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CONSERVATIVE AND OPERATIVE MANAGEMENT OF BLUNT TRAUMA TO THE ABDOMEN IN AL - HILLA TEACHING HOSPITAL

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ABSTRACT

Background: Abdominal trauma is a major contributor to trauma-related injuries and fatalities, with blunt abdominal trauma accounting for more than half of these cases. **Aim of the Study:** This study aims to evaluate cases of blunt abdominal trauma in terms of causes, affected age groups, commonly injured organs, the type of management provided—either surgical or conservative—and the outcomes of each approach. **Patients & Methods:** This cross-sectional study included patients admitted to the surgical wards of Al-Hilla Teaching Hospital between December 2014 and June 2015 after sustaining abdominal trauma. Patients underwent detailed history-taking, clinical examination, and appropriate investigations. Once diagnosed with blunt abdominal trauma, they were monitored for treatment course—either surgical intervention or conservative management—and outcomes were recorded. **Results:** Blunt abdominal trauma was most common in children aged 1–10 (27.3%) and young adults aged 21–30 (22.2%). The sample was 81.8% male, with a 5:1 male-to-female ratio. Leading cause was car accidents (39.4%), followed by falls from height (22.2%). Most patients (86.9%) had no chronic conditions, however hypertension (6.1%) and diabetes (4.0%) were prevalent. Most damaged organs were the spleen (24.2%), colon (20.3%), and liver (11.1%). Patients had 63.6% associated injuries, with chest injuries being the most common (28.3%). Surgical intervention was undertaken in 56.6% of patients, with 89.29% recovery and 10.71% death. Conservative therapy was employed in 43.4% of patients, with 83.72% recovery and 16.28% death. In 35 instances (78%), FAST ultrasonography detected true positives with 83% sensitivity. Abdominal CT scans exhibited 94% sensitivity and true positives in all 30 cases. **Conclusions:** Car accidents are the leading cause of blunt abdominal trauma. While CT scan remains the most sensitive diagnostic tool, both surgical and conservative treatments show comparable outcomes in terms of mortality.

KEYWORDS: Conservative, Operative, Management, Blunt trauma, Abdomen.

INTRODUCTION

Trauma is defined as bodily harm resulting from energy exchange that exceeds the body's resilience.[1] The evaluation and management of trauma patients differ significantly from those with undiagnosed medical conditions, as historical data may be unavailable and distracting injuries or altered consciousness complicate diagnosis.[2] Trauma remains the leading cause of death among individuals aged 1–44 years and the third most common cause of death across all age groups.[3] The increasing rates of automobile and motorcycle accidents have contributed to a rise in blunt trauma cases, with vehicles being the primary cause of non-penetrating trauma.[4] Blunt abdominal trauma (BAT) frequently presents in emergency settings, accounting for approximately 15% of trauma-related deaths and 80% of abdominal injuries.[5] It often coexists with extra-abdominal injuries, with the spleen and liver being the most commonly affected solid organs.[6] Other possible injuries include those to the pancreas, bowel, mesentery, bladder, diaphragm, and retroperitoneal structures like the kidneys and abdominal aorta.[7] Causes of BAT include motor vehicle accidents (MVAs), falls from height, assaults, and contact sports.[8] MVAs remain the leading cause, especially among young males aged 15–24 years. Ultrasound plays a vital role in the evaluation of intraperitoneal bleeding, especially through focused abdominal sonography for trauma (FAST), which helps rapidly assess the presence of free fluid in critical areas such as Morison's pouch and the pelvis.[9] While ultrasound is noninvasive and cost-effective, it is less sensitive for bowel and retroperitoneal injuries and may

be limited by body habitus or bowel gas.[10] Computed tomography (CT) remains the gold standard for diagnosing and grading solid organ injuries, particularly in hemodynamically stable patients.[11] Despite its limitations in detecting some injuries and its cost, CT surpasses diagnostic peritoneal lavage (DPL) and ultrasound for evaluating retroperitoneal injuries.[4] DPL is useful in unstable or unconscious patients where physical findings are unreliable and is considered positive with the presence of blood or gastrointestinal contents.[1,4] Additional diagnostic tools include laparoscopy and angiography, the latter of which may assist in embolization of bleeding vessels.[1,11] Non-operative management is increasingly favored for stable patients with solid organ injuries, although risks such as missed injuries and infections persist.[12] Key clinical signs include pain, tenderness, hypovolemia, and gastrointestinal bleeding. Specific signs, such as Cullen or Grey-Turner, may suggest retroperitoneal hemorrhage.[8] Aim of the Study: to assess cases of blunt abdominal trauma and determine the most appropriate management approach—either conservative or surgical.

Method

This cross-sectional descriptive study was conducted at Al-Hilla Teaching Hospital between December 2014 and June 2015. It included all patients admitted with blunt abdominal trauma during the study period, totaling 99 cases—79 males (81.8%) and 20 females (18.2%). Patients with isolated non-abdominal trauma, such as chest, head injuries, or fractures, were excluded.

Data collection was performed using a structured questionnaire designed by the researcher and approved by two specialists. Verbal consent was obtained from patients or their caregivers. The questionnaire included patient demographics (name, age, sex), mechanism of trauma (motorcycle, car, pedestrian accidents, falls from height, assaults), ASA grading (I–IV), findings from FAST and CT scan investigations, details of operative or conservative treatments, and associated injuries.

The study calculated the case fatality rate (CFR) for both conservative and surgical treatments. CT scan validity was assessed using sensitivity and specificity formulas:

- **Sensitivity** = (True Positives) / (True Positives + False Negatives) × 100
- **Specificity** = (True Negatives) / (True Negatives + False Positives) × 100 High specificity indicated the test's strong diagnostic performance.

Data analysis was carried out using SPSS version 20. Discrete variables were expressed as frequencies and percentages, while continuous variables were presented as means. Chi-square tests were used for associations between categorical variables, and ANOVA tested the significance of differences in means (age, BMI). A p-value ≤ 0.05 was considered statistically significant.

Study limitations included the short duration and relatively small sample size. Not all patients underwent abdominal ultrasound or CT scans, and the CT scan interpretations were not verified by expert radiologists, which may have affected the accuracy of diagnoses and treatment plans.

RESULTS

Between December 2014 and July 2015, a total of 99 patients with blunt abdominal trauma were admitted to the surgical ward at Al-Hilla Teaching Hospital and included in this study.

Type of Trauma: The most common mechanism of injury was car accidents, accounting for 39 patients (39.4%), while assault was the least common cause with 6 patients (6.1%) [table 1].

Age Distribution: Patients ranged widely in age, with the highest frequency observed in the 1–10 years' age group (27 patients, 27.3%) and the lowest in those above 70 years (1 patient, 1.0%) [Table 2]. A statistically significant association was found between age group and type of trauma ($p = 0.016$).

Sex Distribution: Of the 99 patients, 81 were male (81.8%) and 18 were female (18.2%). Among males, car accidents were the leading cause (30 cases, 76.69%), and assault was the least frequent (5 cases, 83.3%). Among females, car accidents were also the most common cause (9 cases, 23.1%), while assault affected only one female (16.7%) [Table 2].

Chronic Diseases: Most patients (86.9%) had no chronic illnesses. Only 2 patients (1.0% each) had known chronic conditions—one with angina pectoris and another with thalassemia [Table 3].

Injured Organs: The spleen was the most frequently injured organ (24 patients, 24.2%), while the bladder and pancreas were the least affected (2 patients each, 1.0%) [Table 4].

Associated Injuries: Extra-abdominal injuries were present in 63 patients (63.6%). Pneumothorax was the most common associated injury (16 patients, 16.2%), whereas fractures were least common (2 patients, 2.0%). A significant association was found between associated injuries and abdominal trauma ($p = 0.019$) [Table 5].

Treatment and Outcomes: Operative management was undertaken in 56 patients (56.6%), most commonly following car accidents (19 patients, 33.9%), and least following assaults (5 patients, 8.9%) [Table 6]. Of these, 50 patients (89.26%) improved, while 6 (10.71%) died [Figure 1].

Conservative management was provided to 43 patients (43.4%), with car accidents again being the leading cause (20 patients, 46.5%) and assault the least (1 patient, 2.3%) [Table 6]. Among them, 36 patients (83.72%) recovered, and 7 (16.28%) died [Figure 1].

Diagnostic Tools: CT scan was used in 56 patients (56.6%), with 30 true positives and a sensitivity of 94% [Table 7]. FAST was performed in 64 patients (64.6%), yielding 35 true positives and a sensitivity of 83% [Table 8].

Table 1: Injury Causes Table.

Cause of Injury	Number	Percentage
Car accident	39	39.4%
Pedestrian accident	21	21.2%
Falling from height	22	22.2%
Motor cycle accident	11	11.1%
Assault	6	6.1%

Table 2: Age and Sex Characteristics of Sampled Patients.

Statistic	Motor Cycle Accident	Car Accident	Pedestrian Accident	Falling From Height	Assault	Total	P value
Min	3	2	5	2	8	2	0.360
Max	47	72	60	70	35	72	
Mean	31.0	28.1	19.4	25.7	22.8	25.7	
SD	14.7	17.4	15.7	23.2	10.3	18.0	
Age Group	Motor Cycle	Car	Pedestrian	Falling Height	Assault	Total	P value
1-10 y (N, %)	1 9.1%	8 20.5%	8 38.1%	9 40.9%	1 16.7%	27 27.3%	0.016*
11-20 y (N, %)	2 18.2%	4 10.3%	7 33.3%	3 13.6%	2 33.3%	18 18.2%	
21-30 y (N, %)	3 27.3%	12 30.8%	3 14.3%	3 13.6%	1 16.7%	22 22.2%	
31-40 y (N, %)	0 0.0%	5 12.8%	0 0.0%	2 9.1%	2 33.3%	9 9.1%	
41-50 y (N, %)	5 45.5%	6 15.4%	2 9.5%	0 0.0%	0 0.0%	13 13.1%	
51-60 y (N, %)	0 0.0%	3 7.7%	1 4.8%	2 9.1%	0 0.0%	6 6.1%	
61-70 y (N, %)	0 0.0%	0 0.0%	0 0.0%	3 13.6%	0 0.0%	3 3.0%	
>70 y (N, %)	0 0.0%	1 2.6%	0 0.0%	0 0.0%	0 0.0%	1 1.0%	
Sex	Motor Cycle	Car	Pedestrian	Falling Height	Assault	Total	P value
Male (N, %)	11 100.0%	30 76.9%	17 81.0%	18 81.8%	5 83.3%	81 81.8%	0.542
Female (N, %)	0 0.0%	9 23.1%	4 19.0%	4 18.2%	1 16.7%	18 18.2%	

Table 3: Chronic diseases encountered in sampled patients.

		Type of Trauma						
Chronic Disease	**Statistic Type**	**Motor Cycle accident N=11**	**Car accident N=39**	***Pedestrian accident N=21***	**Falling From height N=22**	**Assault N=6**	**Total N=99**	**P value**
								0.426*
None	**N**	**8**	**34**	***20***	**19**	**5**	**86**	
	%	**72.7%**	**87.2%**	***95.2%***	**86.4%**	**83.3%**	**86.9%**	
Hypertension	**N**	**1**	**2**	***0***	**2**	**1**	**6**	
	%	**9.1%**	**5.1%**	***0.0%***	**9.1%**	**16.7%**	**6.1%**	
Diabetes	**N**	**1**	**1**	***0***	**1**	**0**	**3**	
	%	**9.1%**	**2.6%**	***0.0%***	**4.5%**	**0.0%**	**3.0%**	
Hypertension & Diabetes	**N**	**0**	**2**	***0***	**0**	**0**	**2**	
	%	**0.0%**	**5.1%**	***0.0%***	**0.0%**	**0.0%**	**2.0%**	
Angina	**N**	**0**	**0**	***1***	**0**	**0**	**1**	
	%	**0.0%**	**0.0%**	***4.8%***	**0.0%**	**0.0%**	**1.0%**	
Thalassemia	**N**	**1**	**0**	***0***	**0**	**0**	**1**	

		Type of Trauma						
Chronic Disease	**Statistic Type**	**Motor Cycle accident N=11**	**Car accident N=39**	***Pedestrian accident N=21***	**Falling From height N=22**	**Assault N=6**	**Total N=99**	**P value**
	%	**9.1%**	**0.0%**	***0.0%***	**0.0%**	**0.0%**	**1.0%**	
**** The minimum expected cell count in this subtable is less than one. Chi-square results may be invalid.***								

Table 4: Organ injuries of sampled patients.

		Type of Trauma						
Organs Affected	**Statistic Type**	**Motor Cycle accident N=11**	**Car accident N=39**	**Pedestrian accident N=21**	**Falling From height N=22**	**Assault N=6**	**Total N=99**	**P value**
Spleen	N	2	10	7	4	1	24	0.769
	%	18.2%	25.7%	33.3%	18.2%	16.7%	24.2%	
Colon	N	2	9	2	4	3	20	0.519
	%	18.2%	23.0%	9.6%	15.1%	50.0%	20.3%	
Liver	N	2	3	3	3	0	11	0.454*
	%	18.2%	7.7%	14.3%	13.6%	0.0%	11.1%	
Small bowel	N	1	2	3	1	0	7	0.683*
	%	9.1%	5.1%	14.3%	4.5%	0.0%	7.1%	
Retroperitoneal hematoma	N	0	1	0	1	0	2	0.818*
	%	0.0%	2.6%	0.0%	4.5%	0.0%	2.0%	
Diaphragmatic	N	0	1	1	0	0	2	0.798*
	%	0.0%	2.6%	4.8%	0.0%	0.0%	2.0%	
Renal injury	N	0	0	0	2	0	2	0.128*
	%	0.0%	0.0%	0.0%	9.1%	0.0%	2.0%	
Bladder	N	0	1	0	0	0	1	0.817*
	%	0.0%	2.6%	0.0%	0.0%	0.0%	1.0%	
Pancreas	N	1	0	0	0	0	1	0.089*
	%	9.1%	0.0%	0.0%	0.0%	0.0%	1.0%	
* The minimum expected cell count in this subtable is less than one. Chi-square results may be invalid.								

Table 5: Associated Injuries Encountered in Sampled Patients.

Organs Affected	**Motor Cycle**	**Car**	**Pedestrian**	**Falling Height**	**Assault**	**Total**	**P value**
Any (N, %)	8 72.7%	28 71.8%	16 76.2%	10 45.5%	1 16.7%	63 63.6%	0.019
Pneumothorax	3 27.3%	9 23.1%	3 14.3%	0 0.0%	1 16.7%	16 16.2%	0.154*
Hemothorax	1 9.1%	5 12.8%	5 23.8%	1 4.5%	0 0.0%	12 12.1%	0.306*
Fracture of femur	1 9.1%	4 10.3%	5 23.8%	1 4.5%	0 0.0%	11 11.1%	0.266*
Intracranial hemorrhage	1 9.1%	7 17.9%	2 9.5%	0 0.0%	0 0.0%	10 10.1%	0.214*
Fracture of ribs	0 0.0%	3 7.7%	3 14.3%	3 13.6%	0 0.0%	9 9.1%	0.553*
SDA	0 0.0%	5 12.8%	3 14.3%	0 0.0%	0 0.0%	8 8.1%	0.223*
Fracture of pelvis	2 18.2%	4 10.3%	1 4.8%	0 0.0%	0 0.0%	7 7.1%	0.290*
SAH	0 0.0%	4 10.3%	2 9.5%	0 0.0%	0 0.0%	6 6.1%	0.384*
Fracture of tibia & fibula	1 9.1%	2 5.1%	1 4.8%	1 4.5%	0 0.0%	5 5.1%	0.950*
Lung contusion	1 9.1%	3 7.7%	0 0.0%	1 4.5%	0 0.0%	5 5.1%	0.664*

Pneumohemothorax	0 0.0%	3 7.7%	0 0.0%	1 4.5%	0 0.0%	4 4.0%	0.565*
Fracture of base of skull	1 9.1%	2 5.1%	1 4.8%	0 0.0%	0 0.0%	4 4.0%	0.727*
Fracture of spine (lower back)	0 0.0%	0 0.0%	1 4.8%	3 13.6%	0 0.0%	4 4.0%	0.107*
Organs Affected	Motor Cycle	Car	Pedestrian	Falling Height	Assault	Total	P value
Extradural hematoma	0 0.0%	1 2.6%	2 9.5%	0 0.0%	0 0.0%	3 3.0%	0.372*
Temporal/parietal bone fracture	1 9.1%	2 5.1%	0 0.0%	0 0.0%	0 0.0%	3 3.0%	0.497*
Fracture of forearm	0 0.0%	3 7.7%	0 0.0%	0 0.0%	0 0.0%	3 3.0%	0.313*
Fracture of clavicle	1 9.1%	0 0.0%	0 0.0%	1 4.5%	0 0.0%	2 2.0%	0.303*
Fracture of humerus	1 9.1%	1 2.6%	0 0.0%	0 0.0%	0 0.0%	2 2.0%	0.427*

Tables 6: Investigations, Management Approach, and Outcomes of Sampled Patients.

Category	Type	Motor Cycle	Car	Pedestrian	Falling Height	Assault	Total	P value
Investigations	FAST Done (N, %)	7 10.9%	22 34.3%	17 26.5%	15 23.4%	3 4.6%	64 100%	0.368
Investigations	FAST Not Done (N, %)	4 11.4%	17 48.5%	4 11.4%	7 20%	3 8.5%	35 100%	
Investigations	CT Done (N, %)	4 7.1%	24 42.8%	11 19.6%	15 26.7%	2 3.5%	56 100%	0.298
Investigations	CT Not Done (N, %)	7 16.2%	15 34.8%	10 23.2%	7 16.2%	4 9.3%	43 100%	
Management	Operative (N, %)	6 10.7%	19 33.9%	13 23.2%	13 23.2%	5 8.9%	56 100%	0.550
Management	Conservative (N, %)	5 11.9%	20 46.5%	8 18.6%	9 20.9%	1 2.3%	43 100%	
Outcome - Conservative	Improved	4 80.0%	16 80.0%	6 75.0%	9 100.0%	1 100.0%		0.243*
Outcome - Conservative	Died	1 20.0%	4 20.0%	2 25.0%	0 0.0%	0 0.0%		
Outcome - Operative	Improved	6 100.0%	16 84.2%	10 76.9%	13 100.0%	5 100.0%		0.619*
Outcome - Operative	Died	0 0.0%	3 15.8%	3 23.1%	0 0.0%	0 0.0%		
Outcome - Overall	Improved	10 90.9%	32 82.1%	16 76.2%	22 100.0%	6 100.0%	86 86.9%	0.122*
Outcome - Overall	Died	1 9.1%	7 17.9%	5 23.8%	0 0.0%	0 0.0%	13 13.1%	

Table 7: Validity of Abdominal CT Study in Detecting Organ Injury.

	Organ Injury Positive	Organ Injury Negative	Total
CT Positive	30	0	30
CT Negative	2	0	2
Total	32	0	32

Indicator	Value	95% CI
Prevalence	0.57	[0.43, 0.70]
Sensitivity	0.94	[0.78, 0.99]
Specificity	1.00	[0.83, 1.00]
Accuracy	0.96	[0.87, 0.99]
Predictive Value of +ve Result	1.00	[0.86, 1.00]
Predictive Value of -ve Result	0.92	[0.73, 0.99]

Table 8: Validity of Abdominal Ultrasound Study in Detecting Organ Injury.

	Organ Injury Positive	Organ Injury Negative	Total
US Positive	35	10	45
US Negative	12	7	19
Total	55	44	64

Indicator	Value	95% CI
Prevalence	0.66	[0.53, 0.77]
Sensitivity	0.83	[0.68, 0.92]
Specificity	0.55	[0.33, 0.75]
Accuracy	0.73	[0.61, 0.83]
Predictive Value of +ve Result	0.78	[0.63, 0.88]
Predictive Value of -ve Result	0.63	[0.39, 0.83]

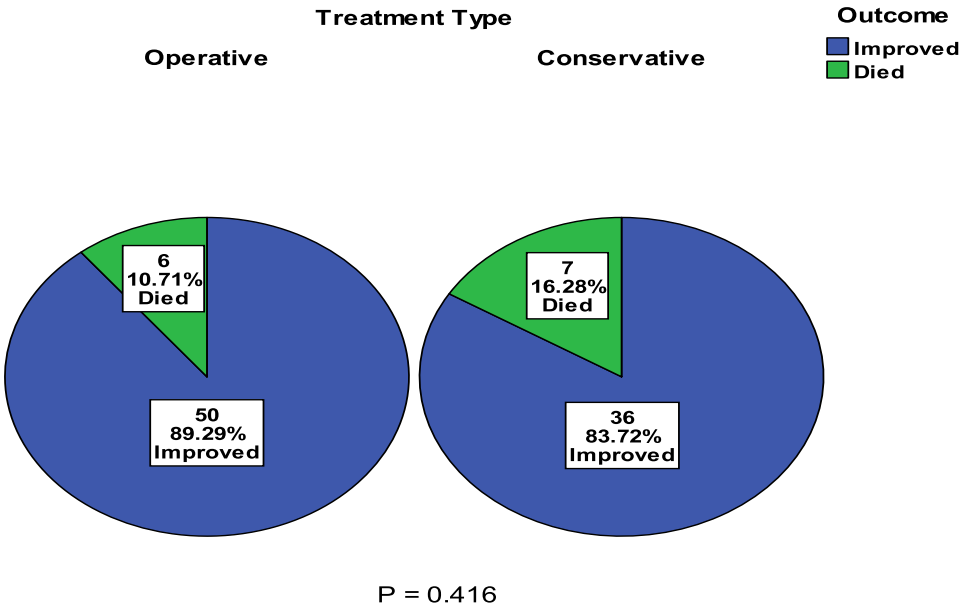

Figure 1: Distribution of sampled patients according to type of treatment and to patient outcome.

DISCUSSION

In this study, male patients constituted the majority (81.8%), consistent with findings from other studies, such as Al-Basri et al. (77.8%),[13] Hemmati et al. (88.2%),[14] Sreeramulu et al. (76.3%),[15] and Kulkarni et al. (94%).[16] This gender disparity can be attributed to cultural and societal norms, where males are more likely to be involved in outdoor activities and occupations, thus increasing their exposure to trauma. Car accidents were the leading cause of blunt abdominal trauma (39.4%) in our cohort, which is lower than reported in other studies 60% by Kulkarni et al.[16] and 54% in another Iranian study.[14] The relatively high rate in our study is likely due to the increased number of vehicles, overcrowded roads, and insufficient enforcement of traffic laws post-2003. Falls from height were the second most common cause (22.2%), aligning with findings by Osifo et al. in Nigeria (23.7%),[17] and higher than the 10.1% reported in another Iranian study.[14] This may be related to inadequate safety precautions and public awareness. Age-wise, the highest proportion of patients were children aged 1–10 years (27.3%), possibly due to inadequate child safety practices such as placing children in the front seat without child restraints. This contrasts with studies like Kulkarni et al., where the peak age group was 21–30 years (29.5%).[16] The second most affected age group in our study was 21–30 years (22.2%), an age characterized by high activity and risk-taking behaviors. Other studies noted that teens (16–20 years) are especially vulnerable due to inexperience and reckless behavior.[14] The spleen was the most commonly injured organ (24.2%), similar to findings by Abdulshaheed et al. (26.31%).[18] and Siddique et al. (16.6%).[19] Liver injuries accounted for 11.1% of cases, close to results by Siddique et al. (16.6%)[20] and Maurice et al. (30%).[21] These organs, though partly protected by the rib cage, are vulnerable in high-impact trauma. Colonic injuries were the second most frequent (20.3%) in our study, whereas Alammar et al. reported a much higher rate (64.4%).[22] Colonic injuries are clinically significant due to their complexity and potential complications. Less commonly affected organs included the urinary bladder and pancreas (1.0% each), similar to previous reports.[16,19] Renal injuries occurred in 2.0% of

cases, lower than the 8.9% reported by Al-Basri et al.[13] Diaphragmatic injuries were also rare (2.0%), compared to 24% reported by Ahmed et al.[23] likely due to limited radiologic expertise. Associated injuries were common (63.6%), in line with Abdulshaheed et al. (71.92%),[18] and slightly higher than Kulkarni et al. (53%).[16] Chest trauma (28.2%) was the most frequent associated injury, similar to the 20.5% observed by Kulkarni et al.[16] Non-operative management was used in 43.4% of cases, consistent with Talib's findings (70%),[20] while 56.6% required surgical intervention, higher than in Saeed's (31%)[22] and Talib's studies (30%).[20] Mortality following operative treatment was 10.71%, and 16.28% after conservative management, with no significant difference in outcomes, supporting the findings of Kulkarni et al. (14.7%).[16] Most deaths were due to associated head or chest injuries.

FAST ultrasound was used in 64.6% of patients with a sensitivity of 83% and specificity of 55%, which is lower than the findings in studies by Witwit et al. (92.3%, 96%),[24] Zedan et al. (93.3%, 86.6%),[25] and Amer et al. (88.88%, 91.3%).[26] This discrepancy may be due to technical limitations or lack of specialist interpretation. In contrast, CT scan showed a sensitivity of 94%, comparable to Al-Saad's finding (95%),[27] reinforcing its role as the gold standard for diagnosing blunt abdominal trauma.

CONCLUSION

Car accidents were the leading cause of blunt abdominal trauma, most commonly affecting children aged 1–10 years, with the spleen being the most frequently injured organ. Over half of the patients required surgery, with similar mortality rates observed between operative and conservative treatments. CT scan showed high diagnostic sensitivity.

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