Section: General Surgery

Original Research Article

STUDY OF PATIENTS WITH ABDOMINAL TRAUMA IN A TERTIARY CARE CENTRE WITH SPECIAL EMPHASIS ON FACTORS INFLUENCING OUTCOMES

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Abstract

Background: The abdomen is the third most commonly injured part of the body in civilian trauma, and in about 25% of cases, surgery is required. The clinical outcome for either penetrating or blunt abdominal trauma is dependent on the anatomical extent of injuries and the presence of extra-abdominal injuries. In particular, head injuries have a disproportionate influence on trauma outcomes and the presence of associated craniocerebral injuries has been known to contribute to adverse outcome. In general, to study the outcomes of trauma, accurate and reliable methodological tools are required for appropriate scoring of severity and outcome prediction. **Materials and Methods:** This was a prospective hospital-based study carried out over 12 months from August 2021 to July 2022. Ethical committee approval was obtained from the Institute. Consecutive adult patients with clinical and imaging finding suggestive of abdominal trauma during the period of the study were included. The degree of physiologic injury and anatomical extent of injuries were computed using the known instruments of stratification such as the Revised Trauma Score (RTS) and the ISS respectively. The management policy for the patients included resuscitation according to Advanced Trauma Life Support protocols and emergency laparotomy for patients with shock and generalized peritonitis. Hemodynamically stable patients with minimal, equivocal, or no abdominal sign were selected for non-operative management. Data collected were collated using Statistical Package for Social Sciences (SPSS) Version 20, IBM, and Armonk, NY, United States of America. Level of significance was set at $P < 0.05$. **Result:** There were a total of 98 consecutive patients with suspected abdominal injuries during the period of the study, but data from only 78 (79.59%) patients were analyzed based on the inclusion criteria. Of these, there were 68 (84.61%) males and 10 (12.82%) females; age range was from 15 to 70 years and a mean age of 32.1 ± 10.1 years. The majority (62.81%) of the patients were between the 2nd and 4th decades of life [Table 1]. Penetrating injuries occurred in 46 (58.97%) patients, while 32 (41.02%) patients had blunt injuries [Figure 1]. Penetrating injuries were due to gunshot in 24 (30.76%) patients and abdominal stab wounds in 21 (26.92%) patients, while blunt abdominal injuries were due to road traffic accidents 25 (32.05%), kicks 6 (7.69%), and fall from height 2 (2.56%). Seventy-three (93.58%) patients were conscious at presentation while five (6.41%) patients were unconscious as a result of head injury. As regards mode of treatment, 67 (85.89%) patients had trauma laparotomy, 10 (12.82%) patients (blunt abdominal trauma) had non-operative treatment, and 1 (1.3%) patient with penetrating trauma underwent diagnostic laparoscopy. **Conclusion:** Past medical illness, bowel evisceration and hemodynamic complications were identified as associated factors for abdominal trauma related death.

INTRODUCTION

The abdomen is the third most commonly injured part of the body in civilian trauma, and in about 25% of cases, surgery is required.[1] Abdominal injuries could be blunt or penetrating, and many patients with abdominal trauma suffer polytrauma. In civilian practice, there is often a predominance of blunt trauma whereas in war, there is a greater incidence of penetrating abdominal trauma.[2] The use of modern means of transport, leading to motor vehicle, motorcycle, and pedestrian-vehicle accidents contributes to blunt abdominal trauma cases.[3] However, sectarian violence, intertribal wars, and criminal acts account for a significant proportion of the penetrating abdominal injury cases.[2]

The clinical outcome for either penetrating or blunt abdominal trauma is dependent on the anatomical extent of injuries and the presence of extra-abdominal injuries. In particular, head injuries have a disproportionate influence on trauma outcomes and the presence of associated craniocerebral injuries has been known to contribute to adverse outcome.[4] Another significant outcome determinant is the degree of physiologic insult, which can be measured by the Revised Trauma Score (RTS).[5]

Age is a significant clinical outcome determinant, as geriatric patients due to decreased physiological reserve, frailty, and preinjury co-morbidities have a higher morbidity and mortality on an injury-for-injury basis than their younger counterparts.[6] The presence of pre-existing medical co-morbidities plays a modulating role in not just physiologic response to injury but the overall outcomes.[7] It has been noted uniformly, however, that the vast majority of trauma victims are young.[2]

In addition to the foregoing, the existence or nonexistence of functional and highly organized trauma management systems can significantly affect outcome in trauma patients. The dearth of organized trauma management systems in resource-poor settings constitutes a significant challenge to the management of trauma patients.

In general, to study the outcomes of trauma, accurate and reliable methodological tools are required for appropriate scoring of severity and outcome prediction.[9-13] Statistical scores for predicting outcomes can be divided into three categories: anatomical scores, physiological scores, or a combination of the two.[13] Trauma and Injury Severity Score (TRISS), Revised Trauma Score (RTS), and ISS are scoring systems used to assist in clinical decision-making and to aid physicians in initial evaluation of trauma. ISS is an anatomical score and independent predictor of death that is mostly used for patients with multiple injuries.[14] RTS is a physiological score for predicting in-hospital mortality and outcome of trauma patients.[5] TRISS uses a combination of both physiological and anatomical ISS (RTS and ISS) as well as age to predict post trauma survival. Studies to identify determinants of outcome in abdominal trauma have not been undertaken in our centre. It is, therefore, necessary to identify these determinants of outcome and recommend changes for the modifiable determinants in this environment.

MATERIALS AND METHODS

This was a prospective hospital-based study carried out over 12 months from August 2021 to July 2022. Ethical committee approval was obtained from the Institute. Consecutive adult patients with clinical and imaging finding suggestive of abdominal trauma during the period of the study were included. It included patients with either penetrating or blunt abdominal trauma. Patients who sustained abdominal trauma but died before arrival or whose injuries could not be evaluated before death were excluded.

Information collected included demographic data: vital signs at presentation, injury mechanisms, and types of injuries sustained, surgery performed, complications, and outcome. These were documented in a pro forma. The degree of physiologic injury and anatomical extent of injuries were computed using the known instruments of stratification such as the Revised Trauma Score (RTS),[5] and the ISS,[14] respectively. The Revised Trauma Score (RTS) is a physiologic scoring system based on the initial vital signs of a patient. The score consists of three continuous measurements, Glasgow Coma Scale, systolic blood pressure, and respiratory rate. On the other hand, the ISS is an anatomically based scoring system to assess trauma severity. It is based on the Abbreviated Injury Scale that classifies each injury in everybody region on a six-point ordinal scale.[15] The TRISS scores were computed from the physiologic and anatomic scores as referred to above. Web-based software was employed for this calculation.[16]

The management policy for the patients included resuscitation according to Advanced Trauma Life Support protocols and emergency laparotomy for patients with shock and generalized peritonitis. Hemodynamically stable patients with minimal, equivocal, or no abdominal sign were selected for non-operative management. The non-operative management protocol involved serial observation of vital signs and abdominal examination and determination of the anatomical grade of injury using a computerized tomography scan of the abdomen. Diagnostic laparoscopy was done for hemodynamically stable patients with penetrating abdominal trauma.

Data collected were collated using Statistical Package for Social Sciences (SPSS) Version 20, IBM, and Armonk, NY, United States of America. Level of significance was set at $P < 0.05$.

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RESULTS

There were a total of 98 consecutive patients with suspected abdominal injuries during the period of the study, but data from only 78 (79.59%) patients were analyzed based on the inclusion criteria. Of these, there were 68 (84.61%) males and 10 (12.82%) females; age range was from 15 to 70 years and a mean age of 32.1 ± 10.1 years [Table 2]. The majority (62.81%) of the patients were between the 2nd and 4th decades of life [Table 1]. Penetrating injuries occurred in 46 (58.97%) patients, while 32 (41.02%) patients had blunt injuries [Figure 1]. Penetrating injuries were due to gunshot in 24 (30.76%) patients and abdominal stab wounds in 21 (26.92%) patients, while blunt abdominal injuries were due to road traffic accidents 25 (32.05%), kicks 6 (7.69%), and fall from height 2 (2.56%) [Figure 1]. Seventy-three (93.58%) patients were conscious at presentation while five (6.41%) patients were unconscious as a result of head injury. As regards mode of treatment, 67 (85.89%) patients had trauma laparotomy, 10 (12.82%) patients (blunt abdominal trauma) had non-operative treatment, and 1 (1.3%) patient with penetrating trauma underwent diagnostic laparoscopy. There were 7(8.97%) deaths in this study and all were males. Four of the mortalities were due to blunt abdominal trauma while the remaining two suffered penetrating abdominal injuries.

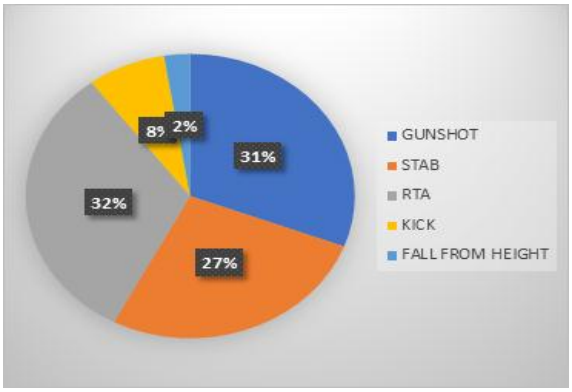

Figure 1: Etiology of Abdominal Trauma

Table 1: Distribution of patients according to age and sex.

Sex	Total no. of cases	Percentage
Male	68	84.61%
Female	10	12.82%
Total	78	100%

Table 2: Distribution according to age group.

Age group	Number of cases	Percentage
11-20 years	10	12.82%
21-30years	26	33.33%
31-40years	23	29.48%
41-50years	12	15.38%
51-60years	4	5.12%
61-70years	3	3.84%
Total	78	100%

Table 3: Injury to intervention time

Variables(h)	Injury -to -intervention time			
	Penetrating	Percentage	Blunt	Percentage
0-6	2	43.47%	0	0%
7-12	17	36.95%	0	0%
13-24	19	41.30%	7	21.87%
25-48	5	10.86%	9	28.12%
>48	3	6.52%	7	21.87%
No surgical intervention	0	0%	9	28.12%
Total	46	100%	32	100%

Table 4: Injury severity score

Variables	Penetrating	Percentage	Blunt	Percentage
0-10	6	7.69%	5	6.41%
11-20	34	43.58%	16	20.13%
21-30	4	5.12%	11	14.10%
31-40	1	1.28%	0	0%
>40	1	1.28%	0	0%
Total	46	58.95%	32	40.64%

Table 5: Variables, Outcomes

Variables	Outcomes		
	Survivors	Non – survivors	P-vlaue
Pulse rate			0.092
<100	31(100.0)	0(0.0)	
≥100	40(86.7)	7(13.3)	

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Systolic Blood pressure <90 ≥90	 5(75.0) 68(93.1)	 1(25.0) 6(6.9)	0.285
Respiratory rate <20 ≥20	 69(100.0) 65(91.5)	 0(0.0) 7(8.5)	1.00
Glasgow coma scale 13-15	68(94.4) 3(50.0)	5(5.6) 2(50.0)	0.029

Table 6: Presentation and intervention parameters and outcome (survival/death)

	Survivors	**Nonsurvivors**	P-value
Time of presentation (h), mean±SD	13.1±27.9	43.2±5.13	0.115
Mode of presentation, n (%) Conscious Unconscious	 68(95.4) 3(50.0)	 4(5.36) 3(50.0)	0.029
Revised trauma score, mean±SD	7.8±0.4	7.3±0.05	0.021
Surgical intervention time (h), mean±SD	16.6±28.2	24.3±16.3	0.049
Injury-to-intervention time (h), mean±SD	25.4±36.6	67.5±58.2	0.007
Mode of care, n (%) Operative Non operative	 60(90.9) 11(100.0)	 7(9.1) 0(0.0)	<0.001
Injury severity score, mean±SD	15.1±27.9	23.7±9.8	0.008
TRISS, mean±SD	97.2±6.9	95±3.5	0.917
ICU admission (days)	7(50.0)	7(50.0)	<0.001
ICU length of stay (days), mean±SD	0.4±1.8	4.2	<0.001
Length of hospital stay (days	13.4±14.3	5.2±3.3	0.019

DISCUSSION

Seventy-eight patients analyzed in this study showed a male-to-female ratio of 6.6: 1.[17] Found a similar sex distribution. Approximately 65.8% of our patients were between the ages of 21 and 40 years while those older than 45 years constituted an outlying group that made up only 15.8% of our patient population. This finding is consistent with a large number of prior studies that have shown the disproportionate involvement of young males in trauma.[4,8,19] There is no doubt because young males are known to be more adventurous than others in any population.

In our present study out of 78 patients 68 (84.61%) were male and 10 (12.82%) were female. [Table 1]. in our study, there was predominance of male over female which shows similar result to other study.

[Table 2] reflect distribution according to age group. Out of 78 patients 10 (12.82%) patients were in the age group of between 11-20 years, 26 (33.33%) patients were in the age group of between 21 to 30 years, 23 (29.48%) patients were in the age group of between 31 – 40 years, 12 (15.38%) patients were in the age group of between 41- 50 years, 4 (5.12 %) patients were in the age group of between 51-60 years and 3 (3.84%) patients were in the age group of between 61-70 years. In our study, majority of the patients of common age group (33.33%) involved was 21-30 years and the least was more than 60years. Just because of trouncing youngster (21-30 years) get more affected by abdominal trauma as compare to old age citizens and young males are known to be more adventurous than others. This was in consistent with study where lower extremity was involved in 74% of cases.[20-22] Consequently, the mean injury-to-intervention time, which was 29.2 ± 40.1 h, was also prolonged. However, these mean values are positively skewed as a result of a few patients with, particularly delayed presentations. A subgroup analysis of patients with blunt trauma showed a longer time to presentation (30.4 ± 44.4 h) compared to patients with penetrating trauma (5.3 ± 4.9 h), P < 0.001. This delay is often due to a failure of the patient to recognize the gravity of abdominal injury or a failure by the medical team to recognize the presence of associated abdominal injuries in polytraumatized patients.[20] reported that delays of as little as 8 h could adversely affect outcomes in patients who have suffered abdominal trauma with concomitant hollow viscous perforation.[21] in Ile-Ife reached a similar conclusion as regards bowel injuries. The average intervention time was 25.4 ± 36.4 for survivors and 67.5 ± 58.2 for nonsurvivors (P = 0.007) [Table 3].[22] Also previously reported this rather prevalent delay in intervention from our centre.

The timing of intervention was a major determinant of outcomes as surgical intervention time (P = 0.049), injury-to-intervention time (P = 0.007), and the requirements for intensive unit care (P = 0.001) were significant predictors of mortality. Furthermore, prolonged durations of ICU and hospital admission were also predictors of mortality.

In this study, the Revised Trauma Score (RTS) of survivors was significantly higher than that of nonsurvivors (7.7 ± 0.4 vs. 7.3 ± 0.5, P = 0.021). Further analysis of the variables in the RTS revealed that nonsurvivors had a significantly lower Glasgow coma score than survivors (P = 0.029). The presence of head injury as manifested by a reduced Glasgow Coma Scale scores (P = 0.029), an increased ISS (P = 0.008), and the presence of significant physiologic injury as evidenced by a low revised trauma score (P = 0.021) were all predictive of mortality. These findings are consistent with the findings.[23] The

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other variables of the RTS score were not significantly different. [Table 4]. Furthermore, there was a significant difference in the ISS of survivors and nonsurvivors. The results indicated the mean ISS value for survivors was significantly lower than that for nonsurvivors (P = 0.008).

CONCLUSION

This study tried to assess different factors like socio demographic characteristics, injury pattern, diagnosis and treatment outcome and factors affecting treatment outcome. Death of abdominal trauma patient was 7(8.97%). Past medical illness, bowel evisceration and hemodynamic complications were identified as associated factors for abdominal trauma related death.

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