



A PROSPECTIVE STUDY OF ASSESSMENT OF SOLID ORGANS IN CASES OF BLUNT ABDOMINAL TRAUMA

Surgery

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ABSTRACT

INTRODUCTION: Blunt trauma continues to be the most common mechanism of injury to the abdomen. This is a part related to the consequences of accidents due to automobiles, although falls, assaults and industrial accidents too contribute significantly. Abdominal injuries can be particularly dangerous because it is often difficult to assess intraabdominal pathology in a victim with multiple injuries.

AIMS AND OBJECTIVES: To study the incidence and clinical profile of BTA and its mechanics and assess solid organs injury (viz. liver, spleen, kidney, pancreas).

MATERIALS AND METHODS: Study conducted in the Department of General Surgery, Geetanjali Medical College and Hospital in a prospective manner where all the subjects of blunt trauma abdomen with or without poly-trauma were categorized according to the involvement of solid organ injury(s) only and no hollow viscous injury based on CT scan and sonography findings.

RESULTS: Out of 75 patients which were managed conservatively none died. Fourteen of these patients presented in hospital in hemodynamically unstable condition and polytrauma. 11 patients were operated within 24 hours of admission, out of which 7 died. 14 patients were converted from conservative to operative procedures after 24 hours of observation. The patients which were admitted early (<12 hrs) have less mortality (1.96%) as compared to higher mortality (25.1%) with delayed (>12 hrs) admission ($p < 0.05$).

CONCLUSION: Multiple organ involvement cause more mortality than single organ involvement. Conservatively managed patients had early and better recovery. Road traffic accident forms the most common mode of injury. So efforts should be made to bring road traffic regulations into strict action and traffic norms regulated.

KEYWORDS

Blunt Trauma Abdomen (BTA), Solid Organ, RTA, Non Operative Management.

INTRODUCTION

Blunt trauma abdomen (BTA) is a common surgical emergency which may present as an isolated problem or as a part of poly-trauma. It is the 3rd most common form in road traffic accidents after orthopedics and head injury and victims. Due to rapid industrialization and urbanization in cities and growing national highways there is a sudden boom of traffic, vehicular accidents and increase of violence. The age group usually affected by blunt trauma is the young productive age group. Exposing this young age group to needless and less effective surgical modality in selected circumstances is a waste of human resources. There needs to be a local study which weighs the significance and feasibility of various modalities which would improve the outcome of treatment of blunt trauma abdomen.¹

Blunt trauma continues to be the most common mechanism of injury to the abdomen. This is a part related to the consequences of accidents due to automobiles, although falls, assaults and industrial accidents too contribute significantly. Abdominal injuries can be particularly dangerous because it is often difficult to assess intraabdominal pathology in a victim with multiple injuries.

The detection of an intra-abdominal injury is a frequent diagnostic problem in polytrauma patients. Delay in diagnosis and treatment of abdominal injuries substantially increases morbidity and mortality in trauma patients due to bleeding from solid organs or vascular injury. The diagnosis requires intelligent interpretation of the history, the physical findings, what the associated injuries are, the age and condition of patient, the time interval between injury and examination and the results of available radiological procedures.

Advantages of conservative management include avoidance of non-therapeutic laparotomy and the associated cost and morbidity; fewer intra-abdominal complications compared to operative repair.

High rate of operative complications caused paradigm shift from operative to non-operative management (NOM) in hemodynamically stable blunt abdominal trauma patients. Repeated clinical examination supplemented with modern imaging and laboratory investigations play a key role in reaching therapeutic decisions, thus preventing

unnecessary laparotomies. Liver being a sturdy organ has a higher success NOM rate, exceeding 90%. Haemodynamically stable liver and spleen injuries can be managed conservatively irrespective of the grade of injury. NOM is also highly successful in case of renal trauma with success rates over 90%.² NOM of solid abdomen organ injuries is now established for hemodynamically stable patients.

A handy & available FAST in focused assessment with sonography for trauma (FAST) examination has replaced emergency room diagnostic peritoneal lavage as diagnostic modality. In hemodynamically stable patients with intra-abdominal fluid detected with FAST, MDCT scanning with intravenous contrast is now the gold standard diagnostic modality.³ A close monitoring in I.C.U. wherein a constant vigil is kept on all the vital parameters with repeat re-evaluation has given a big impetus to NOM in such situation.

AIMS AND OBJECTIVES

1. To study the incidence of BTA among the total admissions of trauma and its mechanics and assess solid organs injury (viz. liver, spleen, kidney, pancreas) in BTA.
2. To determine the frequency and clinical profile of patients with BTA who do not require surgical intervention and requires intensive care management.
3. Incidence of conversion of conservatively managed patients to surgical management.

MATERIALS AND METHODS

This study was conducted in the Department of General Surgery, Geetanjali Medical College and Hospital in a prospective manner where all the subjects of blunt trauma abdomen with or without poly-trauma were categorized according to the involvement of solid organ injury(s) only and no hollow viscous injury based on CT scan and sonography findings.

1. **Sonography-** Abdominal ultrasound can be used to look for solid organ injury and free intra-abdominal fluid, after which trauma is assumed to be blood or gastrointestinal tract and provide indirect evidence of the injury. Focused abdominal sonography for trauma (FAST) is abbreviated, protocolised form of ultrasound that seeks

only to demonstrate intra-peritoneal and pericardial fluid.

- CT scan-** CT scan is the imaging modality of choice for evaluating hemodynamically stable patients. It is sensitive and specific. It also accurately evaluates the retro peritoneum and is also a modality of choice for diagnosing injury to chest.

INCLUSION CRITERIA:

All patients of all age group and both sex having a history of blunt injury abdomen and involvement of solid organ(s) injury were included in study.

EXCLUSION CRITERIA:

Patients with gut injury, mortality before beginning of investigation. Detailed examination with baseline investigations, posted for surgical procedure if required. Patients with solid organ injury with or without hemodynamic axis stability were directly admitted into surgical intensive care unit for intensive care unit monitoring. Follow up of patients during hospital stay was done and after the hospital stay if required. After correction of hemoglobin and suitable management, patients' deteriorating were subjected to operative intervention.

RESULTS

Incidence of BTA among indoor patients of GMCH: Total surgical patients = 11135 (during 1 year); Total BTA patients = 100; Incidence of BTA = 0.89%. 81% victim of BTA were in productive age group (15-45yrs). The male to female ratio was 2.6:1.

Table 1 : Mode of injury in BTA

Mode of injury	No. of patients	%
Motor vehicle accident (MVA)	66	66%
Fall from height (FFH)	16	16%
Assaults	12	12%
Others (Animal, etc.)	6	6%

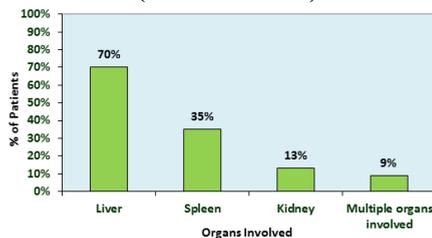
Pain abdomen is the most common symptom in patients of BTA followed by abdominal distension in 42%. 100% of patient of blunt trauma abdomen presented with sign of abdominal tenderness. 14% had hemodynamic instability and 23% had shifting dullness.

Table 2: Relation of Shock (At admission) and Mortality in BTA

Shock	No. of patients	%	Mortality
Present	23	23%	3 [13.04%]
Absent	77	77%	0 [0%]

23% cases in present series were admitted in state of shock with 13.04% mortality compared to none in stable cases.

Organ Involved in BTA (On USG / CT Scan)



Liver (70%) was the most common solid organ involved followed by spleen (35%) and kidney (13%). 9 (9%) patients had multiple injuries involving more than one organ. 25% had no organs involved. 91% cases had single organ involvement. 9% had multiple organ involved, out of them 5 (55.55%) expired. Patient with multiple organ involvement had highest mortality.

Table 3: Converted cases of Non Operative Management (NOM) to Operative

	No. of patients	Mortality
Non Operative Management (NOM)	75	0
Operated	11	7
Conversion NOM to Operative	14	0
Total	100	7

Out of 75 patients which were managed conservatively none died. Fourteen of these patients presented in hospital in hemodynamically unstable condition and polytrauma. 11 patients were operated within

24 hours of admission, out of which 7 died. 14 patients were converted from conservative to operative procedures after 24 hours of observation.

The patients which were admitted early (<12 hrs) have less mortality (1.96%) as compared to higher mortality (25.1%) with delayed (>12 hrs) admission (p<0.05).

Table 4 : Outcome of Conservatively Managed Solid Organ Injury

	Total No. of patients planned for conservative management	Converted to Operative Management	Death	Favorable outcome of Conservative Management
Liver	62	6	7	49 (79%)
Spleen	32	6	4	22 (68.75%)
Kidney	13	1	4	8 (61.53%)

Patients of blunt hepatic and splenic injury have favorable outcome as compared to other organs when managed conservatively. Three patient had multiple solid organ (3 liver & 3 spleen) involved.

DISCUSSION

With recent developments in diagnostic aids in a modern set up and development of trauma care system, most of patients with blunt trauma abdomen can be treated successfully without loss of life. Prognosis of BTA depends on many factors including frequent clinical examination, detailed history, laboratory and radiological investigation and timely management of associated injuries. Thorough investigations, timely treatment saves many victims of abdominal trauma.

All the patients with distended abdomen and hemodynamical instability were subjected to FAST scan. Out of which 11 patients were operated immediately due to gross hemoperitoneum and active bleed. FAST scan turned out to be an immediate choice of investigation in hemodynamically unstable patients.

In present study, 100 cases of BTA admitted to all general surgical wards or transferred to general surgical wards from other wards in Geetanjali Medical College & Hospital, Udaipur, during study period were included. This may not actually reflect the true incidence of blunt trauma abdomen (BTA) in Udaipur region, it actually reflects the incidence of BTA cases reporting to GMCH Hospital, Udaipur. Allen and Curry⁴, Britt et al⁵, Tripathi et al⁶ reported BTA in 0.2%, 0.1-0.2%, 0.12% respectively. In present series incidence of BTA to total surgical admission is 0.89% which is comparable to above studies.

In present series males (72%) grossly outnumbered females (28%) as BTA victims. The male to female ratio is 2.6:1. Probably due to an active outdoor life and having more social interaction and aggressive behavior pattern. This male to female ratio is comparable with Sharma et al⁷ 2.33:1, Srivastava et al⁸ 4:1, Zargar et al⁹ 7.33:1.

The most common mode of injury was motor vehicular accidents in our study accounting to 66% of cases, is comparable to reports of and Srivastava et al⁸ 58%, Sharma et al⁷ 47%.

In present series 100% cases had solid organ injury. Among the solid organ involvement liver (75%) is the most common organ injured followed by spleen (35%). This study is quiet similar to studies by Sharma et al⁷ who reported 76.3%, Srivastava et al⁸ reported 54% spleen and 30% liver.

In our study 91% cases had single solid organ involvement, 9% cases had multiple solid organ involvement. Patient with multiple organ involvement had higher mortality (55.55%) than single organ involvement (2.20%). Our findings were similar to findings of Srivastava et al⁸, who reported 24% cases with multi organ injury. Mortality and morbidity were directly related to number of organ injured. Mortality reached to 60% when multiple organs were involved (Moore¹⁰).

In present series 75% cases of BTA were managed conservatively with loss of 7 lives. 14% cases of BTA ended up in surgical procedure after initial conservative approach due to deterioration of their condition. All patients (11%) with serious internal injuries were treated by surgical means. Srivastava et al⁸ (2015) reported 30% cases of BTA were treated conservatively. Gopalswamy S¹¹ (2008) reported 37.8% cases of solid organ injury treated conservatively. In our study

hemodynamic instability was seen in 14 (14%) cases which are comparable with Moore et al¹⁰ (22%) cases and less than Gopalswamy S¹¹ (39.8%). Mortality was higher in hemodynamic unstable cases compared to with stable case.

CONCLUSION

All solid organ injuries can be managed conservatively. Liver and spleen (liver > spleen) have favorable outcome when treated conservatively and most of them recovered without any complication. Delayed hospitalization contributes major morbidity and mortality. Multiple organ involvement cause more mortality than single organ involvement. Conservatively managed patients had early and better recovery.

Road traffic accident forms the most common mode of injury. So efforts should be made to bring road traffic regulations into strict action and traffic norms regulated.

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