

Trauma; frequency of missed intra-abdominal injuries in Al-Sulaimaniyah Teaching Hospital/ Emergency Department

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ABSTRACT

Background: The most common reason for injuries to be missed is altered level of consciousness due to head injury or alcohol. Other reasons include severity of injury and instability requiring immediate operation, lack of symptoms at admission, technical problems, and low index of suspicion by the examiner. Missed injuries can occur at any stage of the management of patients with major trauma. Any delay in providing the necessary treatment may lead to increased morbidity and mortality.

Objective: To find the frequency of missed intra-abdominal injuries and their mortality, to raise suspicion of potential missed injuries in order to avoid these preventable deaths.

Methods: A retrospective study including 2978 patients with abdominal injuries out of 13201 traumatized patients in 2006. Records were reviewed for demographics, injury characteristics, and associated injuries, missed injuries, need and indications of reoperation, morbidity and mortality.

Results: The study included 2978 trauma victims; 2195 males and 783 females, with a male to female ratio of about 4:1. Their age ranged from 2- 87 years, median age 39.5 and peak age of trauma was 31 years. From 2978 patients with abdominal injuries, there were 28 deaths (1.06%), and four missed injuries (0.134%).

Conclusion: A careful history taking, precise and repeated clinical examinations, complete diagnostic procedures, complete surgical explorations, and proper timing of reoperation are necessary for patients with blunt abdominal injuries, which are cornerstones in improving the quality of trauma care.

Keywords: Trauma patient, missed injuries, missed abdominal injuries, small intestinal injuries, and preventable death.

الخلاصة

خلفية البحث: ان أكثر أسباب الإصابات غير المشخصة هي تشوه الوعي عقب شدة على الرأس او الكحول، هناك أسباب أخرى مثل شدة الإصابة، والحالة غير مستقرة للمريض، حيث يحتاج الى تدخل جراحي فوري وغياب العلامات المرضية عند وصول المصاب ومشاكل تكنولوجية وعدم الانتباه لاحتمال الإصابة من قبل الجراح الفاحص. الإصابات غير المشخصة يمكن ان تحدث في أية مرحلة من مراحل العلاج وأي تأخير في العلاج الضروري يمكن ان يؤدي الى المضاعفات أو الوفاة.

هدف البحث: بيان مدى شيوع حالات إصابات البطن غير المشخصة واحتمال الوفاة كنتيجة، ولرفع الوعي حول احتمال حدوث هذه الأخطاء لتلافي حالات الوفاة التي يمكن تجنبها.

طرق البحث: تم دراسة ٢٩٧٨ حالة إصابة على البطن من أصل ١٣٢٠١ حالات حوادث عولجت خلال سنة ٢٠٠٦، تم استقصاء المعلومات الشخصية ونوع الإصابة والإصابات المترافقة والحالات غير المشخصة وأسباب إجراء عملية لمرّة ثانية والمضاعفات وحالات الوفاة.

النتائج: شمل البحث (٢٩٧٨) من ضحايا الحوادث, (٢١٩٥) ذكر و(٧٨٣) أنثى, النسبة (١/٤) . معدل عمرهم (٢-٧٠) سنة ووسط عمرهم (٣٩,٥) سنة وقمة العمر للإصابات (٣١) سنة.
الاستنتاج: أخذ تاريخ المرض بدقة وفحص مفصل للمصاب وباستمرار, وإرسال الفحوصات وإجراءات تشخيصية كاملة وإجراء العملية الجراحية مبكرا, في حالات إصابات البطن المغلقة, يؤدي الى تحسين الطرق العلاجية والاهتمام الجراحي.

Increased number of emergency admissions, unstable patients, incomplete histories, time-critical decisions, concurrent tasks, involvement of many disciplines and often junior personnel working after-hours in busy emergency departments create a perfect storm for medical errors.^(1,2) One of these avoidable errors is missed intra-abdominal injuries (MAI), which could be defined as “unsuspected intra-abdominal injury requiring laparotomy in patients otherwise undergoing non operative management (NOM)⁽³⁾. It is clear that missed injuries adversely affect patients outcomes and damage physicians/institutional credibility⁽⁴⁾ which could be avoided by “The timely treatment of the injury continues to rely on a high index of clinical suspicion and serial examinations by an experienced surgeon”⁽⁵⁾. The most common reason for injuries to be missed is altered level of consciousness due to head injury or alcohol. Other reasons include severity of injury and instability requiring immediate operation, lack of symptoms at admission, technical problems, and low index of suspicion by the examiner.^(3, 6) Missed injuries can occur at any stage of the management of patients with major trauma, any delay in providing the treatment necessary may lead to increased morbidity and mortality.⁽⁷⁾ In many literatures the incidence of missed injuries is significant (8.1%)^(6, 7). Understanding the etiology of missed injuries is essential in minimizing its occurrence.⁽⁶⁾ Among these injuries blunt abdominal trauma needs early and prompt identification and it can be challenging, and failure to detect these injuries initially can lead to preventable complications.⁽⁸⁾

Autopsies are useful in uncovering missed injuries or undiagnosed conditions that contribute to death after injury⁽⁹⁾, otherwise

valuable information regarding possible missed injuries and potential improvements in management will be lost⁽¹⁰⁾.

Our aim is to find the frequency of the missed intra-abdominal injuries and their mortality, to raise the index of suspicion of potential missed injuries in order to avoid these preventable deaths, and improve the quality of the emergency medical services

Methods

A retrospective study including 2978 patients with abdominal injuries from the sum of 13201 traumatized patients in the 2006. Most of these patients were received directly after an accident from Al Sulaimaniyah city center or nearby areas which are served by Al-Sulaimaniyah Teaching Hospital/ a tertiary hospital in Iraqi Kurdistan Region, receiving annually over 20000 surgical emergencies. As recorded in the files; the initial examination was carried out by the trauma team in the Emergency Department (ED) according to standard protocols. Resuscitation was carried out according to Advanced Trauma Life Support principles. Patients were later reexamined as frequently as needed. Records were reviewed for demographics, injury characteristics, associated injuries, missed injuries, need and indications of reoperation, morbidity and mortality. Postmortem results of the 122 deceased patients were taken from Al Sulaimaniyah Forensic Institute; medical records of another 12 deaths were missing, who were excluded from the study. The study was approved by the Ethics Committee of the University of Al Sulaimaniyah-College of Medicine. All the data were analyzed by SPSS (statistical package for social science) version 16. Qui square analysis was done, P value less than 0.05 was considered positive and statistically important.

Results

The study included 2978 abdominal trauma victims; 2195 males and 783 females, with a male to female ratio of about 4:1. Their age ranged from 2- 87 years ,median age 39.5 and peak age of trauma was 31 years .Three quarters of the injuries were caused by blunt trauma, road traffic accidents being the commonest (61.8%), and then falls (14.9%). While in the penetrating injuries gunshot injuries (13.9%) were the most frequent penetrating type. Mortality was 1.1 % (134 patients, 12 exclude because of missing of their medical records). About two third of deaths had sustained head injury (77.9%), only 28 deaths had abdominal injuries and many victims had multiple injuries (Table1).

From 2978 patients with abdominal injuries (Table 2), there were 28 deaths (1.06%), and four missed injuries (0.134%). Three missed injuries were intraoperative. One who had laparotomy for severely injured liver with severe haemoperitonium, and 49 hours later on reoperation, revealed shattered right kidney. The other two patients had undergone laparotomy for spleen avulsion and deep laceration in the spleen, while small intestine injuries were missed, revealed 4 days later during reoperation. The fourth one had multiple injuries by a heavy blunt object and was treated for the thoracic and orthopedic

injuries while abdominal injury in the form of duodenal damage was missed, and died on the 5th posttrauma day. Postmortem revealed missed posterior duodenal tear and periduodenal bilious debris and pus collection (Table 3).

We could notice that three quarters of the missed injuries (Table 4), were intestinal lacerations and occurred in the patients who sustained blunt abdominal injuries. Injuries were missed in two of the patients in the first operation, and the third diagnosed at autopsy.

Table (1): The frequencies of injuries in anatomical body regions.

Injured Region	No.	%
Head	95	77.9
Multiple superficial wounds	42	34.4
Lower limb fractures	28	23
Chest	21	17.2
Abdomen, pelvis	28	23
Upper limb fractures	17	13.9
Spine	7	5.7

* Some patients injured in more than one anatomical region.

Table (2): Details of the intra-abdominal injuries.

Injured organs	No. and %	Operated on	Non-operative management
Abdominal wall	804 (26.99%)	393	407
Small intestine	435 (14.60%)	433	2
Pelvic # with bladder and or urethra	370 (12.42%)	370	0
Liver , spleen	326 (10.94%)	326	0
Kidneys and ureter	132 (4.43%)	18	114
Large intestine	111 (3.72%)	111	0
Combined (Polytrauma)	800 (26.86%)	369	431
Total	2978 (100%)	1894	1084

Table (3): Details of the missed intra-abdominal injuries in four patients.

Stage of ATLS	Missed intra-abdominal injury	Survived No. and %	Died No. and %
Tertiary Assessment	Duodenal tear	0	1
Intra-operative	Renal injury	0	1
	Small intestine	2	0
Total	4	2	2

Table (4): Details of the intestinal injuries s.

Condition of the intestinal injury (Small and large)	Type of the injury			Missed injury	P value
	Penetrating		Blunt		
	HVM*	SW**			
single	46	37	463		0.0317
Combined with intra-abdominal injuries	39	10	90	2 (Blunt trauma)	
Combined with extra-abdominal injuries	2	1	32	1 (Blunt trauma)	

* HVM: High velocity missiles.

** SW; Stab wound.

P value less than 0.05 considered significant.

Discussion

Missed injuries still occur at an unacceptably high rate in trauma patients⁽¹¹⁾, it is mentioned in details in the literature and the incidence is (8.1-22%)^(6,7,11). But incidence of missed intra-abdominal injuries (3 -18%) is mentioned less in the literature⁽¹²⁾, claiming that it will not result in mortality, although it's associated with significant morbidity^(5,13). While others found 0.19% of necessary reoperation and (0.29%) mortality in patients with missed injuries. In the results of the current work need for reoperation was 0.1% which is comparable to the literature⁽¹⁴⁾ and mortality was (1.1%) with (p value 0.0317).

Missed intestinal lacerations may be difficult to diagnose. There may be no initial or typical clinical presentation of the abdominal injuries especially in patients with multiple injuries or when there is change in the consciousness of the victim, even after examination with ultrasonography and CT scan of the abdomen and pelvis^(5,11,12), it is still not easy. Ultimately, the decision for exploratory laparotomy should be a clinical decision^(5,13,15) and high index of clinical suspicion helps in the recognition of these types of injuries⁽¹²⁾. The timely treatment

of these injuries continues to rely on a high index of clinical suspicion and serial examinations by an experienced surgeon⁽⁵⁾, which may help in improving the quality of trauma care⁽¹¹⁾.

Although in initial assessment, one still has to treat the greatest threat on life before complete diagnosis of all injuries, but alertness to evolving injuries must remain throughout the patient's stay in the hospital⁽⁷⁾ Acute physiological derangements can occur at any time after the original injury, with life threatening sequelae.⁽¹⁶⁾

The majority of treatment errors occur in the emergency department, the intensive care unit (ICU) and the operating room⁽¹¹⁾. The results of this work revealed 4 missed intra-abdominal injuries (MIAI) (Table 3), one missed in the ED, ICU and there was no suspicion of the injury (duodenal lacerations) before death. Other three cases were missed in the ED, ICU and in the first operation (2 patients with small intestinal lacerations and one with shattered right kidney).

The presence of associated intra-abdominal injuries significantly affected the presentation and time of diagnosis of patients with small

bowel injuries(SBI)⁽¹²⁾ and any delay in the surgical treatment in trauma victims over 90 min increases mortality of 1 % every 3 minutes^(17,18). Patients inflicted with more severe associated injuries were less likely to survive the trauma⁽¹²⁾.

Conclusion

A careful history taking, precise and repeated clinical examinations, complete diagnostic procedure, complete surgical explorations, and timing early reoperation are necessary for patients with blunt abdominal injuries, which are cornerstones in improving the quality of trauma care.

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