



RESEARCH ARTICLE

A CLINICO-DEMOGRAPHIC PROFILE, DIAGNOSIS AND MANAGEMENT OF BLUNT ABDOMINAL TRAUMA CASES AT A TERTIARY CARE CENTER, ELURU

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Abstract

Background: Blunt abdominal trauma (BAT) is a critical clinical condition often resulting from road traffic accidents and physical assaults. It presents substantial diagnostic and management challenges, particularly in low- and middle-income countries where trauma-related mortality remains high.

Objective: To explore the epidemiology, diagnostic complexities, and management approaches associated with blunt abdominal trauma.

Methods: A literature-based survey and clinical insight review were conducted, focusing on trauma incidence, diagnostic protocols, and treatment outcomes. Data was compiled from tertiary care center experiences and published medical sources.

Results: Blunt trauma is the predominant form of abdominal injury, often presenting without external signs, complicating timely diagnosis. Imaging modalities such as Focused Assessment with Sonography for Trauma (FAST), CT scans, and clinical vigilance are key. Management varies from conservative monitoring to surgical intervention depending on injury severity.

Conclusion: Enhanced diagnostic training, broader access to imaging, and standardized management protocols are essential to reduce BAT mortality. Multi-disciplinary coordination and early recognition remain the cornerstones of effective trauma care.

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Introduction:-

Trauma is recognized as the most frequent cause of mortality and a major public health problem worldwide irrespective of the level of socioeconomic development¹. Road traffic accident (RTA) is documented as the leading cause of trauma across the world and also in India. Younger population are more vulnerable as the incidence of trauma is identified to be high in the age group of 15 to 49 years and also trauma is a major contributing factor of deaths occurring in the first decades of life².

Blunt injury or trauma is defined as cellular disruption caused by an exchange with environmental energy that is beyond the body's resilience. Severely injured trauma patients often sustain frequent abdominal injuries which form an integral part in the crucial management component³. Both penetrating and blunt trauma occur frequently among abdominal injuries. While penetrating abdominal trauma (PAT) can be diagnosed more easily, the diagnosis of blunt abdominal trauma can be challenging as the clinical signs are not obvious¹. A high index of suspicion is needed in

order not to miss abdominal injuries which helps in preventing morbidity and mortality. It often manifests as a part of polytrauma in most number of cases but may also occur as an isolated event ⁴.

Most common causes resulting in blunt abdominal trauma are fall from height, assault with blunt objects, sports injuries, bomb blasts and industrial mishaps ⁵. Motor vehicle accidents alone account for 75 —80% of the cases of blunt abdominal trauma and 85% of abdominal traumas are characterized to be blunt in nature⁶. Due to increase in population growth exponentially and also increased use of motor vehicles consequently the problem of injuries and RTAs is more pertinent. This translates to increased incidence of abdominal injuries which if not diagnosed early will lead to unnecessary deaths and complications. The evaluation and diagnosis of patients with blunt abdominal trauma can be an arduous task as investigative modalities cannot replace appropriate clinical judgement. Rapid resuscitation can save many patients and also helps in avoidance of needless surgery and complications later⁷. The systematic identification of risk factors predisposing to blunt abdominal trauma can minimize and also save an unstable yet salvageable patient. Many studies have identified such risk factors which include sex, length of interval between injury and surgery, shock, associated polytrauma such as spine, thorax, extremities, cranial injury etc ¹. The identification of risk factors therefore is a decisive factor in planning initial evaluation and diagnosis. The mechanism of injuries occurring in blunt abdominal trauma are due to contusions in less serious cases, or rupture of internal organs in more serious cases, from increased intraluminal pressure. These injuries are seen most often in motor vehicle accidents as great force is applied for a brief time due to rapid deceleration. These two mechanisms namely, compression and deceleration are identified as the basic potential factors related to blunt abdominal trauma ⁸.

Several studies reported that liver and spleen are the most common organs involved due to abdominal trauma followed by small intestine. Although conflicting results are reported, in some studies indicating spleen as the most common organ damaged and in some others as liver, the overwhelming majority conclude that these two organs are involved most frequently ⁹. The extent of injury is noticed to be higher in fixed position organs in contrast to mobile organs, which explains the higher occurrence of injuries to liver and spleen following blunt abdominal trauma. The least frequent reported were diaphragm and kidneys¹⁰.

Evaluation of blunt abdominal trauma is a strenuous exercise for a surgeon as external injuries often mask the occult trauma sustained by a patient. The injuries also range from a single organ to polytrauma. This is even complicated by the fact that almost 40% of patients with hemoperitoneum have no obvious abdominal findings. This undiagnosed injury to the abdomen is a significant reason of preventable morbidity and mortality ¹¹. Initial rapid resuscitation and early diagnosis are considered to be very beneficial in a favourable outcome. Imaging modalities like abdominal X ray, focused assessment with sonography in trauma (FAST) and computed tomography (CT) including contrast enhanced CT (CECT) help in detecting patients with minimal signs of abdominal injury and are also part of management guidelines. Other invasive techniques like four quadrant aspiration, diagnostic peritoneal lavage and abdominal paracentesis have also been mentioned to help in the diagnosis of patients in whom it is difficult to evaluate based solely on physical findings ^{7,8}.

A systematic and prioritized approach to correct hemodynamic instability and the decision to use non operative management (NOM) or operative treatment is crucial to avoid unnecessary complications associated with operative repair. Moreover there has been an increasing trend towards the use of NOM in hemodynamically stable solid organ injuries. Recent studies demonstrated success rates exceeding 80%, using NOM as the standard of care in hemodynamically stable injured adults¹². Operative intervention is reserved in those patients whose condition deteriorates in spite of aggressive hemodynamic stabilization and obvious organ damage.

The outcome of the patient with blunt abdominal trauma depends upon a number of factors like general condition of the patient, time between injury and management, early diagnosis and prompt surgical intervention. Poor condition of the patient indicates associated extra abdominal injuries, and extensive damage to one or more of the internal organs including hollow viscus injuries¹¹. Long interval between injury and management is a significant factor related to mortality. Early diagnosis is often delayed due to wide range of clinical manifestations which range from no physical findings to hypovolemic shock⁷. Appropriate clinical judgement is vital in correct diagnosis and to prevent delayed surgical intervention. The use of proper imaging techniques has been stressed in evaluation of patients requiring surgery and those who can be managed by NOM.

The study thereby intends to identify the risk factors that contribute to blunt abdominal trauma and evaluate appropriate diagnostic techniques and management strategies which help in decreasing the morbidity and mortality

rates among those patients. Keeping in view of this, the present study was undertaken to add relevant findings to the existing literature and also to collect data regarding patterns and outcome of blunt abdominal trauma.

Aims & Objectives:-

1. To study the clinico-demographic profile of Blunt abdominal trauma cases in ASRAM Hospital, Eluru.
2. To determine the incidence and to find out the available investigations for detection of blunt abdominal trauma
3. To compare the effectiveness of conservative vs operative management.
4. To analyze the factors associated with the outcome of blunt abdominal trauma in relation to socio-demographic variables, clinical characteristics and treatment approach.

Materials and Methods:-

Study Design:	Hospital based observational prospective study.
Study Setting:	Patients admitted to general surgery and emergency departments, ASRAMS, Eluru, Andhra Pradesh.
Study Period:	2 years (August 2022 to August 2024).
Study Population:	Randomly selected patients admitted in trauma ward with possible history of blunt abdominal trauma.
Sample Size:	A sample of 100 patients is taken using non-probability sampling method.

Inclusion Criteria:

1. Patients above 18 years.
2. Patients who had sustained blunt abdominal injuries.
3. Patients consenting for the study.

Exclusion Criteria:

1. Patients presenting with penetrating injuries of abdomen.
2. Pregnant women.
3. Those who refused for the study.

Data collection:

Structured questionnaire was used for the study with necessary modifications based on the variables used in previous studies.

Data Analysis:

Data from the questionnaires was entered in MS Excel 2016 and was analyzed using SPSS software version 20. Data is represented in the form of frequencies and percentages with the help of tables, bar diagrams and pie diagrams. Bivariate analysis was performed using chi-square test and p —value of less than 0.05 was considered as statistically significant.

Reference citing:

Vancouver system of listing and citing of references was used. As per this system, the references are numbered and listed consecutively in the order in which they are first cited in the text.

Expected benefits of the study:

The causes, patterns, characteristics and the possible outcomes due to blunt abdominal injuries can be ascertained and necessary interventions can be identified which help in improving favorable outcome in the patients undergoing surgery.

Limitations of the study:

An adequate sample size could not be established owing to several constraints, which might skew the results and inferences.

Ethical Considerations:

The study was carried out after obtaining Ethical approval from the Institutional Ethics Committee. Respondents were interviewed after taking informed consent and were guaranteed strict privacy and confidentiality.

Variables studied:**Socio-demographic characteristics:**

Detailed information of study subjects like name, age, sex, religion, caste, marital status, education, occupation, type of family and socioeconomic status.

Injuries:

Organ specific injuries like liver, duodenum, pancreas, spleen etc.,

Clinical Picture:

Includes symptoms and signs with which the patients are presented.

Time of presentation:

Interval between the injury and time of presentation.

Investigations:

Laboratory and diagnostic methods used in the study.

Treatment:

1. **Operative:** If the patients had undergone any surgical treatment.
2. **Non Operative:** Conservative treatment in patients without any hemodynamic instability.

Morbidity:

Postoperative complications in patients who had undergone surgical treatment and other complications observed in patients who receive conservative treatment.

Mortality:

Patients who had expired.

Observations & Results:-

A total number of 100 patients were included in this study after satisfying the inclusion criteria and only patients above 18 years of age who had sustained blunt abdominal injuries admitted in the surgical trauma ward were studied.

Socio-demographic characteristics:**Age distribution:**

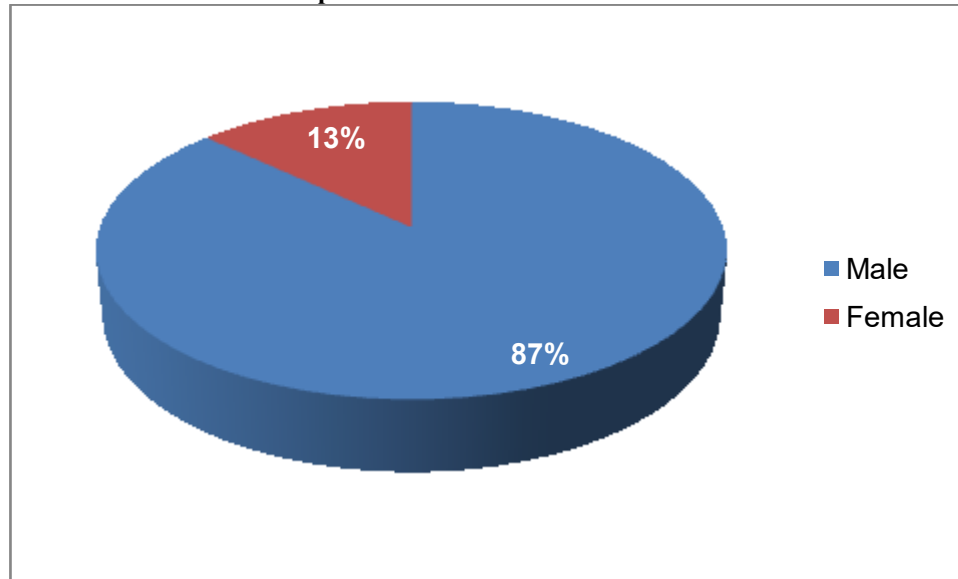
The majority of patients, accounting for 36.7%, belonged to the age group of 26 to 40 years, followed by 30% in the 18 to 25 years category, as indicated in Table No. 1. Notably, there was a decrease in the incidence of injuries with increasing age, with only 13.3% of patients falling into the age group of 51 to 60 years.

Table No. 1:- Age Group wise distribution.

Age Group (Years)	Number	%
18—25	30	30.0
26—40	37	36.7
41—50	20	20.0
51—60	13	13.3
>60	0	0.0
Total	100	100

Gender:

Majority of the patients were men (87%) and only 13% women were admitted with blunt abdominal injury. The male to female ratio was 6.5: 1.

Graph No. 1:- Gender wise distribution.**Mode of injury:**

The primary cause of blunt abdominal trauma in the majority of cases was road traffic accidents (RTAs), accounting for 70% of the cases, as indicated in Table No. 2. Additional modes of injury included falls from a height (16%), assault with a blunt object (6 %). Other modes that led to blunt trauma included a heavy object falling on the abdomen during construction work and collapse of wall (6%)

Table No. 2:- Mode of injury.

Mode	Number	%
RTA	70	70.0
Fall	16	16.0
Assault	6	6.0
Others	6	6.0
Total	100	100

Clinical presentation:

Abdominal pain emerged as the predominant presenting symptom for the majority of patients, accounting for 87% of cases. Additionally, symptoms like abdominal distension were observed in 77% of the study subjects, while guarding and rigidity were noted in 67% of the patients. Other signs, including hematuria, were noticed in 10% of the patients, and vomiting was observed in 7% of cases. Notably, 10% of the patients were unconscious at the time of admission.

Table No. 3:- Symptoms & Signs.

Clinical presentation*	Number	%
Abdominal pain	87	87.0
Abdominal distension	77	77.0
Guarding & rigidity	67	67.0
Hematuria	10	10.0
Unconscious	10	10.0
Vomiting	7	7.0

*Includes multiple complaints

Latent period:

The latent period, referred to as the interval between the time of injury and the time of admission is early (<6hrs) in about 83.3% of the cases and delayed in 6.7% of the cases.

Table No. 4:- Latent Period.

Mode	Number	%
<6hrs	83	83.3
6–24hrs	10	10.0
>24hrs	7	6.7
Total	100	100.0

Associated injuries:

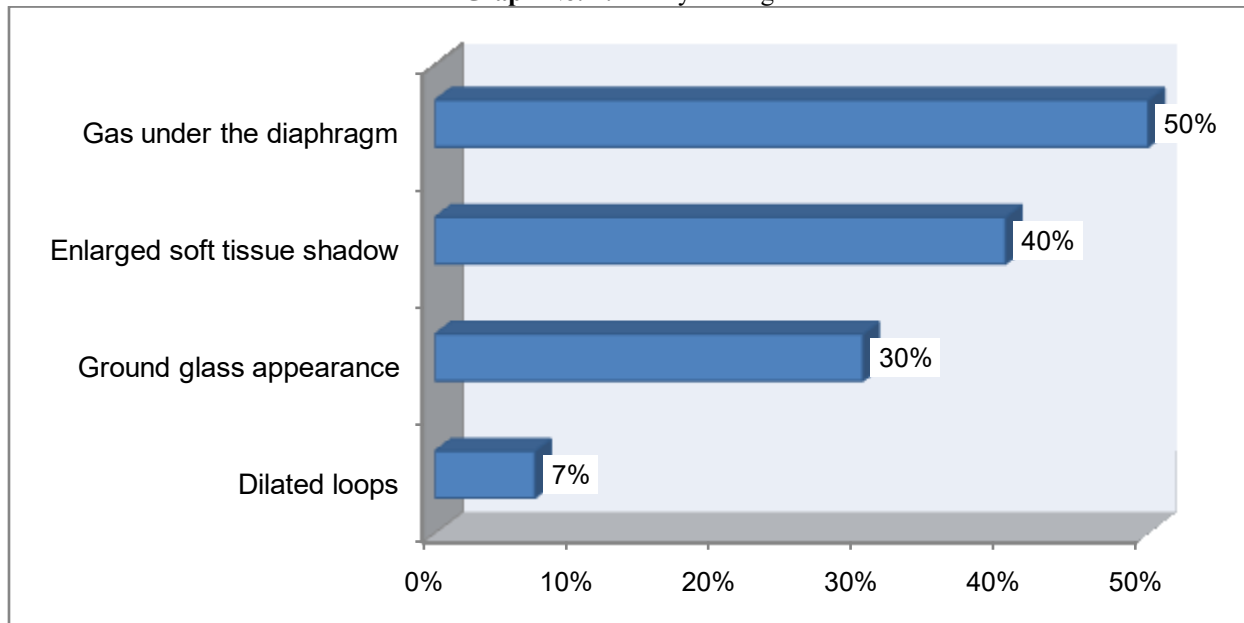
Among the 57 patients with extra-abdominal injuries, thoracic injuries with associated rib fractures were common, occurring in 17.5% of cases. Soft tissue injuries were a frequent finding, noted in 35.1% of these patients. Femur fractures were observed in 13 (22.8%) patients, while head injuries were seen in 7 (12.3%) patients. Additionally, pelvic fractures were identified in 7 (12.3%) patients.

Table No. 5:- Associated injuries.

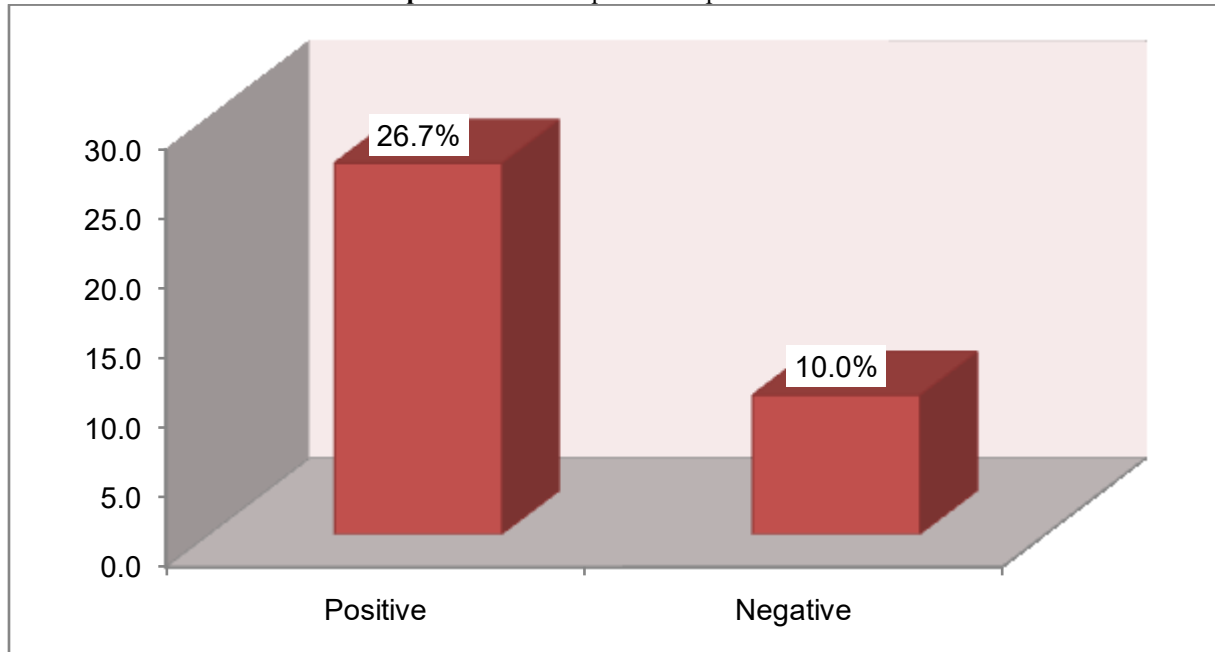
Associated injuries	Number	%
Head injury	7	12.3
Rib fractures	10	17.5
Femur fracture	13	22.8
Pelvis fracture	7	12.3
Soft tissue injuries	20	35.1

Investigations:**Plain X–ray abdomen:**

When X-ray abdomen imaging was performed on the patients, the predominant finding was the presence of gas or air under the diaphragm, observed in 50% of cases. Other X-ray findings included an enlarged soft tissue shadow, noted in 40% of the patients, a ground glass appearance in 30% of the patients, and the presence of dilated loops in 7% of the patients.

Graph No. 2:- X-ray findings.**Four quadrant aspiration:**

A total of 37 patients had undergone four quadrant aspiration for further diagnosis and it was found to be positive in 27 patients (26.7%) and negative in 10 patients (10%) among the total study subjects.

Graph No. 3:- Four quadrant aspiration results.**Focused Assessment with Sonography in Trauma (FAST):**

FAST is performed usually within 2 -5 minutes to detect abdominal injury. The following table [Table no.6] depicts the frequency or organ injuries detected using FAST. A total of 69 patients had positive findings using FAST. Spleen (23%) was the most common organ injured, followed by liver (10%). Other solid organs injured were bladder and kidney (3% each). Small intestine was the hollow viscus injured and retroperitoneal hematoma was seen in 7% of the study subjects. Free fluid in the abdomen was noted among 17% of the patients.

Table No. 6:- FAST observations.

Organ injured	Number	%
Spleen	23	23.0
Liver	10	10.0
Bladder	3	3.0
Kidney	3	3.0
Mesentery	3	3.0
Small intestine	3	3.0
Retroperitoneal hematoma	7	7.0
Free fluid	17	17.0

CT scan:

Among the 33 remaining patients CT scan was performed in whom FAST was inconclusive or could not be performed. A total of 17 patients were found to have solid organ injuries and other 13 hollow viscus injuries. In some patients serial CT scan was done to further evaluate for any additional findings.

Incidence of organ injury:**Table No.7:-** Organ injured.

Organ injured	Number	%
Spleen	33	33.0
Liver	24	24.0
Bladder	3	3.0
Kidney	3	3.0
Mesentery	7	7.0
Small intestine	10	10.0
Colon	13	13.0

Retroperitoneal hematoma	7	7.0
Total	100	100.0

Most of the patients with blunt trauma had Splenic injury (33.3%) and followed by liver (23.3%) [Table no.7] Other solid organs like kidney and bladder were seen to be injured in 3.3% of the patients each. Colon (13.3%) and small intestine (10.0%) were the hollow viscus organs to be injured and retroperitoneal hematomas were seen in 7 patients (6.7%).

Management:

The decision to manage a patient with NOM or with surgical repair was based on the hemodynamic stability and general condition after initial evaluation and resuscitation. Out of the 100 patients under study, 40 were hemodynamically stable and were treated conservatively, while in the remaining 60 patients, three died during initial resuscitation and the rest 57 were operated. The cause of death in the three patients was due to associated injuries such as head injury and cervical injuries.

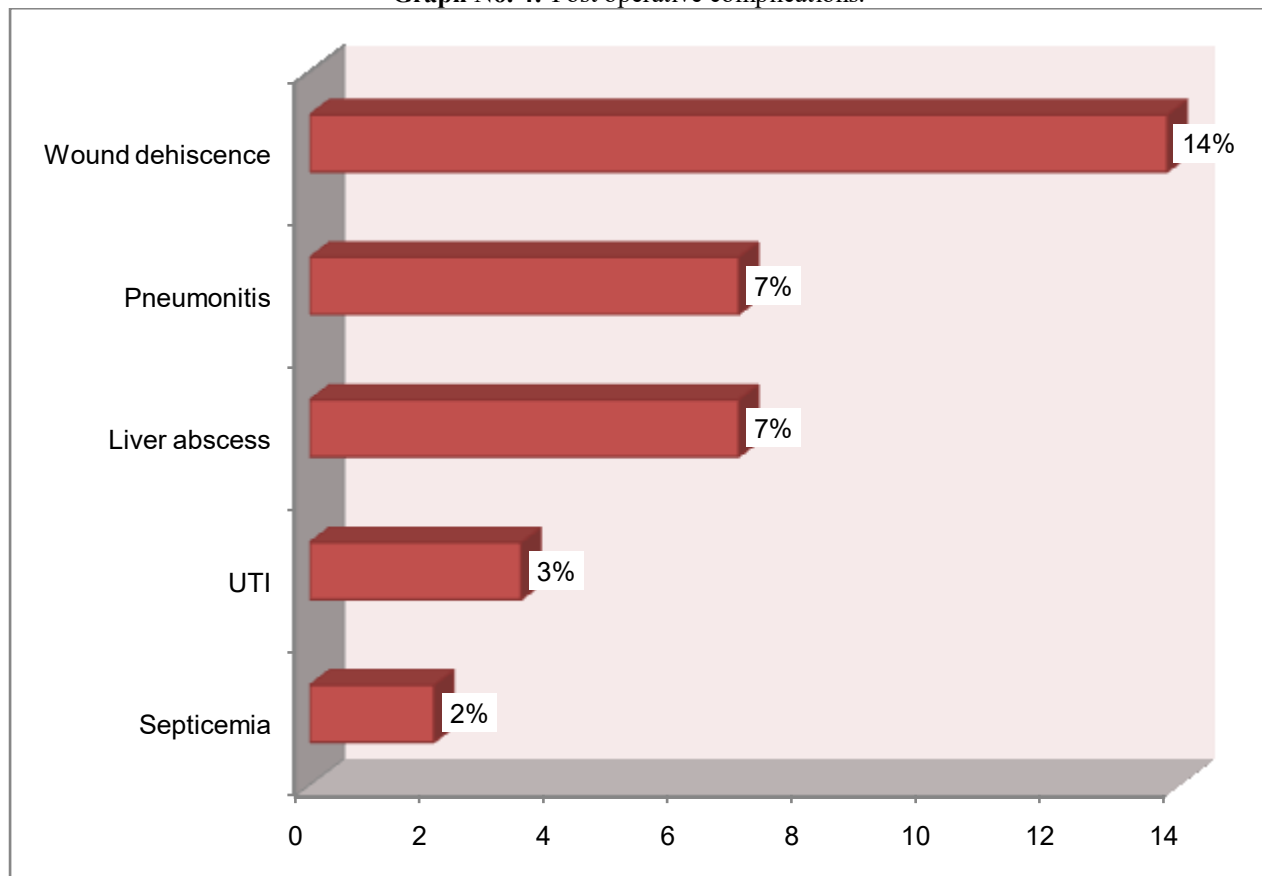
Table No.8:- Type of management.

Management technique	Number	%
Operative repair	57	57.0
Nonoperative Management	40	40.0
Death	3	3.0

Operative procedures performed:

Splenectomy was performed on 14 patients (24.6%), whereas splenorrhaphy was done in 7 patients (12.3%). For liver injuries 10 (17.5%) patients had undergone Hepatorrhaphy, where suturing with chromic catgut along with gel foam packing was done. Primary bowel repair was done in 7 patients (12.3%) and 3 (5.3%) patients had to undergo colostomy. Another 3 patients (5.3%) were treated with resection and anastomosis for bowel perforation.

Graph No. 4:-Post operative complications.



Tableno 9:- Types of surgical procedures performed.

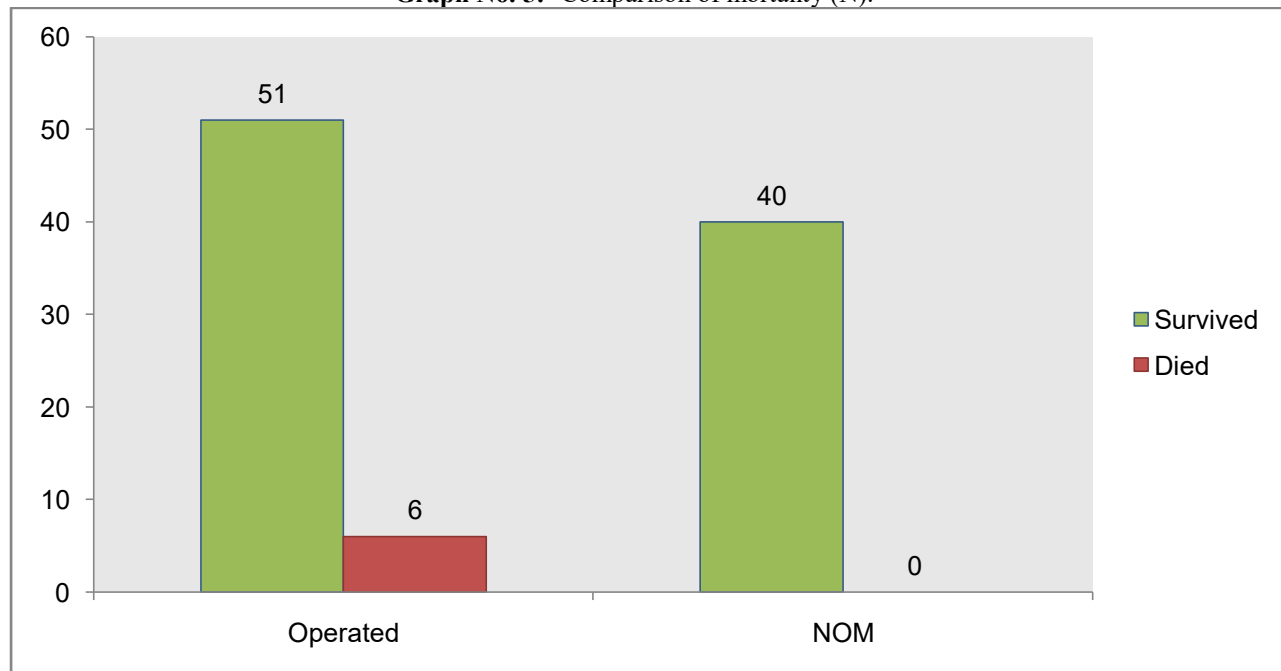
Surgical Procedure	Number	%
Splenectomy	14	24.6
Splenorrhaphy	7	12.3
Hepatorrhaphy	10	17.5
Bladder repair	3	5.3
Nephrectomy	3	5.3
Mesenteric repair	7	12.3
Primary bowel repair	7	12.3
Colostomy	3	5.3
Resection &anastomosis	3	5.3
Total	57	100.0

Postoperative Complications:

As seen from the graph below [Graph no.4], wound dehiscence with subsequent wound infection was seen in most of the patients (14%) as the common post operative complication. Other complications noted among the study subjects were liver abscess (7%), pneumonitis (7%), UTI (3%) and septicemia (2%).

Morbidity and mortality:

The mean range of hospital stay was 10 – 18 days, with minimum days of stay as low as 5 days and maximum being 45 days. Out of the 57 patients who were operated upon, 6 patients died due to postoperative complications and 3 patients died prior to initial resuscitation there by making a total figure of 9 deaths in the current study. The mortality rate due to blunt abdominal trauma in the present study is thus 9%. The patients who underwent conservative management had uneventful recovery and no deaths occurred in this group. [Graph no.5]. This difference was found to be statistically significant ($p < 0.05$).

Graph No. 5:- Comparison of mortality (N).

Chi square value=4.48; p-value=0.034 ($p < 0.05$)

Discussion:-**Socio-demographic characteristics****Age:**

A higher incidence of trauma was seen among younger age group in the present study with 36.7% belonging to 26 to 40 years of age and 30 % from 18 to 25 years of age group. This was attributed to increased use of motor vehicles by persons belonging in this age group. Similar results were observed in studies done by Ntundu SH et al⁷¹ Mehta N et

al¹¹ Agarwal V et al⁷². Ntundu SH et al⁷¹ in their study reported a peak incidence of age ranged between 21 - 40 years. Mehta N et al¹¹ also noted that majority of the patients were in the age group between 21 to 30 years. Agarwal V et al⁷² in their study revealed a higher incidence of cases among age group 15 to 45 years (81%). These findings suggest an increased incidence of blunt abdominal trauma among younger and productive age group. Similarly Pandey VK et al³ also noted that the most common age group was in the 2nd decade of life (34%).

Gender:

Almost all the previous studies done observed that men were more prone for trauma than women and there is a consistently higher male to female ratio in incidence of trauma. In this study 87% of the patients were men and the male to female ratio was 6.5:1. Gad MA et al⁶⁹ also reported that there is a strong preponderance for incidence of BAT among males (87.1%). Similar findings were observed by Goedecke M et al⁷⁰ where they noticed a higher incidence of BAT among men (64.8%) compared to women (35.2%). In a study done by Ntundu SH et al⁷¹ it was observed that men were more prone to trauma, accounting for 84.6% of the cases, and the male-to-female ratio was reported as 5.5:1. A strong male preponderance to the trauma was also reported by Pandey VK et al³ with a male to female ratio of 11.5:1. Agarwal V et al⁷² reported a similar increased incidence of trauma in men with a male to female ratio of 2.6:1. This finding was attributed to the greater mobility of males either for work or any other activities.

Trauma characteristics

Mode of injury:

RTAs were the most common mode of injury resulting in a blunt abdominal trauma in this study (70%) the other modes of injury being fall from a height (16%), assault with a blunt object (6%) and other causes (6%) like fall of heavy object on the abdomen while doing construction work and collapse of a wall. The role of motor vehicle accidents as the primary cause of trauma is demonstrated in several studies.

The most common cause of trauma identified by Goedecke M et al⁷⁰ was road traffic accidents (61.4%) the other causes were falls (21.6%), assaults (5.7%), sports related (2.3%) and other unspecified causes (9.1%). Similarly Vehicle accidents were reported as the common cause of blunt abdominal trauma by Gad MA et al⁶⁹. Ntundu SH et al⁷¹ mentioned RTAs as a cause of injury was noted in more than half of the patients (53.7%) and the rest (21.3%) sustained injuries due to fall from a height. Arumugam S et al²² also reported in their study that the most common cause for trauma as motor vehicle accidents (61%) followed by fall from height (25%). Pandey VK et al³ in their study also revealed that significant proportion of cases occurred due to RTAs (78%), other modes of injury noted in this study were fall from height (18%) and injury due to a blunt object (4%).

Clinical presentation:

Most of the study participants complained of pain abdomen in the present study (87%), other clinical findings observed were distension of abdomen (77%), guarding and rigidity (67%), hematuria (10.0%) and vomiting (7%). 10 (10%) patients were unconscious at the time of admission. Amuthan J et al⁷ also described a similar clinical picture with majority of the patients complaining of pain abdomen (94%) which is almost comparable to the present study. Other clinical findings observed were also similar in respect to the present study as vomiting (30%), distension of abdomen (16%) and hematuria (4 %) are the most common complaints experienced by study subjects.

A similar pattern was observed by Mehta N et al¹¹, where pain abdomen was the main presenting symptom in more than 90% of the patients. Other clinical findings observed in decreasing order of frequency were vomiting (70%), guarding and rigidity (65%) and hematuria (10%), which were also the similar complaints in the present study. The study reported other clinical features which were not present in the current study such as dyspnea, hematemesis and pneumothorax. Congruently a similar clinical pattern was reported by Wadiwa et al⁷³ where the most common presenting complaint was pain abdomen, noticed in about 90% of the patients and the next common clinical finding reported was distension of abdomen (56%).

Latent Period:

The interval between the time of injury and the time of admission is early (<6hrs) in about 83.3% of the cases in the present study and delayed in 7 (6.7%) cases. There were conflicting results reported in different studies on the latent period probably due to the accessibility of the trauma facility and availability of ambulance support. In a study done by Mehta N et al¹¹ most of the patients presented early to the hospital with the earliest presentation reported to be as low as 30 minutes, however late or delayed presentation was also noted, in one case being as late as 15 days with

concomitant increase in the mortality in those cases. Contrastingly Wadiwa Y et al ⁷³ reported a higher proportion of cases presenting late to the hospital (41.7%) with only 31% presenting less than 6 hrs after injury.

Associated Injuries:

Apart from the soft tissue injuries associated with the blunt trauma (20%), other extra- abdominal injuries seen in the present study were femur fractures, observed in 13 (22.8%) patients, rib fractures seen in 10 (17.5%) patients and pelvic fractures seen in 7 (12.3%) patients. 7 patients had associated head injuries (12.3%). Mehta N et al ¹¹ also reported a similar incidence of soft tissue injuries (20%). Other extra-abdominal injuries noted commonly in this study were rib fractures (20%) consistent with the findings observed in this study. Arumugam S et al ²² in their study also reported a similar common occurrence but varying proportions of chest trauma (35%), soft tissue injuries (24%) and head injuries (24%).

Incidence of organ injury:

Spleen accounted for the most common organ being injured (33%) followed by liver (24%) in the present study. Other solid injuries noted were bladder (3%) and kidney (3%). Among hollow viscus injuries colon was injured most commonly (13%) followed by small intestine (10%). Mesenteric injuries were noted in 7% of the cases and a similar proportion of cases (7%) of retroperitoneal hematoma were found.

These findings were consistent with a study done by Ntundu SH et al ⁷¹ where Spleen (91.7%) was noted as the most common organ injury due to blunt trauma followed by liver (80%), however a higher incidence of injuries to the small intestine (56%) was seen in this study in contrast to the present study. Arumugam S et al ²² in their study observed a higher incidence of injuries to the liver (36%) followed by spleen (32%). Other most common organs that are injured were kidney (18%), small bowel (12%), large bowel (5%) and urinary bladder (4%). A similar common injury to the spleen (29%) was reported by Pandey VK et al ³ after which liver (23%) was observed to be the next most common organ injured which is almost comparable to the present study. In this study they also observed a relatively higher incidence of retroperitoneal hematoma (10%) in contrast to the current study (6.7%). Similar proportion of (26%) hollow viscus injuries were also observed when compared with the present study (23.3%).

Agarwal V et al ⁷² reported a higher incidence of liver trauma (44.5%) followed by spleen (25.5%) similar to the results obtained by study done by Arumugam S et al ²². Several studies also reported spleen and liver as the most common organs being injured following blunt trauma. These findings suggest a common increased incidence of spleen and liver as being the most common solid organ injuries occurring in blunt abdominal trauma.

Management:

A higher proportion of study subjects were treated by surgical repair (57%) as compared to non operative management (40%) in the current study. Congruent with these findings a study done by Nandhana Prashanth et al ⁷⁴ reported that most (68.3%) of the cases were treated surgically and only 31.6% were treated conservatively. A similar higher use of surgical management was reported by Amuthan J et al ⁷ 58% were managed surgically and 42% were treated with conservative management. Contrastingly Goedecke M et al ⁷⁰ reported that most (80.7%) of the patients in their study were treated non operatively but later NOM failure was seen in 13 patients among them. Pandey VK et al ³ also reported a higher use of conservative management (68%) of the patients in their study compared to operative intervention (32%).

Postoperative Complications:

Wound dehiscence due to infection was noted as the most common (14%) post operative complication observed among the patients in this study. Other complications noted among the study subjects were liver abscess (7%), pneumonitis (7%), UTI (3%) and septicemia (2%). Similar higher incidence of wound infection (53%) was reported by Amuthan J et al ⁷, other complications that occurred in this study were pelvic abscess (21%) and pneumonia (11%). Arumugam S et al ²⁴ in their study also mentioned a similar pattern of post operative complications such as wound infection (3.8%), pneumonia (3%) and urinary tract infections (1.4%). Prashanth N et al ⁸³ reported a higher incidence of septicemia as a post operative complication leading to death. Mehta N et al ¹¹ reported a similar incidence of wound infection as the commonest post operative complication.

Mortality:

The mortality rate due to blunt abdominal trauma in the present study is found to be 9%. There was a variable degree of rates of mortality reported among different studies ranging from as low as 4% to as high as 23%. Mehta N et al

¹¹ reported 4 % mortality in their study, whereas Arumugam S et al ²² reported a mortality rate of 8.3%. Wadiwa Y et al ⁷³ reported a mortality rate of 14%. Prashanth N et al ⁷⁴ in their study reported a mortality rate of 10% relatively comparable with the present study. In contrast to the different rates of mortality reported in different studies, the causes of deaths are equivocally demonstrated to be due to complications occurring postoperatively.

Among the six deaths reported in this study, the causes were attributed to septicemia in three cases, sudden cardiac arrest in one case, and one death occurred due to traumatic brain injury. Prashanth N et al ⁷⁴ also reported a consistent observation of septicemia as the most common cause of death. However Arumugam S et al ²² stated that the primary cause of death among the patients as severe traumatic brain injury, the other complications resulting in deaths being sepsis and multiorgan failure. Wadiwa Yet al ⁷³ reported that the majority of deaths occurred due to septicemia (52.17%). Based on these findings it may be concluded that the most common complication observed in several studies as septicemia leading to death. The other complications noted were due to associated injuries like traumatic brain injuries and chest trauma ending up in ARDS.

Limitations:-

Owing to the small sample size, the study findings could not be generalized to the general population. A larger sample size would reduce any potential confounders that may be interfering with the study results. An appropriate randomization technique will yield better predictions of outcome among operative and non operative management group.

Recommendations:-

Initial resuscitation measures and timely diagnosis forms the crucial part of management of blunt abdominal trauma. Effective evaluation of the mechanisms of injury can prevent unnecessary surgical exploration thereby minimizing preventable morbidity and mortality. Appropriate management of associated injuries also forms a vital part in management of blunt abdominal trauma. Early recognition and well judged application of imaging techniques coupled with repeated clinical examinations can save a seemingly unsalvageable patient. Finally the importance of early shifting of patients to a trauma center could not be stressed enough.

Conclusion:-

In conclusion, this study revealed a higher incidence of trauma among individuals in the younger age group (18 to 40 years), attributed to the increased use of motor vehicles in this age cohort, whether for work or other activities. Consistent with other studies, a strong male predominance in trauma cases was noted, with the average male-to-female ratio falling within the range of 2.6:1 to 11.5:1.

Blunt abdominal trauma, primarily resulting from road traffic accidents (RTAs), was the predominant cause of injury, followed by injuries due to falls from height. Abdominal pain emerged as the most common clinical finding, with additional symptoms such as abdominal distension, guarding and rigidity, hematuria, and vomiting being less frequent but consistently present across various studies.

The interval between the time of injury and admission varied among studies, likely influenced by the accessibility of trauma facilities and the availability of ambulance support. Extra-abdominal injuries, including soft tissue injuries, head injuries, and fractures of the upper and lower limbs, were noted. The presence of head injuries was associated with higher odds of mortality.

Spleen and liver injuries were identified as the most common among various studies, followed by injuries to hollow viscera and other solid organs such as the kidney, bladder, and pancreas. The use of non-operative management (NOM) varied, with some studies reporting higher utilization of conservative management, while others favored operative intervention.

Postoperative complications, such as septicemia and wound infections leading to dehiscence, were observed, with septicemia being a common cause of mortality. Mortality rates due to blunt abdominal trauma ranged from 4% to 23%, aligning with the type of management practiced in different trauma facilities, with higher mortality associated with studies employing more operative interventions. The study underscores the importance of recognizing and addressing postoperative complications, particularly septicemia, to improve patient outcomes

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