entero-anastomosis is performed.

The duodenum is the initial part of the small intestine, consisting of four duodenal segments. In terms of frequency, the second segment is the most affected during traumas (36%), followed by the third (18%) and fourth (15%). Multiple injuries are found in 18% of cases [3, 4].

The third segment is horizontal, slightly ascending to the left, crossing in front of the fourth lumbar vertebra. This transverse configuration explains the possibility of compression injuries.

Computed tomography scan is the preferred method for assessing duodenal wall, content, and the peri-duodenal environment.

A duodenal contusion is suspected with focal wall thickening (>4 mm), intramural air bubbles, fat infiltration, and peri-duodenal fluid collection [5]. A duodenal hematoma is characterized by spontaneously dense wall thickening, possibly with upstream gastric distension [5].

Perforation manifests as a parietal discontinuity with adjacent pneumoperitoneum. Retroperitoneal fluid accumulation may be present. In cases of complete rupture, the wall appears dislocated and completely torn, accompanied by pneumoperitoneum, retro-pneumoperitoneum, and retroperitoneal bleeding.

Therefore, semiotic analysis is crucial. In the presence of minor signs like parietal hematoma or peri-duodenal fluid, a conservative approach with a follow-up CT scan at 24 hours is recommended [3]. Conversely, in the presence of major signs, surgical treatment is required. In our patient, a duodenal rupture was identified with a disrupted wall at the D3–D4 junction, along with pneumoperitoneum, retro-pneumoperitoneum, fluid accumulation, and hematoma at the mesentery root.

The surgical treatment of traumatic duodenal perforation involves suturing the breach with an appropriate surgical setup (gastro-entero-anastomosis) or reinforcing the wall with a muscle flap.

CONCLUSION

The duodenum is a deeply located organ that can be affected by both open and closed abdominal traumas. Duodenal rupture is a critical condition that requires prompt recognition. The diagnosis relies on CT scans, and a thorough understanding of anatomy and semiotics is crucial for accurate and precise interpretation.

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Author Contributions

Chaimae Lahlou – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Hadj Hssain Ihssan – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Kaoutar Meslouhi – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Jroundi Laila – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

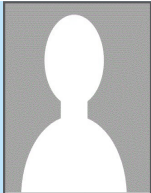
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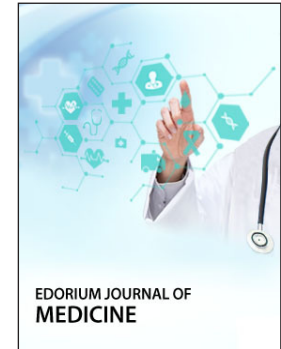
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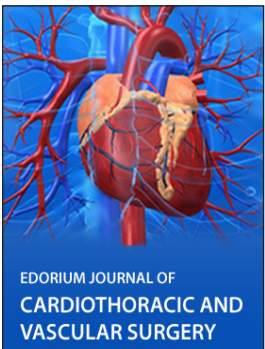
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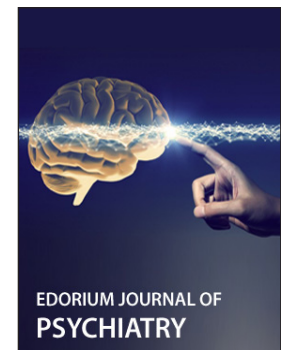
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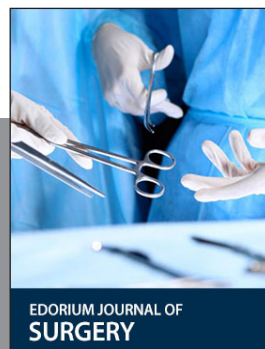
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