Hollow Viscus Injury Following Blunt Abdominal Trauma: A Retrospective Study.

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ABSTRACT

Background: Gastrointestinal and mesenteric injuries are the third most common type of injury from blunt trauma abdomen and are associated with high rates of morbidity and mortality. Objectives: To determine the clinico-demographic profile, localization of injury, diagnostic and management methods and the outcome in cases of hollow viscus injury (HVI) following blunt trauma abdomen which were admitted to our unit. Methods: Records of patients who were admitted emergently with gastrointestinal injuries and blunt abdominal trauma between July 2014 and July 2016 were reviewed retrospectively. Results: The study group comprised 65 patients with mean age of 33.3 ± 16.2 years and a male predominance (89.2%). The commonest cause of injury was road traffic accident in 44 (67.7%) cases. Ileum was the most common site of injury detected in 31 (41.3%) followed by jejunum in 26 (34.7%) cases. Treatment comprised primary closure of perforation in 48 (64%) cases, segmental resection and anastomosis in 22 (29.3%) and stoma in 5 (6.7%) cases. Three out of 5 cases of anastomotic leak occurred in patients who were operated at 8-24 hours or beyond. Associated injury to intra-abdominal solid viscera and other sites were present in 30.7%. The mean duration of hospitalization was longer in patients with associated injuries as compared to those with isolated HVI (12.2±4.6 days versus 9.3±0.8 days). Conclusion: Early diagnosis followed by prompt surgical intervention and careful monitoring for associated injuries is the key to favourable outcome in blunt HVI.

Keywords: Blunt abdominal trauma; colon injury; gastrointestinal injury; small bowel injury.

INTRODUCTION

The incidence of hollow viscus injury (HVI) following blunt abdominal trauma is on the rise due to increasing rates of road traffic accidents and is associated with high rates of morbidity and mortality.[1] Moreover, HVI may be associated with injury to other intra-abdominal viscera and poses a diagnostic as well as therapeutic dilemma. Physical examination alone has inadequacies in determining the need for laparotomy. [2], additional meticulous imaging techniques are required to aid in diagnosis. The main challenge is to timely detect lesions that require prompt surgical repair as diagnostic delay has been associated with poor outcome.[3] Since the incidence of blunt HVI is low and there is limited published data from India, we share our experience from a tertiary care centre in Eastern India. In the present study we retrospectively review cases of HVI following blunt trauma which were admitted and managed in our unit and determine the clinico-demographic profile, localization of injury, diagnostic and management methods and the outcome. We further compare our experience with previous studies reported in the literature.

MATERIALS AND METHODS

Records of all patients who were admitted emergently for blunt abdominal trauma under our unit between July 2014 and July 2016 were reviewed. Patients with gastrointestinal injuries due to blunt abdominal trauma were enrolled in the study. Only those patients who had been subjected to one or more of the following procedures (abdominal ultrasound, abdominal computed tomography scan, diagnostic peritoneal lavage, or exploratory laparotomy) were included. A retrospective analysis was done in terms of clinico-demographic profile, injury mechanism and localization, associated injuries, diagnostic and repair techniques, time from admission to operation, complications, duration of hospital stay and mortality. Ethical Committee approval was obtained. Patient informed consent was not required in view of the retrospective study.
design; however, patient confidentiality was maintained throughout. Statistical analysis was performed using the Statistical Package for Social Sciences for Windows (SPSS, version 20.00). Continuous variables were expressed as mean ± standard deviation. A p-value of <0.05 was considered as statistically significant.

RESULTS

Total 65 patients were included in the study. There were 58 (89.2%) males and 7 (10.8%) females. The mean age of the patients was 33.3 ± 16.2 (ranging from 15 – 67) years. The commonest cause of injury was road traffic accident in 44 (67.7%) cases; in rest it was fall from height (26.1%), or physical assault (6.2%). Abdominal signs such as features of peritonitis and distension were present in 45 (69.2%) patients and haemodynamic instability was present in 4 (6.2%) patients. Erect abdominal radiography was done in 61 patients of whom 50 (81.9%) patients had free gas under the diaphragm. Abdominal ultrasonography (USG) was performed in 26 (40%) patients, of whom 14 (53.8%) had intra-abdominal pathological findings suggestive of haemoperitoneum or solid organ injury. Total 13 (20%) patients underwent computed tomography (CT) scan preoperatively. Among the most common CT findings, free peritoneal fluid was found in 6, bowel wall thickening in 3 and extraluminal intraperitoneal air in 2 patients.

A total of 75 HVIs occurred in 65 patients. Multiple gastrointestinal injuries were present in 6 (9.2%) patients while in rest single HVI was present. The localization of injuries to the gastrointestinal tract is summarized in Figure-I. Exploratory laparotomy was performed based on clinical and /or radiological findings. Treatment comprised primary closure of perforation in 48 (64%) cases, segmental resection and anastomosis in 22 (29.3%), and stoma in 5 (6.7%) cases. Associated injury to intra-abdominal solid viscera and other sites were present in 20 (30.7%) cases [Table 2].

Total 39 (60 %) patients were operated within 0-4 hours of admission, 11 (16.9%) within 4-8 hours, and 10 (15.4%) within 8-24 h. Five (7.7%) patients underwent laparotomy at >24 h following admission. Out of these 5, three had normal abdominal X-ray finding at the time of admission but subsequent CT done 18-24 hours later showed features of bowel injury. All 3 cases of wound infection, 1 case of burst abdomen, 3 out of 5 cases of anastomatic leak occurred in patients who were operated at 8-24 hours or beyond. The complications rate and mortality trend in HVI is shown in Table 3. The mean duration of hospitalization was longer in patients with associated injuries as compared to those with isolated hollow viscous injury (12.2±4.6 days versus 9.3±0.8 days); however the difference was not statistically significant (p>0.05).

DISCUSSION & CONCLUSION

Gastrointestinal and mesenteric injuries occur in 3-5% cases of blunt abdominal trauma (BAT).[^1] They represent 16% of all lesions seen in BAT and are the third most common type of injury from blunt trauma to abdominal organs. Direct compression force may crush the gastrointestinal tract or cause a sudden increase in intra-luminal pressure resulting in bursting injuries; rapid deceleration may produce shearing force between fixed and mobile portions of the tract.[^4] Motor vehicle accidents were the most common cause of these injuries in various series which accords with our findings.[^5, 6] Seat belts form a closed loop within the abdomen and cause gastrointestinal injury. Early diagnosis followed by prompt surgical intervention is the key to favourable outcome in hollow viscous injury (HVI). Presence of features of peritonitis or active bleeding calls for urgent laparotomy; however a high index of suspicion for HVI should be kept in all cases of BAT even in the absence of characteristic clinical findings.[^1] In our study 16 (24.6%) patients did not have positive findings on clinical examination initially at the time of admission but further evaluation led to a diagnosis of HVI. Ultrasonography and erect X-ray abdomen are the first diagnostic methods for evaluation of
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In the Nastase et al study, 81% patients were operated within 6 hours whereas 7% were diagnosed and operated on at >24 hours. Another study reported detection and laparotomy within 8 hours in 76% cases whereas 11% were detected with HVI at >24 hours. Their findings accord with our study. Delay to laparotomy following blunt small bowel injury results in significantly higher mortality rates, from 2% within the first 8 h, to 30% if the delay is >24 h. Contradictory to this, some studies reported that a delay to surgery of >24 hours following injury was associated with an increase in bowel-related complications but not mortality. Lawton et al in their review described bowel injury as the most common missed injury in BAT. Reliability of clinical examination may be reduced in the presence of altered mental status, intoxicated state or distracting injuries. If treatment of HVI is based on clinical assessment alone, it can have a high negative laparotomy rate of 40%. Imaging modalities specifically CT scan, when performed soon after the injury, may fail to demonstrate them. Conservative management of blunt abdominal trauma can add to the delay in diagnosis of HVI. Prognosis in BAT is significantly influenced by timely diagnosis of cases which require emergency surgery. Therefore radiological evaluation besides serial physical examination should be the protocol of tertiary survey in all patients of BAT and the decision for laparotomy should be judiciously based on the mechanism of injury, and clinical as well as radiological findings together. Our study was marked by the limitation of small sample size. Larger multi-centric trials from India in future might further define the demographic profile, diagnostic and management techniques, the associated morbidity as well as risk factors for poor outcome in blunt HVI.

Disclosure
The authors declare no conflict of interests.

REFERENCES


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