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Pattern and Early Treatment Outcome of Abdominal Injuries in Hospital Pakar Sultanah Fatimah Muar

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Abstract: Abdominal trauma is responsible for 10% of all the traumatic deaths. With progressing technologies and civilization, the profile and pattern of abdominal trauma is changing. This study was conducted to look into the pattern and early treatment outcome of abdominal trauma in our local setting. Prospective and observational study from 1 February 2017 - 1 February 2018. Records of patients with abdominal trauma were collected from the day they were admitted to final outcome of management at discharge or death. Data analysis was done using IBM® SPSS® Statistics Version 22. Forty-nine patients were admitted with abdominal trauma. The majority was male (87.8%) and Malay (61.2%). Mean age was 31.6 years old (range 3-75). The most frequent type was blunt trauma (95.9%); its most common cause was motor vehicle accident (85.7%). Abdominal trauma was associated with other injuries in 75.5% of cases. The most common associated injuries were chest injuries (44.9%), followed by skeletal (40.8%) and soft tissue injuries (26.5%). FAST were done on 89.8% of patients, CECT scan (61.2%) and ultrasonogram (18.4%). The liver was injured in 49.0% of patients, spleen 49.0% and bowel 14.3%. Fifty-one percent of patient had single abdominal organ injury, 16.3% had 2 organs and 24.5% had 3. The majority of patients were treated non-operatively (61.2%). Four patients died of polytrauma (8.2%). Most trauma patients are young male. Abdominal trauma is commonly associated with other injuries but most can be treated non-operatively.

Keywords: trauma, abdominal injuries, pattern, treatment, outcome.

INTRODUCTION

Trauma is still the leading cause of death for people under the age of forty [1]. Of all traumatic deaths, abdominal trauma contributes about 10 percent [1]. Common causes of abdominal trauma are motor vehicle accident, assault, industrial accident or fall. Identifying serious abdominal injury can sometimes become a challenge. Some injuries may not manifest itself during the initial period of assessment. Mechanisms of injury often result in other associated injuries that may divert the physician's attention from potentially life threatening intra-abdominal pathology. For patients who are alert and responsive, physical examination is the method of choice to rule out serious abdominal injuries. However signs of peritonism may take many hours before it becomes clinically significant. For patients who are unresponsive, intoxicated or intubated, physical examination may loss its value and we may need to rely on imaging studies.

Whilst ultrasonography and conventional radiography remain well-established techniques, computed tomography (CT) scanning of the abdomen and pelvis is the procedure of choice to evaluate the haemodynamically stable patient who has sustained abdominal trauma. CT has replaced diagnostic peritoneal lavage (DPL) as the first method of choice in many trauma centers worldwide.

There are two main types of abdominal trauma: blunt and penetrating. Blunt abdominal trauma can be the result of compression or from deceleration forces. Evaluating patients who have sustained blunt abdominal trauma remains one of the most challenging and resource-intensive aspects of acute trauma care. Missed injuries and concealed haemorrhages are frequent causes of increased morbidity and mortality.

Penetrating abdominal trauma is trauma whereby the abdominal cavity communicates with the exterior. The causes may include gunshot wound, missiles shrapnel or knives. The extent of injury may be difficult to predict. However, a high index of suspicion must be maintained to avoid missing occult injuries. For penetrating abdominal trauma the management is usually operative, but for blunt injuries, non-operative management is now commonly practiced. Decision for management are assisted by grading of imaging investigation and clinical factors (haemodynamic evaluation, age, presence of concurrent injuries)

Hospital Pakar Sultanah Fatimah (HPSF) is a district hospital located in the state of Johor, Malaysia. It is situated in Muar district that has a population of 245, 957 people (Department of Statistics Malaysia, 2010). As with the rest of Malaysia, the population is Muar is made up of multi ethnic group mainly Malay, Chinese and Indian. There are 550-gazetted beds in the hospital. Our surgical department consists of one consultant and 4 specialists' general surgeons. This study was conducted to look into the pattern and early treatment outcomes of abdominal trauma in our local setting and to compare the data with other available national and international data.

Objective

- To determine the pattern and early treatment outcome of patients with abdominal injury in the surgical unit of Hospital Pakar Sultanah Fatimah Muar.

MATERIALS AND METHODS

This prospective and observational study was done in a district, teaching hospital in the state of Johor. From 1 February 2017 until 1 February 2018, records of patients with abdominal trauma were collected from the day they were admitted to final outcome of management at discharge or death. Data analysis was done using IBM® SPSS® Statistics Version 22. Descriptive statistics were given as frequencies, median, mean, minimum and maximum for continuous variables and as percentages for categorical variables

Ethics

Permission to carry out this study was obtained from the Medical Research & Ethics Committee, Ministry of Health Malaysia.

RESULTS

From 1 February 2017 until 1 February 2018, forty-nine patients were admitted with abdominal trauma in our centre. The majority was male (87.8%) and Malay (61.2%). Mean age was 31.6 years old (range 3-75). The most frequent type of abdominal trauma was blunt trauma (95.9%); its most common cause was motor vehicle accident (85.7%). Baseline investigations were done for all patients after resuscitation. Focused assessment with sonography in trauma (FAST) was done in 44 patients; abdominal ultrasound was done in 9 and CT scan abdomen in 30. Three patients were transferred to other tertiary hospitals for further management and one was transported to a private centre upon request. The demographic data of our study population is represented in Table 1.

Table-1: Demographic characteristics of the study population

Baseline characteristics	
Number of patients	
Total	49
Men, % (n)	87.8 (43)
Women, % (n)	12.2 (6)
Race	
Malay, % (n)	61.2 (30)
Chinese, % (n)	24.5 (12)
Indian, % (n)	8.2 (4)
Others, % (n)	6.1 (3)
Age	
Range (years)	3-75 years
Mean (years) [a]	31.6 ± 17.2
Cause of trauma	
Motor vehicle accident, % (n)	85.7 (42)
Fall from height, % (n)	6.1 (3)
Stab wound, % (n)	4.1 (2)
Industrial accident, % (n)	4.1 (2)
Types of trauma	
Blunt, % (n)	95.9 (47)
Penetrating, % (n)	4.1 (2)
Investigations done	
Chest radiography	100 (49)
FAST, % (n)	89.8 (44)
Ultrasound abdomen, % (n)	18.4 (9)
Computed tomography scan, % (n)	61.2 (30)
Length of stay	
Range (days)	1-35
Mean (days) [a]	8.76 ± 8.12
n = number, [a] = Mean ± S.D.	

Figure 1 shows that most of our abdominal trauma patients are young people in the 11-40 years old age group (75.5%). Lone et al. found that most of their abdominal trauma patients were in the second and third decade of life [2]. Baradaran *et al*. in their series found 87% of their penetrating abdominal trauma patients were aged from 15-44 years old [3].

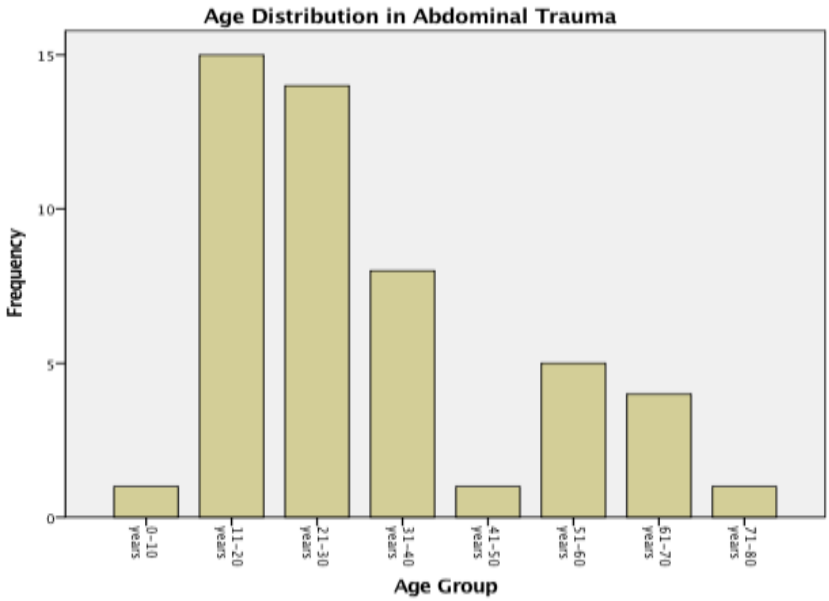

Fig-1: Age distribution in abdominal trauma

Figure 3 shows the distribution of organs injured. Liver and spleen were the organs that were most frequently injured (49%, n=24). In 8.2% of cases (n=4), no organs were found to be injured although free fluid was presence on imaging.

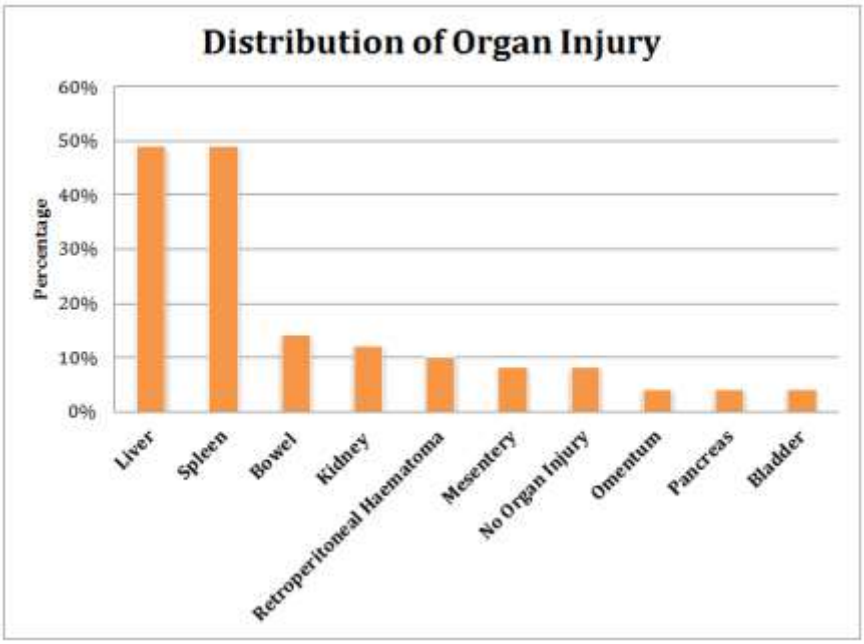

Fig-3: Distribution of organ injury

Table-2: Grading of liver, spleen and kidney injury

	Liver		Spleen		Kidney	
	n	%	n	%	n	%
Grade 1	4	8.2	4	8.2	1	2.0
Grade 2	9	18.4	6	12.2	1	2.0
Grade 3	6	12.2	7	14.3	3	6.1
Grade 4	3	6.1	3	6.1	1	2.0
Grade 5	0	0	3	6.1	0	0
Grade 6	0	0	0	0	0	0
Unknown Grade	1	2.0	1	2.0	0	0

Abdominal trauma is often associated with other injuries as shown in Table 3. Often there is more than one injury seen in the same patient.

Table-2 shows the grading of the solid organ injury. Most of our patients had grade 2 and 3 solid organ injuries

Table-3: Associated injuries

Associated injuries	n	%
Soft tissue injury	13	26.5
Head injury	7	14.3
Chest injury	22	44.9
Skeletal injury	20	40.8
Other	1	2.0

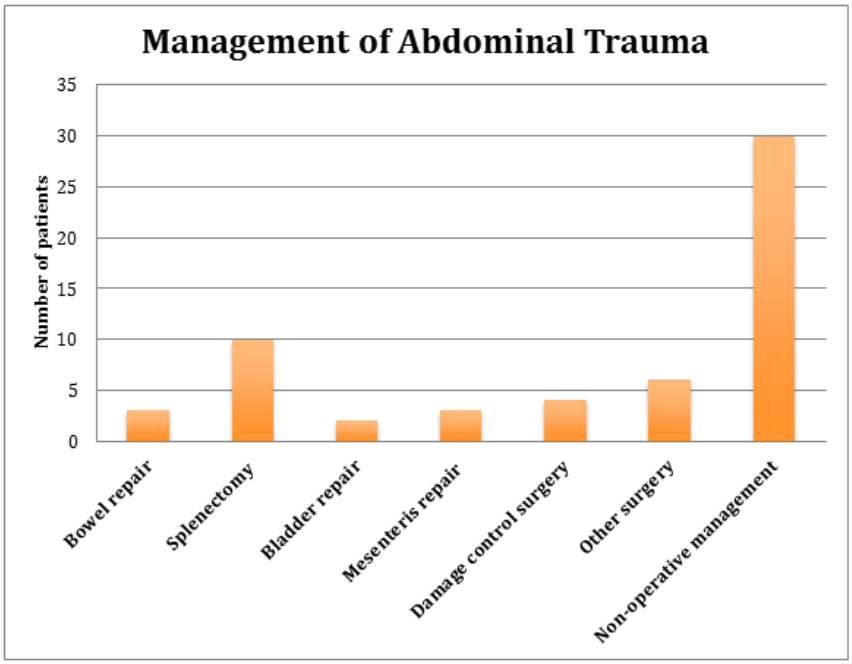

Fig-4: Management of abdominal trauma patient in HPSF Muar

As evidenced on the graph (Figure 4), most of our abdominal trauma patients were treated conservatively (n=30, 61.2%). Splenectomy was done on 10 patients (20.4%), bowel repair in 3 (6.1%) and bladder repair in 2 (4.1%). Some patients had more than one surgery done. We had 4 mortalities in our series (8.2%) and all of them had polytrauma.

DISCUSSIONS

Abdominal trauma in our centre (87.8% male, 77.6% < 40 years old) and in many centres in the world [2, 3] is affecting mainly young men in their most productive years. This has implication to the national economy and to the families who are depending on these young men as the breadwinners. The majority of our abdominal traumas were caused by blunt injuries with penetrating injuries contributing to only 4.1% (n=2). Both our patients had stab wounds secondary to assaults. The result is almost similar to a local study done in Hospital Sultanah Aminah in Johor Bahru, Malaysia. They reported penetrating injuries being present in 7.28% of their trauma patients [4]. Comparing this result with other centres internationally, our penetrating injuries are definitely smaller in

percentage. Lone in Kashmir reported 52.8% of penetrating injuries [2] and Gad in Egypt 30.6% [5]. The reason for the low rate of penetrating injuries could be because Muar has a low crime rate if compared to the other countries mentioned above. It is also illegal for people to use or own firearms in the country for most of the reasons. Stab wounds from self-inflicted injuries are also low in Malaysia as our suicide rate is 6 to 8 in 100,000 of the population [6].

Imaging studies play a very important part in the management of abdominal trauma. Plain abdominal radiography, however, has no role in the assessment of abdominal trauma as it cannot visualize abdominal organs and it does not detect free fluid. In haemodynamically unstable patients, ultrasound assessment of the abdomen is the modality of choice. It is cheap, non-invasive and repeatable. Focused abdominal sonography for trauma (FAST) is an abbreviated form of ultrasound that can be done to demonstrate intraperitoneal of pericardial fluid. Almost 90% of our patients had FAST performed on them and some of them later underwent a formal ultrasound or computed tomography scan to further image their injuries. Computed tomography scan is essential in grading the severity of solid organ injuries. According to the grade of injuries and other factors (haemodynamic stability, other associated injuries, etc), decision can be made whether an operative management is necessary or not. Computed tomography also has a high negative predictive value in a normal scan, therefore avoiding unnecessary surgical explorations [7].

Most patients with abdominal trauma can be safely treated conservatively. Raza *et al*. Performed a 10-year review in 1071 blunt abdominal trauma patients concluded that non-operative management was found to be highly successful in almost 90% of the time [8]. Gad reported 28.3% of their overall abdominal trauma cases received surgical intervention and among the blunt trauma patients, only 13.2% underwent surgery [5]. In our series, only 19 patients (38.8%) underwent surgical intervention. Even in haemodynamically unstable blunt abdominal trauma patients, some authors are treating these patients non-operatively by using therapeutic angioembolization and resuscitative endovascular balloon occlusion of the aorta [9]. Over the last few decades, selective management of penetrating abdominal trauma has been widely accepted in many centres in the world whereby selective patients with penetrating abdominal trauma are treated non-operatively [10, 11]. Como in 2010 concluded that routine laparotomy is not indicated in haemodynamically stable patients with abdominal stab wounds without signs of peritonitis or diffuse abdominal tenderness [10]. Selected groups of patients with penetrating abdominal trauma can also be treated with minimally invasive surgery [12].

The mortality rate in our study is 8.2%. Other authors have reported similar rate for example Arumugam in Qatar 8.3% [13], Okus in Turkey 4.3% [14] and Lone in Kashmir 9.2% and 8.2% in penetrating and non-penetrating injuries, respectively [2]. According to Arumugam the predictors of mortality were head injury, injury severity score, need for blood transfusion and serum lactate [13].

CONCLUSIONS

Consistent with previous studies, most trauma patients are young male. Abdominal trauma is commonly associated with other injuries but most can be treated non-operatively. The overall mortality rate among abdominal trauma patients in our series was comparable with other centers.

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