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Surgery

Outcome and Management of Blunt Trauma Abdomen: A Prospective Study

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Original Research Article

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Abstract: Blunt trauma abdomen is one of the commonest presentations in surgical emergency and is commonly seen in large urban centers, largely due to road traffic accidents, falls and interpersonal violence. Diagnosis and management remains a challenge despite all advances in medical treatment. We therefore in our study prospectively analyzed various modes of presentation of blunt trauma abdomen and there modalities of management in our tertiary care center**.** This prospective study was performed from September 2017 to February 2018 in the Shaheed Hasan Khan Mewati Government Medical College Nalhar (Mewat) Haryana, India. A total of 100 patients were selected for study, data was carefully collected, examined and interpreted. Each patient was evaluated upon arrival by an attending trauma surgeon Patients with a clinically indicated need for laparotomy was operated upon without delay. Our study demonstrated that road traffic accidents accounted for commonest mode of injury for blunt trauma abdomen and gold standard investigation for assessing intra-abdominal injury was CT scan and conservative management remains best modality of management in hemodynamic stable patient
Keywords: blunt trauma abdomen, CECT abdomen in blunt trauma abdomen.

INTRODUCTION

Blunt trauma abdomen is one of the commonest presentations in surgical emergency and is commonly seen in large urban centers, largely due to road traffic accidents, falls and interpersonal violence. Diagnosis and management remains a challenge despite all advances in medical treatment.

Patients may have others associated intra-abdominal injury that may require specialist or tertiary level care which may be missed even after intensive clinical examination [1-4]. Exact clinical evaluation may also be missed due to simultaneous effects of drugs, neurological anomalies and concomitant others systemic injuries. The exact frequency varies due to variation in sample analyzed [5-6]. Injuries are often missed in majority of population and delay in diagnosis may be various disastrous outcomes and even death [7-10]. Various diagnostic modalities have evolved which includes ultrasound, computed tomography (CT) and video laparoscopy, each having inherent advantages, disadvantages and complications [11].

The most accurate imaging exam is computed tomography, being able to identify most injuries [12]. Some authors advocate liberal use of CT in blunt trauma patients [13]. However, the exam poses some risks to the patient such as anaphylactic reactions due to administration of contrast and cancers resulting from radiation exposure [14-15]. Missed abdominal injuries can occur despite adherence to strict evaluation protocols and are often associated with the absence of abdominal pain or of abnormalities on the abdomen physical examination.

Currently, conservative treatment is the gold standard for solid organ injuries in thermodynamically stable patients. The suspected or confirmed hollow organs injury requires emergent surgery after optimization [16]. The abdomen is the third most affected region in blunt trauma and major traumatic injury may not be recognized quickly enough and it becomes a cause of preventable death [17]. Abdominal injury is the third most common cause of death from trauma [18] Early diagnosis and treatment can reduce mortality by up to 50 % [19]. Although ultrasound is the first diagnostic approach for intra-abdominal injury, its accuracy is quite operator-dependent and has low efficacy for hollow viscous and non-bleeding parenchymal injuries. Therefore it is not very reliable in detecting blunt abdominal trauma [20-22].

We therefore in our study prospectively analyzed various modes of presentation of blunt trauma abdomen and there modalities of management in our tertiary care center.

MATERIALS AND METHODS

This prospective study was performed from September 2017 to February 2018 in the Shaheed Hasan Khan Mewati Government Medical College Nalhar (Mewat) Haryana, India. A total of 100 patients were selected for study, data was carefully collected, examined and interpreted. Each patient was evaluated upon arrival by an attending trauma surgeon Patients with a clinically indicated need for laparotomy was operated upon without delay.

Inclusion criteria

All BAT victims due to motor vehicle crash, fall, acceleration-deceleration, pedestrian trauma, motorcycle crash, direct trauma, physical assault.

Exclusion criteria

- All pregnant women with gestational age>3 months (based on previously performed ultra- sound or last menstrual period).
- Patients under 18 years of age.
- Patients on warfarin or on anticoagulant therapy.
- Patients who did not have reliable history or physical exam (such as GCS less than 15, alcohol toxicity etc.
- Penetrating abdominal trauma.
- Patients refusing to be part of study.
- Patients referred to other center.
- Patients of HIV, HBsAg, HCV.
- Patients having severe systemic comorbidities.

Based on ATLS protocol, all patients were assessed first followed by appropriate treatment. CT scans were also performed based on protocol and results were considered as the gold standard. Questionnaire (closed-response format questionnaire) was filled based on patient history, physical exam, ultra- sound findings, and completed after CT scan. In physical exam, we gathered data on vital signs like blood pressure and pulse rate (PR), abdominal pain, abdominal guarding, abdominal tenderness, abdominal wall sign (erythema, ecchymosis, abrasion), low chest rib (6 lower ribs) tenderness, chest wall sign (erythema, ecchymosis, abrasion), and pelvic fracture. Abdomino-pelvic CT scan with intravenous contrast was done by 128 slice machine from the diaphragm to the pelvic outlet. Obtained images were interpreted immediately by the emergency medicine specialist and then reviewed by a radiologist expert for final analysis. In the present study, CT scan was considered as the gold standard for any intra-abdominal injury.

OBSERVATIONS AND RESULTS

Table-1: Classification of patients according to different mechanism of injury -

Serial number	Mechanism of injury	Number of patients	Percentage
1	Road traffic accidents	55	55%
2	Physical assault	22	22%
3	Fall from height	11	11%
4	Others causes eg household accidents etc	12	12%

Table-2: Classification of patients according to different clinical presentation -

Serial number	Clinical findings	Number of patients	Percentage
1	Tenderness right hypochondrium	17	17%
2	Tenderness left hypochondrium	13	13%
3	Masking of liver dullness	6	6%
4	Tenderness pelvic region	1	1%
5	Normal	63	63%

Table-3: Classification of patients according to CECT abdomen findings

Serial number	CT findings	Number of patients	percentage
1	Liver laceration	11	11%
2	Splenic injury	9	9%
3	Bowel perforation	6	6%
4	Bladder injury and associated pelvic fracture	1	1%
5	Hemoperitoneum and mesenteric injury	7	7%
6	Normal scan	66	66%

Table-4: Classification of patients according to different modalities of management applied

Serial number	Methods of treatment	Number of patients	Percentage
1	Exploratory laparotomy and proceed	6	6%
2	Splenectomy	5	5%
3	Conservative treatment	88	88%
4	others	1	1%

Fig-1: Lacerated spleen post splenectomy

Fig-2: Liver laceration after blunt trauma abdomen on CT scan

Fig-3: Splenic injury as shown on CT scan

Fig-4: Free gas under right dome of diaphragm suspected of bowel perforation

Fig-5: Exploratory laparotomy per operatively for bowel perforation

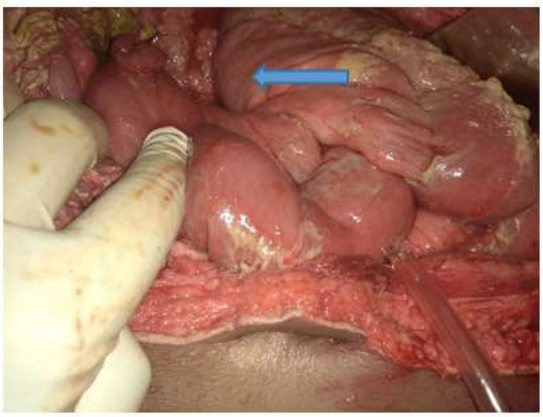

Fig-6: Exploratory laparotomy showing jejunal perforation

DISCUSSION

In our study road traffic accidents includes two wheeler, three wheeler etc accounted for a majority of cases that presented in our study accounting for about 55% followed by 22% cases due to physical assault followed by remainder of cases.

Study conducted by Wangxun Jin *et al.* [23] and others reveals similar results and showed that out of 53 patients taken for study, 35 patients had road traffic accidents followed by 10 patients of fall from heights followed by others remainder of causes for blunt abdominal trauma.

In our study tenderness in right hypochondrium was present in 17% which was followed in tenderness in left hypochondrium in 13%, masking of liver dullness suggestive of bowel perforation was present in 6% of cases Cotton *et al.* [24] in his study pointed out that absence of abdominal tenderness, abrasion, ecchymosis, and normal liver enzymes in children can rule out intrabdominal injuries with a sensitivity of 100%.

Poleti *et al.* [20] also found that on abdominal physical exam, ultrasound, chest X-ray and laboratory findings (hematocrit, white blood cell, and serum glutamic oxaloacetic transaminase or aspartate transaminase) are normal then intraabdominal injuries can be ruled definitely ruled out.

In our study most common findings on CT scan was liver laceration of various grades constituting a percentage of 11% followed by splenic injury which shows 9%, bowel perforation was present in 6% of cases, bladder injury with association of pelvic fracture was present in 1% of cases, hem peritoneum with mesenteric injury was present in 7% of patients remaining 66% of patients presented with normal scan with no apparent detectable injury.

However study conducted by Jorge A *et al.* [25] reveals splenic injuries are the most common intrabdomen organ to be injured followed by liver injury and others findings .These variation may be due non uniformity of sample analyzed or different mechanism of injuries.

In our study the patients that were having isolated liver injury responded to conservative treatment and one patient in later part of study refused to be in study. This is in accordance to study conducted by Martijn Hommes *et al.* [26] in whom study 74% patients of isolated liver injury responded to non-operative treatment. In our study out of 9 patients of clinically splenic injury 5 patients underwent splenectomy due to altered hemodynamic status.

However study conducted by Schnüriger B *et al.* [27] revealed that majority of patients of splenic injury even upto grade 3 and heamodynamic stable responds very well to conservative treatment. This may be due to variation in sample analyzed and non-uniformity of patients in this demographic area.

CONCLUSIONS

- Hemodynamic instability, generalized peritonitis, worsening metabolic acidosis during resuscitation or CT- findings showing associated intra-abdominal injuries requiring surgical repair warrants early surgical exploration.
- Non operative management of blunt liver and splenic injuries in hemodynamic stable patients is feasible and safe.
- Multidetector CT technology offers unprecedented imaging capabilities that can be readily applied for optimal evaluation of the polytrauma patient.

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