

DISCUSSION

Trauma represents a major health problem. It is the principal cause of death during the first half of normal human life span and the third leading cause of death for all age groups.⁽¹⁰⁹⁾

Blunt trauma is the most common mechanism of injury. Blunt abdominal trauma occurs in about 25-30% of multiply injured patients and represents the most common type of abdominal injuries. Approximately, 10% of civilian injuries that require operations are the result of BAT.⁽¹⁰⁴⁻¹⁰⁹⁾

The present prospective study was conducted to compare between BAT in adults and children regarding the mode of trauma, organ affection, the importance of CT in diagnosis and the outcome of treatment (operative and non operative).

In this series the prevalence of BAT was significantly higher in adults (64.08%) than children (35.98%) which is in agreement with the study by (Charles et al, 1990)⁽¹¹³⁾ who reported that 85.6% of victims were adults and 14.4% were children. It was also significantly higher in males (81.4% and 78.1% in both children and adults, respectively) compared to females (18.6% and 21.9%, respectively) as males are more involved in activities that predispose them to injury.

Similar results were reported by (Ruhinda et al, 2008)⁽¹¹⁴⁾. In their study, men were slightly more affected by BAT than women. Moreover, in the study done by (Claude et al, 2005)⁽¹¹⁵⁾, there were 77 (60.2%) male and 51 (39.8%) female patients with BAT, and in the study of (Chirdan and colleagues, 2007)⁽¹¹⁶⁾ there were 34 (70.8%) males and 14 (29.2%) females in the pediatric age group.

This male predominance could be explained by the fact that males in this age group are more exposed to trauma as they spend more time outdoors, in addition to the harder character of work.

Results of this study as regards the mechanism of trauma are in agreement with the results found in most of trauma literature, as the most common mechanism of injury causing BAT was RTA constituting 52.5% and 64.8% in both children and adults respectively, followed by FFH constituting 22.0% and 16.2% of both groups respectively and local trauma to the abdomen 18.6% and 11.4% of both groups, respectively.

(Claude et al, 2005)⁽¹¹⁵⁾ reported that BAT most often results from RTA 61%, followed by falls 19%, others 10% and physical assault 10%. Also (Liu M et al, 1993)⁽¹¹⁷⁾ reported that motor vehicle accidents represented major source of BAT which occurred in 70% of patients, blow or direct kick to abdomen represented 15%, followed by FFH which occurred in 11% then motor cycle accident which occurred in 4 % of all cases.

Moreover, (Howard et al, 2003)⁽¹¹⁸⁾ reported that intra-abdominal injury (IAI) in children most often results from motor vehicle collisions (without proper restraint and ejection from a vehicle), automobile versus pedestrian accidents, and falls.

There is agreement in the predominance of RTA as the most common mechanism of BAT. Increased incidence of RTAs is mostly due to several factors: overcrowding in Alexandria and surrounding cities, bad design of many roads, bad

quality of many vehicles, lack of experience of some drivers and pedestrians are not stuck to traffic rules.

In this study, BAT with associated injuries were more common among adults (74.3%) than children (59.3%), while isolated BAT were more common among children (40.7%) than adults (25.7%).

The most common associated injuries in both age groups were cardiothoracic injuries (39% and 66.7% of both children and adults group, respectively), followed by CNS injuries in children and pelvic fracture in adults.

According to (Malhotra et al, 2000) ⁽¹¹⁹⁾ who studied the distribution of 551 cases with BAT according to associated injuries, 16.6% of their patients had no associated injuries, while the remaining patients (83.4%) had one or more associated injuries, with chest injury being the most common.

In the present study the predominance of chest injury as associated injuries was mostly because the most common mechanism of trauma was RTA, and most of RTA's victims were either drivers or riders who were more liable to get chest injury, as well as victims of FFH (as second most common mechanism of trauma) were liable to have CNS injuries and pelvic fractures.

In this study the spleen was the commonest solid organ injured but its incidence was more common in children than in adults (72.9% and 59%, respectively), while the liver ranked the second solid organ injured (55.9% and 53.3% in both children and adults, respectively) because of its size and location in the upper right quadrant of the abdomen. Other wise, (Basileet al, 2006) ⁽¹²⁰⁾ reported that the most injured organ was spleen. In (Velmahos's et al, 2001) ⁽¹²¹⁾ study, 50% had a splenic injury while 48% of BAT patients had a liver injury. (Gaines and colleagues, 2002) ⁽¹²²⁾ in their series reported that the spleen is the most frequently injured intra abdominal organ in pediatrics, followed by the liver, intestine, and pancreas. (Resende et al, 1998) ⁽¹⁶⁾ reported that splenic trauma is more common in children than in adults.

Although the spleen is relatively protected under the ribcage, injury due to rapid deceleration, which occurs in motor vehicle crashes, direct blows to the abdomen and play activities such as bicycling, frequently result in a variety of splenic injuries. Its injury was more common in children than in adults as the location of the spleen in the abdomen is not protected by a bony cage which makes it very prone to traumatic injury.

In the present study 40.7% of children and 34.3% of adults were hypotensive at the time of presentation with SBP < 90 mmHg, while 44.1% of children and 47.6% of adults were tachycardic with pulse > 100 b/min.

(Charles et al, 1990) ⁽¹¹³⁾ reported that most patients (83%) were normotensive on arrival to emergency department, with less than 5% having no obtainable blood pressure on admission. They also reported that there were no statistically significant differences in hemodynamic status at presentation among both age groups. Charles et al results were not similar to our study as Charles et al in their study included all blunt trauma patients not only patients with BAT as in our study.

Initial physical examination that suspect abdominal injuries help to detect signs of peritoneal irritation and hemoperitoneum. In the present study, there were no differences between both groups in inspection (external wounds and bruises), while

there were differences between them in palpation (rigidity), percussion (shifting dullness) and auscultation (peristalsis).

On examination 59.3% of children and 53.3% of adults had external wounds or bruises on inspection, 93.2% of children and 83.8% of adults had rigid abdomen on palpation, and 93.2% of children and 83.8% of adults had dullness on percussion, while 74.6% of children and 85.7% of adults had heard peristalsis on auscultation.

These results were similar to the results (Moore et al, 1995)⁽¹²³⁾ who mentioned in their study that abdominal rigidity and guarding were a predominant clinical signs accounting for 86.3% of all cases of severe intra abdominal organs injuries, however, these finding were not specific. Bowel sounds were infrequently valuable as their absence usually means visceral injury, but could also occur with retroperitoneal hematoma, their presence did not exclude serious visceral damage. However, these results were not similar to those of (Cotton and colleagues, 2004)⁽¹²⁴⁾ as regarding abdominal tenderness (40.7%) in children, ecchymosis and abrasions as positive predictors of IAI (15.8% and 16.8%, respectively) as their study was based on the detection of IAI among children presented with trauma, while our study included children with BAT.

In the present study, US and CT were important diagnostic tests to detect free intraperitoneal fluid and solid organ injury in all BAT patients. Focused assessment sonography for trauma and CT were performed in all BAT patients. Although CT had shown 100% accuracy in detecting hemoperitoneum and solid organ injury, FAST had shown 100% accuracy in detecting hemoperitoneum in both age groups while it had shown 61% in detecting solid organ injury in children and 56% in adults.

(Asuquo et al, 2010)⁽⁵⁾ and (Kirk Patrick et al, 2004)⁽¹²⁵⁾ reported that FAST is one of the most important screening tools for detection of free intra-peritoneal and intra-pericardial fluid. They are accurate screening and diagnostic tests for detecting the presence, the sources and amount of hemoperitoneum. Focused assessment sonography for trauma can also define organ injury.

(Havvaet al, 2011)⁽¹²⁶⁾ reported that accuracy of US in detecting abdominal free fluid was 87.3% and it was 12.7% in associated evidence of solid organ injuries. Also (Rhea et al, 2004)⁽¹²⁷⁾ and (Jalli et al, 2009)⁽¹²⁸⁾ reported that US has low accuracy in detection of solid organ injuries and over looks significant damage.

Computed Tomography in our study was a method for diagnosis of rupture diaphragm and intestinal tear. (Elton et al, 2005)⁽⁶³⁾ reported that Helical CT scan sagittal and coronal reconstruction images are useful for detecting ruptured diaphragm, moreover, it seems to improve the diagnosis of gastrointestinal injuries. So CT is the gold standard technique in the assessment of BAT patients because it is panoramic and highly sensitive compared with US.

As regard the management of BAT, there were no differences among both age groups as 84.7% of children and 81.9% of adults were managed conservatively, while 15.3% of children and 18.1% of adults were managed surgically either from the beginning or due to failed conservative treatment.

Among those who were treated surgically, 77.8% and 78.9% of both children and adults were managed surgically from the start, while 22.2% of children and 21.1% of adults, respectively were managed surgically after failed conservative management.

According to (Nawaz Khan and colleagues, 2009)⁽¹²⁹⁾, almost 80% of adults and 97% of children were treated conservatively by using careful follow-up imaging studies, all this

results were similar to (Yanar et al, 2008)⁽¹³⁰⁾ (75%), (Al-Mulhim et al, 2003)⁽¹³¹⁾ (82.5%) studies.

While (Leon Pachter and colleagues, 1995)⁽¹³²⁾, who studied the NOM of BAT of 495 patients, noted a success rate with this form of treatment of 94%. This discrepancy is mostly due to that Leon's study based on NOM of adult blunt liver injuries while our study included management of all BAT in both age groups.

In our series, the most common surgical procedure was splenectomy in both children and adults (44.4% and 42.1%, respectively) followed by liver repair in both age groups.

These results were similar to those of (Nashat Gwely et al, 2001)⁽¹³³⁾ who reported that the most commonly injured organ in both groups in patients who underwent laparotomy was the spleen constituting 26.8% and 25% of paediatric and adults patients, respectively.

Splenectomy was the most common surgical procedure followed by repair of liver laceration as the spleen was the most common involved organ then was the liver.

In this series the overall mortality rate was 11%. This is not in agreement with (Mohammed Gad et al, 2012)⁽¹³⁴⁾ who reported that the overall mortality rate among abdominal trauma patients in their series was 25.8%, which is higher than our study as their study included mortality rate in both blunt and penetrating abdominal trauma while our study included those with BAT.

Lastly, there were no differences about mortality rate in both age groups. In our study the overall mortality rate was (11.9% and 10.5% in both children and adults, respectively). This is in agreement with (Nashat Gwely et al, 2001)⁽¹³³⁾ as the overall mortality in their study was 8.9% in paediatric. (Kirshtein B et al, 2007)⁽¹³⁵⁾ have reported slightly higher mortality rates of 13.3% in BAT as there were no exclusion criteria in their patients.

The scope of this study reported mortalities in emergency department only and did not record secondary mortalities which occurred further on.

SUMMARY

Blunt abdominal trauma (BAT) is still a big problem and a matter of argument, not only in the algorithm of diagnosis but also in the way of management. Victims of BAT whether children or adults are similar in many aspects of trauma care systems. The differences are few and do not affect the over all algorithm of trauma care system. So, in management of a trauma patient never look for the age alone but also for the severity and the pathology of injuries. Age serves only as a guide and background in the trauma management, because each age has its specific physiology and co-morbidities that must be taken in consideration.

The present prospective study covered all patients from July 2013 through January 2014 and included 164 victims with BAT who were admitted to Emergency Department of Alexandria Main University Hospital. Victims were divided into two groups according to their ages, children group (<16 years) and adult group (>16-60 years).

Males were predominantly affected by BAT in both age groups. They represent 81.4% and 78.1% in both children and adults, respectively. Road traffic accidents (RTAs) which constituted 52.5% and 64.8% in both children and adults, respectively followed by FFH which constituted 22.0% and 16.2% in both age groups, respectively.

Isolated BAT represented 59.3% in children and 25.7% in adults, while patients with associated injuries represented 40.7% in children and 74.3% of adults. The most common associated injuries was cardiothoracic injuries in both age groups followed by CNS injuries in children and pelvic fractures in adults.

In this series there were no significant differences between both groups regarding inspection (external wounds and bruises), while there were differences between them in palpation (rigidity), percussion (shifting dullness) and auscultation (peristalsis).

Computed Tomography showed a 100% accuracy in detecting hemoperitoneum and solid organ injury while FAST showed a 100% accuracy in detecting hemoperitoneum, and only 61% in detecting solid organ injury in children and 56% in adults.

There were no statistically significant differences in the management of BAT as most cases were managed conservatively by close observation of vital signs and periodic imaging follow-up. Deterioration of vital signs and/or radiological evidence of increased intraabdominal collections were indication for urgent laparotomy.

Hemodynamic instability in cases after BAT on presentation without response to fluid resuscitation and with evidence of massive intra-abdominal free fluid collection by abdominal ultrasonography, were indication for urgent laparotomy without further clinical observation or imaging evaluation.

There were no statistically significant differences between the two age groups regarding mortality rate (11.9% and 10.5% in both children and adults ,respectively).