



MESENTERIC “BUCKET HANDLE TEAR” AFTER RUN OVER ACCIDENT: A CASE REPORT

Surgery

Rahul Bhanja Chowdhury*

Department Of General Surgery, Nil Ratan Sircar Medical College, Kolkata, West Bengal, India. *Corresponding Author

Saptarshi Bhattacharya

Department Of General Surgery, Nil Ratan Sircar Medical College, Kolkata, West Bengal, India.

Ravi Kumar Singh

Department Of General Surgery, Nil Ratan Sircar Medical College, Kolkata, West Bengal, India.

ABSTRACT

Introduction: Intestinal and mesenteric injuries are less common than solid organ injuries around 3–5 % and due to the diagnostic dilemma they can result in therapeutic delay and undiagnosed complications are severe with high mortality rates. They are third in order of frequency after liver and splenic injury. **Aims & Objectives:-** eFAST is not enough for diagnosis of Intestinal and mesenteric injuries. -Laparotomy should be done for hemodynamically unstable patient in high velocity blunt trauma abdomen with positive clinical findings. -Interventional dilemma may cause patient's life. **Discussion:** 24 year male, involved in a vehicular run over accident, arrived 2h after the accident in hemodynamically unstable condition. Diffuse abdominal tenderness present. eFAST showed chink of free fluid collection in perisplenic area ONLY Even after resuscitation, patient remained hemodynamically unstable and an urgent Laparotomy was performed. “Bucket Handle Tears” of the mesentery were found. Enterectomy was performed and end-to-end hand sewn anastomosis done. Mild postoperative complications were recorded but patient was discharged after 18 days. 1, 3 & 6 month's follow-up, patient is without any complications. Small intestinal injuries constitute more than half of all intestinal injuries. It should be suspected in all high energy traumas. eFAST is not useful for the diagnosis. Laparotomy is the standard of care in hemodynamically unstable patients. Patient prognosis is affected by the delay of therapeutic intervention. **Conclusion:** If we have hemodynamically unstable patient with abdominal tenderness and features of peritonism then it is better to think for exploratory laparotomy as soon as possible rather to wait and watch.

KEYWORDS

Bucket handle tear, Laparotomy, eFAST, Hemodynamically unstable

INTRODUCTION

Intestinal and mesenteric injuries are less common than solid organ injuries (liver, spleen) and due to the diagnostic difficulties they can result in therapeutic delay.

The intestinal injuries include hematoma, seromuscular tear, perforation and ischemia. Clinical and radiological signs can be obvious for mesenteric and intestinal injuries, but some injuries may present muted or subclinical signs only.

In abdominal traumas hollow organ and mesenteric injuries are found in 3–5 % [1–3] of the patients. They are third in order of frequency after liver and splenic injury [4].

Case presentation

A patient involved in run over by bus accident, arrived 2h after the accident to the Emergency Department of our hospital. He had a blunt abdominal injury and presented in hemodynamically unstable condition with tachycardia 102 pulses/min, BP 98/72 mmHg, 23 breaths/min and GCS 12/15, no hematuria. The abdomen was devoid of any laceration or gaping wounds or bruises but diffuse tenderness with left sided guarding was present, tyre mark was present over the left chest wall and grazed abrasion over the right flank region.

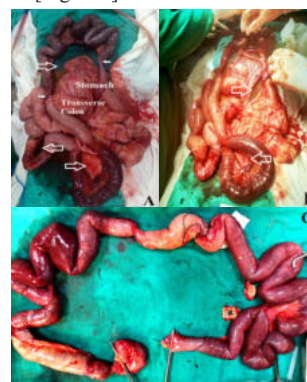
A complete blood count was abnormal with Hb 8.8 mg/dl. An eFAST was performed, revealing chink of free fluid in perisplenic area [Figure 1]. Serial X-Rays showed no bony fractures or involvements, NCCT Brain was normal also.



(Figure-1: eFAST image: Red Arrow showed mild free fluid collection only in perisplenic area and in no other regions)

Patient resuscitated as per ATLS protocol, Crystalloids were infused, analgesic medication was given, and a serial clinical monitoring was conducted till the patient's vital stabilizes.

But even after the initial resuscitation the patient remained hemodynamically unstable and an emergent laparotomy through midline incision was performed. An amount of 250ml of free bloody fluid was found. Spleen, liver, large bowel, bladder, retroperitoneum were inspected but no abnormalities found. The small bowel was carefully inspected from the ligament of Treitz up to the ileocecal valve. Multiple large “Bucket Handle Tears” of the mesentery were found and segments of the small bowel were found to be ischemic and also twisted around [Figure 2].



(Figure-2 A and B showing the “Bucket Handle Tear” of mesentery in white lined arrows, with twisting and ischemia of small bowel, Fig. C showing the resectional segment of the small bowel)

A length of 200cm enterectomy was performed as well as an end-to-end hand sewn anastomosis done with 3-0 PDS 100cm from Duodeno-Jejunal flexure and 50cm from the ileocecal valve. The peritoneal cavity was washed-out with warm saline solution, and two abdominal drains were placed in the peritoneal cavity (in the Pouch of Morrison and pouch of Douglas). The patient was transferred to the ICU. No postoperative complications were recorded. The drain was removed on the 7th day. The patient was discharged home after 12 days. After one-year follow-up the patient is asymptomatic and without complications.

DISCUSSION

Mesenteric and hollow organ injury represent 16% of all blunt abdominal traumas and occur as a result of high energy trauma

involving motor vehicle accidents in 70–90% of cases [4]. Intestinal injuries and their mesenteries (mesocolon and mesentery) are considered as a single clinic-anatomic entity. Small intestinal injuries constitute more than half of all blunt intestinal injuries, with equal involvement of the jejunum and ileum. The second most frequent location of injury is the colon: some studies show that left colon is more commonly injured than the transverse or right colon [5,6]. Duodenal lesions are less common, representing 10% of the total and are often associated with pancreatic trauma. There are several types of intestinal and mesenteric injuries. The mesenteric injuries range from bruising, to hematoma, to frank bleeding through the torn peritoneal envelope. Mesenteric disinsertion may occur with avulsion of the proximal or distal mesenteric root, which may cause intestinal perforation along the mesenteric surface of the bowel and localized devascularization of an intestinal segment resulting in ischemia and secondary perforation. The three main mechanisms leading to these injuries are direct impact, deceleration and increased luminal pressure. As far as the diagnosis is concerned, history and clinical examination play an important role. History helps to analyze the dynamics of the accident: intestinal or mesenteric injury should be suspected in all high energy blunt trauma. For hemodynamically unstable patients urgent abdominal exploration is required. For hemodynamically stable patients physical examination is important but is often suboptimal. The presence of abdominal skin bruising means there is a high risk of underlying bowel injury. Seatbelt bruising is associated with intra abdominal injury in 20–60% of cases [8,9] and increases the risk of perforated bowel injury by a factor of 2,4 [10]. However, when bruising is an isolated finding with no associated abdominal pain or guarding, the risk of intra-abdominal injury is low [10]. Physical examination should assess abdominal tenderness and guarding, but these signs are non specific since they can be observed with all abdominal injuries. eFAST in unstable patients, is not useful for the diagnosis of lesions of intestinal and mesenteric injury because of its low sensitivity [2]. For hemodynamically stable trauma patients CT plays an important role. Radiological signs associated with intestinal and mesenteric injuries are well defined [13]. Signs of intestinal wall injury include: discontinuity of the intestinal wall, thickening of the bowel wall and increased or decreased enhancement of the intestinal wall defect after i.v. contrast injection. Images suggestive of mesenteric injury include: i.v. contrast extravasation (blush) or abrupt discontinuation along a vascular branch, infiltration of mesenteric fat and hematoma. Other signs include: pneumoperitoneum, free peritoneal or retroperitoneal fluid and injury of the muscular layers of the abdominal wall and subcutaneous tissue. With modern multi-slice helical CT scans, the risk of false-negative has become very low or even zero in two recent studies [4,5]. For those patients with isolated free peritoneal fluid with no evidence of solid organ, intestinal or mesenteric injury, studies reports that 27% of cases are in need of exploratory laparotomy [6].

There are a lot of difficulties to characterize the lesions that require surgical repair and in order to avoid operative delay, surgical exploration is carried out systematically for the least suspicion of intestinal and mesenteric injury. Surgical intervention for all hemodynamically stable patients with suspected bowel or mesenteric injury has led to a high rate of non-therapeutic laparotomy upto 44% for intestinal lesions and up to 31% for mesenteric injuries [7].

The decision to restore intestinal continuity depends on patient condition as well as the degree and duration of intestinal contamination. In most cases, one stage repair or resection with restoration of continuity can be performed for both small intestinal and colonic lesions [8]. If there is any delay in surgical intervention, a stoma is preferable, especially in cases of colonic perforation. Proximal jejunal lesions pose a specific problem, because ostomies at that level result in high flow and lack of nutritional absorption. It is also important to preserve, if possible the ileocecal valve, because there are many benefits including prevention of small bowel overgrowth, diarrhea (electrolytes imbalance) as well as preserving colonic absorptive surface capacity. In complex situations, or in elderly patients with co-morbidities, a two stage technique with initial intestinal exclusion at the first surgery and restorative anastomosis at the “second look” may be a solution.

The management of blunt abdominal trauma has evolved overtime. While laparotomy is the standard of care in hemodynamically unstable patients, stable patients are usually treated conservatively. Laparotomy is associated with high morbidity as well as additional

surgical trauma if it is unnecessary. Studies disclose a high morbidity up to 413% in such cases [9]. The laparoscopic approach allows us to identify a bleeding or the presence of visceral lesions combining the minimally invasive treatment of the possible injury and reduces the incidence of negative laparotomies [10]. In hemodynamically stable patients who don't suffer from intracranial injuries, high grade chest trauma, pre-existing intra abdominal adhesions as well as pregnancy, the laparoscopic approach can be diagnostic and therapeutic.

Laparoscopic repair of the diaphragm is the most common therapeutic minimally invasive procedure in blunt and penetrating trauma. Diaphragmatic injuries can often be undiagnosed, due to the physiological movements of the diaphragm, and can be revealed during surgical procedures. Only approximately 5% of patients with abdominal trauma have a diaphragmatic injury mainly caused by blunt abdominal trauma of the chest and abdomen (75%), and more rarely by stabbing (25%)

The advantages of laparoscopy in trauma are: the reduction of blood loss, the low risk of postoperative pain, the low risk of contamination, the early functional recovery and the better cosmetic result.

The mortality in the present series of intestinal and mesenteric trauma is between 10–23%. Patient prognosis is affected by the delay interval between the time of injury and the time of therapeutic intervention. In many studies the threshold varies from 5 to 8 h.

CONCLUSION

Mesenteric and bowel injuries are difficult to diagnose and their undiagnosed complications are severe with high mortality rates. In a polytrauma patient, with abdominal symptoms, clinical examination and imaging studies (preferable a ct scan) are necessary. If you have a polytrauma patient with abdominal tenderness, it is better to think for exploratory laparotomy as soon as possible rather than to wait and see.

Conflicts of interest

There are no conflicts of interest.

Sources of funding

The study received no financial support.

Authors' contributions

All the authors substantially contributed to conception, design, data acquisition, data analysis, drafting and interpretation of this article till final approved version.

REFERENCES

- [1] Samer Malak Boutros, Mohamed Amin Nassef, Ahmed Fathy Abdel-Ghany. Blunt abdominal trauma: the role of focused abdominal sonography in assessment of organ injury and reducing the need for CT. Alexandria J. Med. 2016; 52:35–41.
- [2] S.M. Fakhry, D.D. Watts, F.A. Luchette, Group EM-IHVIR. Current diagnostic approaches lack sensitivity in the diagnosis of perforated blunt small bowel injury: analysis from 275,557 trauma admissions from the EAST multi-institutional HVI trial, J. Trauma 2003; 54(2):295–306.
- [3] A. Karamercan, T.U. Yilmaz, M.A. Karamercan, et al., Blunt abdominal trauma: evaluation of diagnostic options and surgical outcomes, Ulus Travma Acil Cerrahi Derg. 14 (2008) 205–210.
- [4] D.D. Damschen, J. Landercasper, T.H. Cogbill, et al., Acute traumatic abdominal hernia: case reports, J. Trauma 36 (1994) 273–276.
- [5] S. Farrath, J.G. Parreira, J.A. Perlingeiro, et al., Predictors of abdominal injuries in blunt trauma, Rev. Col. Bras. Cir. 39 (2012) 295–301.
- [6] B.W. Nolan, S.G. Gabram, R.J. Schwartz, et al., Mesenteric injury from blunt abdominal trauma, Am. Surg. 61 (6) (1995) 501–506.
- [7] N.S. Xeropotamos, V.E. Noutsias, H.V. Ioannou, et al., Mesenteric injury after blunt abdominal trauma, Eur. J. Surg. 167 (2) (2001) 106–109.
- [8] A.L.J. Jahromi, M.Y. Asser, Delayed small bowel perforation following blunt abdominal trauma: a case report and review of the literature, Asian J. Surg. (2013) 1–4, <https://doi.org/10.1016/j.asjsur.2013.01.006>.
- [9] S.T. Butela, M.P. Federle, P.J. Chang, et al. Performance of CT in detection of bowel injury, AJR Am. J. Roentgenol. 176 (1) (2001) 129–135, <https://doi.org/10.2214/ajr.176.1.1760129>.
- [10] N. Brofman, M. Atri, J.M. Hanson, L. Grinblat, T. Chughtai, F. Breneman, Evaluation of bowel and mesenteric blunt trauma with multidetector CT, Radiographics 26 (4) (2006) 1119–1131, <https://doi.org/10.1148/rg.264055144>.