

Management of abdominal trauma

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Abstract

Objective : This study prospectively evaluated in hospital patients who have got abdominal trauma . **Methods** : All patients with abdominal trauma admitted between January 2014 and June 2015 in Zawia teaching Hospital , Zawia , Libya , were assessed for different abdominal injuries using multiple diagnostic studies . **Results** : A total of 134 patients were included , the greatest number of patients were below the age of 40 years and the commonest cause of trauma were the penetrating gunshot injuries . A significant number of patients were shocked at presentation and the commonest organ involved in this study was the liver . There were associated extraabdominal injuries which involved other organs of the body . **Conclusion** : Organized systems of trauma care are required at the trauma site , in prehospital care and during hospital care . Prompt evaluation of the abdomen is necessary to minimize preventable morbidity and mortality .

Introduction

Trauma has been considered as the neglected disease of modern society ¹ . Trauma is the leading cause fo death and disability in the first four decades of life ^{1,2,3}.

Patients with severe abdominal injuries after blunt or penetrating trauma appear commonly in our society

The majority of preventable deaths after blunt trauma is attributed to unrecognized abdominal injuries ⁴ .Approximately 25% of persons who die as a result of explosive or gunshot wounds have potentially survivable wounds if appropriate care can be initiated close to the time of injury ⁵.

Significant abdominal trauma is present in 12-15 % of patients with blunt trauma and usually occurs in association with multisystem injuries ⁴ .

Blunt abdominal injuries are not obvious and indication for operation is not clear as in penetrating abdominal trauma ⁶ .

Penetrating trauma of the abdomen continues to be a major cause of trauma admission in USA ⁷, and in our society .Stab wounds have a lower mortality than gunshot because of the lower energy transmitted ⁷. In blast victims even a small penetrating skin wound may be accompanied by devastating underlying trauma .Rapid loss of 2000 cc blood will result

In sever shock ⁵ , and massive haemorrhage as occurs in massive liver injuries ⁸ remains a potentially preventable cause of death ⁹ . Coagulopathy , acidosis and hypothermia form a lethal triad ⁹ .

Splenic injuries account for 40 %-55 % of abdominal traumas in the emergency treatments .

Spleen is the most vulnerable abdominal organ because it is superficial and fragile 10 .

Spleen is the most commonly injured abdominal organ following blunt abdominal trauma 11,12.

Traumatic colorectal perforation leads to peritonitis and septic shock which is responsible for disseminated intravascular coagulation and organ failure 13 .

Diaphragmatic injuries occur in up to 20% of patients with penetrating thoracoabdominal injuries 14 . Large diaphragmatic lacerations may cause intrathoracic herniation and visceral strangulation 7 .

Pancreatic injury is uncommon 15,16, the incidence in blunt trauma is 0.2% and in penetrating injuries ranging from 1 % to 12 % 16 , pancreatic injuries associated with significant morbidity and mortality 15,16 .

Clinical signs suggestive of intraabdominal injury include diffuse and localized tenderness , hemodynamic instability , haematuria , haematemesis , blood on rectal exam and diminished or absent lower extremity pulses . Assessment of abdominal trauma initiated by clinical examination which may be inaccurate in presence of distracting injuries altered level of consciousness and nonspecific abdominal signs 17 .

Methods

This prospective study evaluating 134 patients with abdominal trauma who were admitted and for whom laparotomies had been done at Zawia Teaching Hospital from January 2014 to June 2015 .After resuscitation , multiple diagnostic studies were used for diagnosis

Beside clinical abdominal examination 4,17,18,19, there are diagnostic tests which help in the diagnosis and management of intraabdominal injuries , among these evaluating modalities are CT scanning 1,4,7,17,19,20 , X-ray of the chest and abdomen 17 , focused abdominal sonography for trauma (FAST) 4,7,17,18,19,21, rigid sigmoidoscopy , intravenous pyelogram , contrast cystogram 17 , and laparoscopy 4,7,17.

The high incidence of abdominal trauma necessitates knowledge of the management of trauma and the complications associated with it 22 .The aim of the initial assessment and management is to reduce the morbidity , the mortality ,and improve recovery 23 .

Haemorrhage control is always an early priority in the management of injured person 11.

The management of intraabdominal injuries changed in the last few decades from routine laparotomy to conservative nonoperative management in a haemodynamically stable patient 2,6,7,8,12,17,20,24,25.

Almost all hollow visceral injuries require operation 6, the policy of mandatory colostomy was replaced by liberal primary repair in most cases in the 1990s 7.

of abdominal injuries including X-rays , focused abdominal sonography for trauma (FAST), CT scanning , and diagnostic peritoneal lavage .

All patients with significant abdominal trauma treated with laparotomies and definite procedure according to the type and organ involved .

Results

Demographic data revealed that the greatest number of patients (123 patients=91.7%) were below the age of 40 year and the majority of them are males (121 patients=90.2%) Table 1 .

TABLE 1. Demographic data of injured patients

Decade	Male	Female	Total	Percentage		
0-<10years	6	1	7	123	5.2	91.7
10-<20years	27	2	29		21.6	
20-<30years	55	6	61		45.5	
30-<40years	23	3	26		19.4	
40-<50years	8	0	8	5.9		
50-<60years	1	0	1	0.7		
60-<70years	0	1	1	0.7		
70-<80years	1	0	1	0.7		
Total	121	13	134	100		

The type of trauma considered were both blunt and penetrating injuries .The majority of them were penetrating type (97 patients=72.3%) caused mainly by gun shot and explosion (89 patients=66.4%) the remaining penetrating trauma caused by stabbing injuries (8 patients=5.9%).

While blunt trauma recorded in 37 patients (27.6%) which mainly caused by road traffic accident (RTA) (32patients=23.8%) and the remaining blunt trauma caused by falldown (5 patients=7.3%) Table 2 .

TABLE 2 . Types of trauma

Type of trauma	Number of patients		percentage		
Blunt trauma	R.T.A.	32	37	23.8	27.6
	Fall down	5		7.3	
Penetrating trauma	Gun shot & explosion	89	97	66.4	72.3
	Stabbing	8		5.9	

During initial resuscitation there were 33 patients (24.6%) with sever shock and 40 patients (29.8%) received blood transfusion.

The involved intraabdominal organs with the operations which had been done are shown in Table 3.

Table 3 . The intraabdominal injuries and related operations performed

Injured organ	Number of patients			Percentage of patients		
	Blunt trauma	Penetrating trauma	Total number	Blunt trauma	Penetrating trauma	Total percentage
Liver reparaire	16	25	41	11.9	18.6	30.5
splenectomy	20	14	34	14.9	10.4	25.3

Small intestine	repaire	3	3	24	39	42	2.2	2.2	17.9	29.1	31.3
	Resction& anastomosis	0		15			0		11.1		
Large intestine	repare	1	2	31	48	50	0.7	1.4	23.13	35.8	37.3
	Resection& anastomosis	1		7			0.7		5.2		
	colostomy	0		10			0		7.4		
Stomach repaire		0		21		21	0		15.6		15.6
Retroperitoneal hematoma		5		13		18	3.7		9.7		13.4
Diaphragmatic repaire		2		12		14	1.4		8.9		10.4
Mesenteric repaire		2		6		8	1.4		4.4		5.9
Pancreatic drain		3		4		7	2.2		2.9		5.2
cholecystectomy		0		4		4	0		2.9		2.9
g. repaire		0		1		1	0		0.7		0.7
I.V.C.		1		0		1	0.7		0		0.7
Portal vien		1		0		1	0.7		0		0.7
Nephrectomy		5		11		16	3.7		8.2		11.9
Kidney repaire		1		0		1	0.7		0		0.7
Urinary bladder repaire		0		3		3	0		2.2		2.2
orchidectomy		0		1		1	0		0.7		0.7
Caesarean section		0		1		1	0		0.7		0.7
Negative laparotomy		0		4		4	0		2.9		2.9

In this study the majority of intraabdominal organs received more damage by penetrating trauma as compared to blunt trauma except spleen which is involved more by blunt trauma (20 patients =14.9%)

The liver which injured by penetrating trauma in 25 patients (18.5%) as compared to blunt trauma which occur in 16 ptients (11.9%).

A large number of patients had got small and large bowel injuries , mainly caused by penetrating trauma . Small bowel injury occurred in 42 patients of which 39 patients (29.1%) involved by penetrating injury and 3 patients (2.2%) involved by blunt trauma . In 27patients (20.1%) of them simple intestinal repair done and in 15 patients (11.1%) resection and , anastomosis required .

Large bowel injury mainly caused by penetrating trauma (35.8%) as compared

to blunt trauma (1.4%) . Simple repair for large bowel injury done for 32 patients (23.8%) , resection and anastomosis performed for 8 patients (5.9%) and colostomy performed in 10 patients (7.4%) .

Gastric injuries reported in 21 patients (15.6%) which treated by repair in two layers .

Retroperitoneal haematoma presented in 18 patients (13.4%) most of them caused by penetrating trauma .

Diaphragmatic injuries reported in 14 patients (10.4%) which treated by surgical repair .

Other operations performed include mesenteric repair in 8 patients(5.9%) and cholecystectomy in 4 patients (2.9%)

Inferior vena cava injury which treated by suture repair occurred in one patient and

portal vein injury also reported in one patient (0.7%) treated by suture repair .

Significant urologic injuries reported which treated by nephrectomy in 16 patients (11.9%) ,kidney repair in one patient (0.7%) ,urinary bladder repair in 3 patients (2.2%) and orchidectomy in one patient (0.7%)

One pregnant patient had got laparotomy and caesarean section at the same time.

4 negative laparotomies after penetrating trauma reported (2.9%) without intraabdominal injuries .

There are associated injuries to the abdominal trauma Table 4 which involve chest in 32 patients (23.8%) , head injury in 5 patients (3.7%) , upper limb injury in 13 patients (9.7%) , lower limb injury in 17 patients (12.6%) , pelvic fracture in 6 patients (4.4%) and vertebral column injuries in 5 patients (3.7%).Table 4.

Table 4. Associated extraabdominal injuries

Associated injury		Number of patients	percentage
chest	haemopneumothorax	22	16.4
	Fractured ribs	7	5.2
Head injury		5	3.7
Upper limb injury		13	9.7
Lower limb injury		17	12.6
Pelvic fracture		6	4.4
Vertebral column injury		5	3.7

Duration of hospital stay varies from one day to more than four days . A significant number of patients discharged the hospital against medical advice DAMA (38patients=28.3%) to complete their management abroad Table 5 .

Table 5. Duration of hospital stay

Duration of Hospital stay	D.A.M.A.		Normal discharge	
	Number of patients	Percentage of patients	Number of patients	Percentage of patients
1 day	38	28.3	7	5.2
2 days	18	13.4	3	3.8
3 days	5	3.7	5	3.7
4 days	8	5.9	8	5.9
>4 days	6	4.4	36	26.8
Total	75	55.9	59	44

The mortality reported in 13 patients (9.7%) , were seven patients (5.2%) died after gunshot injuries , six patients died (4.4%) after RTA and nine patients had sever shock at the time of presentation .

Discussion

Trauma is one of the most common cause of morbidity and mortality in our country .

The pattern of trauma was changed in the last few years in our society . Nowadays the major cause of trauma is gunshot injuries (66.4%) as compared to the major cause of trauma in the same city and hospital which was road traffic accident (68.3%) (Zarrouk et al) 3 .

In this study it is clear that there are multiple intraabdominal organ injuries especially in penetrating abdominal trauma Table 3 .

Blunt abdominal trauma does not occur in isolation and these patients often present with hypovolemic shock and is associated with significant extraabdominal injuries many of which will determine the overall outcome 6 .

During damage control surgery resuscitation involving early administration of plasma and platelets is associated with less mortality in patients with massive haemorrhage 9.

Older patients and patients with lower blood pressure have high mortality rate 13 .

Nonoperative management of solid organ injury is one of the notable changes in the care of blunt abdominal trauma 8,10,24 , also selective nonoperative management is used safely for penetrating abdominal trauma 7,17.

Minimal invasive surgery can be used selectively in haemodynamically stable patients in trauma care 14 .

The most commonly injured solid organs are liver and spleen 6 . Major hepatic trauma consists of large parenchymal lacerations , haematemesis , juxtahepatic

venous injuries and complete hepatic avulsions . High mortality correlated with grade of injury 8 . Splenic injuries can be treated nonoperatively 12,20, the conservative treatment abandoned in persistent haemodynamic instability and at surgery the aim is splenic salvage to reduce the risk of infection and overwhelming postsplenectomy sepsis 12 .

Pancreatic trauma is rare 24 and seldom occurs in isolation 15 . Pancreatic injuries are difficult to detect 4 because of its retroperitoneal location 16 and requires high degree of suspicion 24 . Pancreatic injuries usually have associated other injuries 4 .Low grade pancreatic injuries treated by external drainage 15 and even can be treated nonoperatively 4 while a major pancreatic injuries may require distal pancreatectomy 15,16 .

The presentation of hollow visceral injury is more incidious and clinical suspicion must be high 6, 24.

The majority of renal injuries following blunt trauma does not require laparotomy which indicated if there is urinary extravasation that is persistant 48-72 hours 4 . Among the renal injuries which may occur is the intraperitoneal bladder rupture which may not be present with clear clinical signs 6,4 when it is diagnosed necessitating surgical repair .

Prophylactic and therapeutic antibiotics are required in trauma patients to reduce the incidence of infection and sepsis 22,26.

It is clear that abdominal trauma is not a single organ injury and requires multidisiplinary management according to the involved organ and according to the severity of the injury .

Conclusion

Abdominal trauma does occur in association with other extraabdominal injuries many of which will determine the overall outcome

Organized systems of trauma care are required at the trauma site, in prehospital time, and during hospital care.

It is important to do resuscitation according to advanced trauma life support ATLS including the primary, secondary and tertiary survey, appropriate radiologic diagnosis and documentation of abdominal findings.

Prompt evaluation of the abdomen is necessary to minimize preventable morbidity and mortality.

Education is still required for our injured patients regarding their health and management to increase their trust to the managing doctors.

There is a need for effective motor vehicle safety legislation.

Better parental control will help to reduce the incidence of injuries from falls.

Health care services need to be increased and improved for trauma care and the facilities for nonoperative management including fully equipped intensive care unit ICU, and angiography need to be established for our patients.

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