

## Case Report

# Isolated rupture of duodenum following blunt trauma abdomen: report of a case of avulsion of pylorus

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## ABSTRACT

Isolated duodenal injury following blunt trauma do not occur often. A patient with complete damage to the duodenum presents a challenge to the surgeons. The choice of procedure must be tailored to the nature of the defect and the amount of tissue lost. A 19-years-old male presented with features of bowel perforation following blunt injury abdomen. After initial conservative management, the patient was taken up for laparotomy. A complete transection of duodenum with avulsion of pylorus was found. Primary closure of duodenum and pylorus with omental patch support was done. The patient made an uneventful recovery. The choice of procedure may vary and it depends on the patient condition and surgeon capability. Primary closure of disturbed ends without any gastric diversion procedure is the excellent choice in a young patient with blunt injury without major intraoperative contamination. Primary closure is also a challenging procedure compared to other natural tailoring techniques.

**Keywords:** Avulsion of pylorus, Blunt trauma, Duodenal rupture, Duodenal trauma

## INTRODUCTION

Duodenal rupture secondary to blunt injury is a relatively rare event and is usually a result of road traffic accident. The incidence of duodenal injuries is 11.2-26% due to blunt trauma.<sup>1</sup> On an average, one to four other abdominal organ injuries are associated with duodenal injury, which makes an isolated injury to duodenum a rarity.<sup>2</sup> The management of duodenal injuries remains controversial. Isolated duodenal injuries in blunt injury, especially complete transection of first part of duodenum do not occur often. Patients with duodenal traumas represent approximately 4% of all patients with abdominal injuries from blunt trauma, usually resulting from road traffic accidents, which account for 22% of all patients with duodenal injuries.<sup>3</sup> The choice of treatment, must be covered to the nature of the defect and the

amount of tissue lost.<sup>4</sup> Different surgical techniques have been developed for the management of patients with duodenal injuries.<sup>4</sup> The surgeon should select the most efficient procedure according to the type and conditions of the patient's injury.<sup>5</sup> Study describe case report of a patient with a complete transection of the first part of duodenum with avulsion of pylorus, resulting from a blunt abdominal injury. The surgical technique that was implemented is simple primary closure using omental patch without any gastric diversion.

## CASE REPORT

This was a case of a 19-year-old boy who sustained a blunt injury to his abdomen when hit by a cricket ball while playing. On admission, the patient had stable vitals and normal laboratory reports. Chest X-ray and ultrasound abdomen revealed air under diaphragm and

free fluid abdomen. On laparotomy, a complete circumferential tear of the first part of duodenum with avulsion of pylorus was found (Figure1).



**Figure 1: Complete circumferential tear of the first part of duodenum with avulsion of pylorus.**

There was no retroperitoneal haematoma and the pancreas was normal. Pedicled ileal loop might have been interposed between the duodenal stumps to restore the continuity of the patient's duodenum.<sup>4</sup> But we did primary closure of disrupted ends with omental patch support along with a feeding jejunostomy (Figure 2).



**Figure 2: Primary closure of disrupted ends with omental patch support.**

The patient was transferred to intensive care unit for continuous monitoring of vitals. Feeding jejunostomy feeds were started on post-operative day 2 and he tolerated full fluid diet without any problem. On post-operative day 4 oral fluids were started which was converted to normal diet after 3 days. Apart from minimal postoperative pelvic collection, the patient's postoperative course was uneventful. The patient was discharged on 10th postoperative day in good general

condition. Jejunostomy tube was removed in his follow up visit.

## DISCUSSION

The duodenum is only mobile at the pylorus and its fourth part. It shares its blood supply with the pancreas and, if its relation to the bile duct is taken into account, the high difficulty in suturing or resecting a segment of the duodenum is easily apparent.<sup>1</sup> Disruption of the duodenum by blunt injury can occur either by crushing the duodenum against the rigid vertebral column (as from a direct blow to the abdomen), from the impact of shearing forces (as may occur during falls) or bursting energy (as with a seat belt injury).<sup>2</sup> In our case, the probable mechanisms, based on the mode of injury, could be the effect of crushing and the shearing forces.

Early treatment of a patient with a duodenal rupture is critical and the time interval from trauma to definitive management influences morbidity and mortality from this injury. An 11% mortality rate in patients who underwent a surgery less than 24 hours after an injury, increases up to 40% in those who were managed after 24 hours of being injured.<sup>5</sup> The factors that influence the outcome are the anatomical location of the injured segment to the bile duct, the type of the injury (simple laceration or destruction of the duodenal wall), the circumference of the duodenum involved, associated injuries to the bile duct, pancreas or major vascular injury, and the time elapsed until the patient received definite management.<sup>6</sup> In our case early surgery was the key for successful management. An alternative method is closure of perforation in two layers along with triple tube decompression, i.e. tube gastrostomy, reverse tube duodenostomy and a feeding jejunostomy.<sup>6</sup> Leaving the abdominal wound as a laparostoma is also a safe procedure, since primary closure of the abdominal wall may not be possible due to tension and a primary closure could have resulted in the development of an abdominal compartment syndrome.<sup>7</sup> Although a grading system has been developed to characterize duodenal injuries, it is less important than several simple aspects of the duodenal trauma that better serve, from a practical point of view, the goal of definite management.<sup>8</sup> In our case report, these aspects were decisive for the characterization of the patient's injury and operative technique selection.

Several surgical procedures have been described for the adequate management of patients with duodenal injuries, according to the type and location of injury.<sup>9</sup> They are, primary end-to-end anastomosis or Roux-en-Y duodenojejunostomy with closure of the distal duodenal stump.<sup>10</sup> Considering the procedure of pedicled graft using jejunum as a method of closing large duodenal defects, we decided that the duodenal continuity would be better restored by primary closure in this case. A primary end-to-end anastomosis is a reasonable option, because of the location of the duodenum and pylorus at that disruption part. Also, performing an anastomosis

without tension could reduce anastomotic leak and development of fistulae, intraabdominal collections or gastric outlet obstruction. This repair would not necessitate an additional gastric bypass. Younger age, early intervention and simple definite procedure without disturbing adjacent structures are the keys for successful management of this patient.

## CONCLUSION

In these cases of complete transection of pyloro duodenal junction, our choices for reconstruction were limited. Crucial factors for the successful management of this patient were early operative intervention and the accurate assessment of the nature of the duodenal and associated injuries. Primary closure without any additional procedure is a reasonable safe treatment because the anatomical continuity of duodenum and pylorus was restored.

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## REFERENCES

1. Allen GS, Moore FA, Cox CS, Mehall JR, Duke JH. Delayed diagnosis of blunt duodenal injury: An avoidable complication. J Am Coll Surg. 1998;187:393-9.
2. Velmahos GC, Constantinou C, Kasotakis G. Safety of repair for severe duodenal injuries. World J Surg. 2008;32:7-12.
3. Bozkurt B, Ozdemir BA, Kocer B, Unal B, Dolapci M, Cengiz O. Operative approach in traumatic injuries of the duodenum. Acta Chir Belg. 2006;106:405-8.
4. Kambaroudis A, Antoniadis N, Papadopoulos S, Spiridis C, Gerasimidis T. Reconstruction of a traumatic duodenal transection with a pedicled ileal loop. J Med Case Reports. 2010;4:343.
5. Blocksom JM, Tyburski JG, Sohn RL, Williams M, Harvey E, Steffes CP, et al. Prognostic determinants in duodenal injuries. Am Surg. 2004;70:248-55.
6. Bhattacharjee HK, Misra MC, Kumar S, Bansal VK. Duodenal perforation following blunt abdominal trauma. J Emerg Trauma Shock. 2011;4(4):514-7.
7. Luther A, Mann C, Hart C, Khalil K. Duodenal rupture secondary to blunt trauma from a football. J Surg Case Rep. 2013;2013(1):041.
8. Asensio JA, Feliciano DV, Britt LD, Kerstein MD. Management of duodenal injuries. Curr Probl Surg. 1993;30:1023.
9. Jansen M, Du DF, Warren BL. Duodenal injuries: surgical management adapted to circumstances. Inj. 2002;33:611-5.
10. Ivatury RR, Nassoura ZE, Simon RJ, Rodriguez A. Complex duodenal injuries. Surg Clin North Am. 1996;76:797-812.

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