AIM OF THE WORK

The objective of this study was to identify the clinical predictors of successful non-operative management of adults subjected to blunt abdominal trauma admitted to the Emergency Department of Alexandria Main University Hospital.

PATIENTS

This prospective study included all adults (16 - 60 years) with BAT admitted to the Emergency Department of Alexandria Main University Hospital, during a six month period, from 1st of August 2012 to 1st February 2013.

Patients with BAT considered to have an intra-abdominal injury are those with any injury documented to the following structures: spleen, liver, gallbladder, pancreas, kidney, ureter, urinary bladder, gastrointestinal tract, or an intra-abdominal vascular structure.[24]

Exclusion criteria:

Patients with the following criteria were excluded from the study:

1. Age < 16 years and > 60 years.
2. Glasgow coma scale (GCS) ≤ 8.
3. Pathological spleen.
4. Penetrating abdominal injuries.
5. History of abdominal malignancy.
6. Pregnancy.
7. Refusal of management /discharge against medical advice (AMA).

Informed written consent was obtained for all patients or their care-givers.

METHODS

The study was conducted following the approval of the hospital's ethics committee.

All patients were subjected to the following:

History:

- Full history taking with special emphasis on age, gender, presence of premorbid conditions, mechanism of trauma (road traffic accident, falling from height, alleged assault by blunt object. etc.). Time of trauma and time of arrival to the hospital.

- AMPLE history: (A= allergies, M= medications currently taken, P= past illness/pregnancy, L= last meal, E= events/ environment related to injuries)

Patient assessment:

All patients were managed according to Advanced Trauma Life Support (ATLS) 9th edition guidelines by the American College of Surgeons. [20]

1) Primary survey:

That includes management of life threatening conditions, it includes ABCDE approach:

➢ ***A= Airway maintenance with cervical spine protection***

- Airway was assessed for patency and clearance.
- Patient who was able to talk, his airways were likely to be clear and this patient cervical spine was protected.
- Unconscious patient who was not able to maintain his own airways; the airway was opened using a chin lift or jaw thrust combined with bimanual inline spinal immobilization.
- Airways which were blocked (e.g., by blood or vomitus), the fluid were cleaned out of the patient's mouth by the help of suctioning instruments.
- Airway adjuncts sometimes were required. In case of obstruction, an endotracheal tube was inserted.
- Neck collar was used for patients with suspected cervical spine injury.

➢ ***B= Breathing and ventilation***

- The chest was examined by inspection, palpation, percussion and auscultation.
- The rate and depth of respirations were determined.
- The neck and chest were examined for tracheal deviation, unilateral and bilateral chest movement and use of accessory muscles. Palpation was done for assessment of fracture ribs, sites of tenderness. Percussion of the chest was done for presence of dullness or hyper resonance. Auscultation of the chest bilaterally was done for air entry assessment and additional sounds.

- Life-threatening thoracic conditions were identified and managed; as airway obstruction were treated using airway adjuncts up to an endotracheal tube, tension pneumothorax, and hemothorax were treated using high flow oxygen and tube thoracostomy drainage.

➢ ***C= Circulation with hemorrhage control***

- The pulse was examined for quality, rate and equality.
- Two large-bore intravenous lines were established. IV fluid therapy with crystalloid solution and cross matched blood product were initiated.
- External bleeding was controlled by direct pressure.
- Identification of potential source(s) of internal hemorrhage was done.

➢ ***D= Disability/Neurologic assessment***

- Neurological examination was done with emphasis on Glasgow Coma Scale (GCS). (table 3) [134, 135]

➢ ***E= Exposure and environmental control***

- The patient will be completely undressed to complete examination of the body.
- Patients were covered with warm blankets to prevent hypothermia in the emergency department.
- Intravenous fluids were warmed and a warm environment was maintained.
- Patient privacy was maintained.

Table (3): Glasgow Coma Scale.

Best eye response (E)	Spontaneous--open with blinking at baseline	4
	Opens to verbal command, speech, or shout	3
	Opens to pain, not applied to face	2
	None	1
Best verbal response (V)	Oriented	5
	Confused conversation, but able to answer questions	4
	Inappropriate responses, words discernible	3
	Incomprehensible speech	2
	None	1
Best motor response (M)	Obeys commands for movement	6
	Purposeful movement to painful stimulus	5
	Withdraws from pain	4
	Abnormal (spastic) flexion, decorticate posture	3
	Extensor (rigid) response, decerebrate posture	2
	None	1

2) Standard Resuscitation:

- Victims with no suspected cervical spine trauma, their airways were opened using the head-tilt/chin-lift maneuver.
- When a spinal injury suspected; the person kept still. Neck collar was placed or the head and neck were hold to prevent movement.
- Fingers were used to grasp the jaw gently and lift it forward.
- Chest compressions began for patients with no pulse. The CPR cycle is often abbreviated as 30:2 (30 compressions, 2 ventilations or breaths). Artificial ventilation was administered using a bag-valve-mask (BVM).
- An intravenous line (IV) was established and connected to a 1000 ml bag of normal saline. Fluid had been given as rapidly as possible.

3) Secondary Survey

Head-to-toe evaluation had been done including a complete history and physical examination.

- **Vital signs:** pulse rate (beat/min), core body temperature ($^{\circ}$C), blood pressure (systolic, diastolic) (mmHg) and respiratory rate (cycle/min) had been reevaluated.

- ***Head and neck:***

Inspection and palpation of the entire head and face for lacerations, contusions, fractures, and thermal injury. Pupils were reevaluated, level of consciousness and GCS score were reevaluated. Cranial-nerve function were examined. Inspection of ears and nose for cerebrospinal fluid leakage.

- ***Chest examination:***

Assessment for signs of chest injuries, pattern of breathing, palpation for fractures and surgical emphysema, Auscultation of breath and heart sounds. Tube thoracostomy under water seal drainage was done when indicated. Open chest wounds were covered with sterile dressing till cardiothoracic surgeon assessment.

- ***Abdominal and perineal examination:***

1- **Inspection:** for abrasions or ecchymosis (e.g. lap belt abrasions, steering wheel–shaped contusions). Inspection for abdominal distention that may be due to pneumoperitoneum, abdominal collection.

2- **Palpation and percussion:** We considered abdominal tenderness present if the conscious child stated that palpation caused pain, if the patient grimaced on palpation, or if there was voluntary guarding. But it was not considred present if there was DLC. Palpation signs revealed, lax abdomen, local or generalized tenderness, guarding, rigidity, or rebound tenderness, which suggests peritoneal injury. Fullness and doughy consistency on palpation may indicate intra-abdominal hemorrhage.

3- **Auscultation:** Auscultation of bowel sounds or abdominal bruit.

4- **Perineal and Rectal pelvic examinations:** Positive signs include evidence of bony penetration, the rectal tone, and palpation of a high-riding prostate in male patients. The genitals and perineum were examined for soft tissue injuries, bleeding, and hematoma.

5- A nasogastric tube was placed routinely (in the absence of contraindications, e.g., basilar skull fracture) to decompress the stomach and to assess for the presence of blood. If the patient has evidence of a maxillofacial injury, an orogastric tube is preferred.

6- Urinary catheter was inserted when was needed to follow the patient urine output in all cases with hypovolemic shock.

7- Insertion of central venous catheter in children with hypovolemic shock non responsive to fluids only and vassopresors used when were needed.

- **Extremities:** the most important were vascular examination. We collected data about;

  - Pulse: absent or present
  - Bleeding: active or stopped
  - Capillary refilling
  - Cold or warm limb

4) Tertiary Survey

Serial assessments were obtained from records help recognize missed injuries and related problems.

All patients were scored according to the Revised Trauma Score (RTS) (Table 3).[136] RTS is a well-established predictor of mortality in trauma populations. It is scored from the first set of data obtained on the patient and consists of GCS, systolic blood pressure and respiratory rate.[137]

Table (4): Revised Trauma Score (RTS)

Coded Value	GCS	SBP (mm Hg)	RR (breaths/min)
0	3	0	0
1	4-5	<50	<5
2	6-8	50-75	5-9
3	9-12	76-90	>30
4	13-15	>90	10-30

Laboratory investigations:

- Complete blood count

- **Hemoglobin (Hb) and hematocrit (Hct):** rapid hemoglobin or hematocrit machines may quickly identify patients who have physiologically significant volume deficits and hemodilution. [138]

- **Platelet:** use platelet transfusions to control active bleeding or **t**o treat patients with thrombocytopenia (i.e., platelet count < 50,000/mL). [139] The decision to transfuse platelet is based on the extent of surgery/trauma, ability to control bleeding with local measures, rates of bleeding, risk of bleeding, the presence of platelet dysfunction, and other coagulation abnormalities.[140]

- **White blood cells (WBC)**: WBC count elevation on admission is nonspecific and does not predict the presence of a hollow viscus injury (HVI). The diagnostic value of serial WBC counts for predicting a HVI within the first 24 hours after trauma is very limited.[141]

- **Coagulation profile:** obtain prothrombin activity / Partial thromboplastin time (PT) / activated partial thromboplastin time (aPTT) in patients who have a history of blood dyscrasias (e.g., hemophilia), who have synthetic problems (e.g., cirrhosis), or who take anticoagulant medications (e.g., warfarin, heparin).[142]

- **Blood type, screen, and crossmatch**

- **Indications:**[143, 144]

  a. Only used in cases of severe life-threatening hemorrhage not expected to respond to crystalloid resuscitation; can almost always wait until type-specific blood is available.
  b. Obvious major bleeding during transport with subsequent impending cardiac arrest due to anemia (not hypovolemia).
  c. Major bleeding in the trauma room resulting in hypotension requiring transfusion prior to availability of type specific blood.

- Urine analysis: significant trauma to the abdomen and/or flank, gross hematuria, microscopic hematuria in the setting of hypotension, and a significant deceleration mechanism. [145]

- Serum chemistries: Na^+, Cl^-, K^+, and blood urea nitrogen levels do not influence the initial management of major trauma patients. In patients with severe blunt injury, hemoglobin, glucose, blood gas, and lactate measurements occasionally result in morbidity-reducing or resource-conserving management changes. Rapid bedside blood-glucose determination, obtained with a finger-stick measuring device, is important for patients with altered mental status. [36]

Imaging and diagnostic test:

I. Focused Assessment with Sonography for Trauma (FAST) [47]

This is a four quadrant ultrasonographic assessment of the abdomen:

1- Hepatorenal pouch (of Morrison).

2- Subphrenic/Splenic Recess.

3- Suprapubic Region.

4- Sub-Xiphisternal/ pericardial View

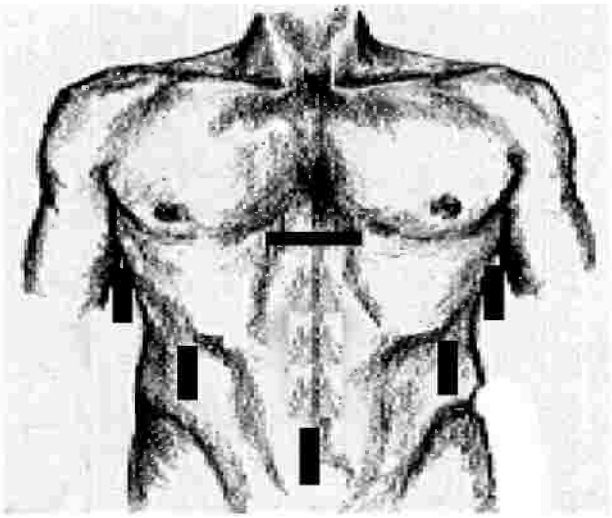

Figure 6: The 4 scanning windows of the FAST examination. [52]

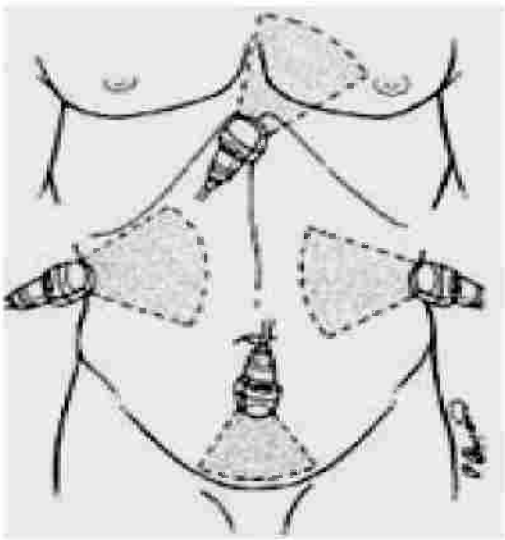

Figure 7: The 4 scanning windows of the FAST examination – clockwise from top = pericardial, perisplenic, pelvic and perihepatic. [146]

II. Computed Tomography (CT) will be performed as indicated:[85, 97, 147]

1. Hemodynamically stable patients with equivocal findings on physical examination and FAST scan.
2. Hemodynamically unstable patients with negative FAST constitute (after aggressive resuscitation).
3. Associated neurological injury.
4. Multiple extra-abdominal injuries (chest and pelvic).
5. Suspicion of retroperitoneal collection in case of injury of pancreas, duodenum, or genitourinary system.

Non Operative Management (NOM):

The decision for operative or non operative management depended on the outcome of the clinical examination and results of diagnostic tests.

General principles of non-operative management were carried only in the appropriate setting for non-operative observation (observation ward, intensive care unit, monitored emergency department bed):[97]

Protocol: [14, 51, 97, 148]

1. High index of clinical suspicion through considering the mechanism of injury in multiply injured patients.
2. Administer O_2 nasally or by mask.
3. Wide bore intravenous line for crystalloid infusion or blood transfusion.
4. Nasogastric tube and urinary catheter insertion.
5. Patients selected for NOM were placed on strict bed rest.
6. Nothing per orum (NPO).
7. Continuous reevaluation by frequent physical examination (heart rate, blood pressure and urine output).
8. Repeated FAST scan every 4 – 6 hours over 24 hours and laboratory tests (hemoglobin and hematocrit).

If stable and there have been no adverse hemodynamic events:

1. The patient can be transferred to a regular ward bed with less intensive monitoring
2. Repeat FAST prior to discharge from the emergency department.
3. Serial imaging studies have been recommended if needed.
4. Advance diet.
5. Hematocrit and hemoglobin daily.
6. Mobilize when stable, physical examination and hematocrit.

If stable and tolerating diet: discharge.

Operative management were considered when indicated as follows:[99]

1. Patient with solid organ injury being managed non-operatively developing hemodynamic instability or requiring > 2 units of packed cell transfusion related to the solid organ injury.
2. Development of peritonitis.
3. Persistent urinary leakage or persistent hematuria from a fragmented kidney.
4. Patient with negative initial evaluation showing clinical deterioration with no other explanation.

RESULTS

This study included 430 patients with history of blunt abdominal trauma attending the Main Alexandria University Hospital over a period of six month from 1st of August 2012 to 1st February 2013.

Distribution of studied patients according to gender: (Table 5, Figure 8)

Out of 430 patients, there were 332 males (77.2 %) and 98 females (22.8 %).

Table (5): Distribution of studied patients according to gender:

Sex	No.	%
Male	332	77.2
Female	98	22.8

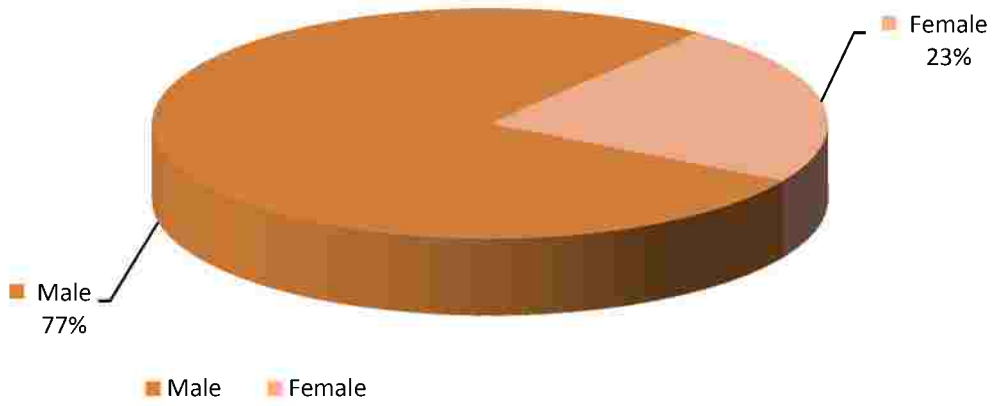

Figure (8): Distribution of studied patients according to gender

Distribution of studied patients according to age: (Table 6, Figure 9)

Their ages ranged between 16 years and 60 years with mean age 30.35 ± 11.75 years, the commonest age group was from 20 to 30 years which represents about 30.7 %.

Table (6): Age distribution of patients included in this study

Age (years)	No.	%
< 20	127	29.5
20 – 30	**132**	**30.7**
30 – 40	88	20.5
40 – 50	54	12.6
>50	29	6.7
Min. – Max.	17.0 – 60.0	
Mean ± SD.	30.35 ± 11.75	
Median	27.0	

Values in bold are most common

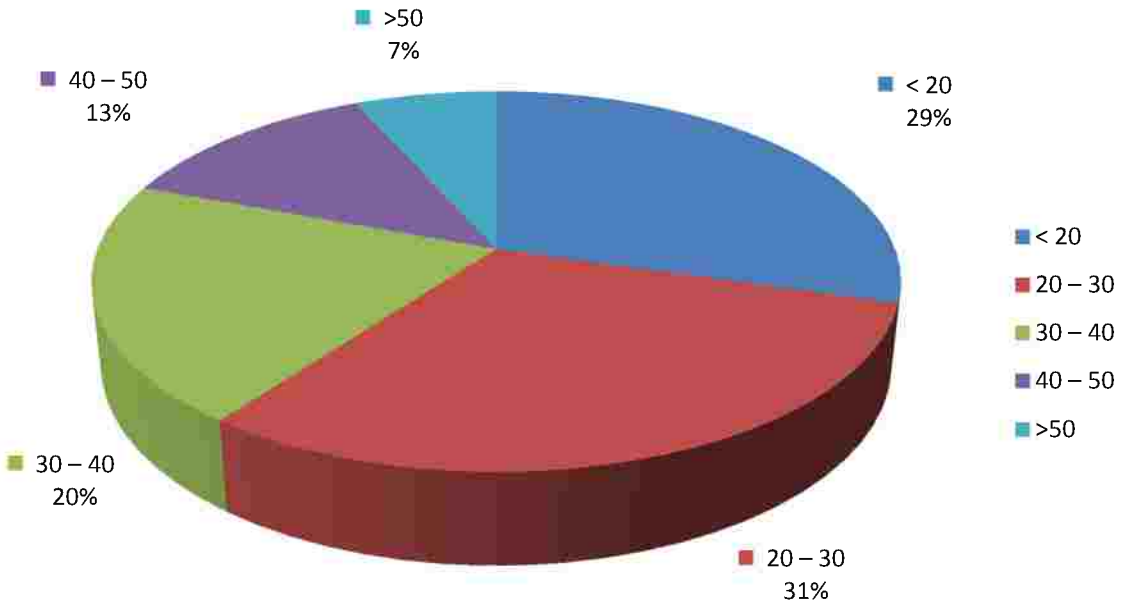

Figure (9): Distribution of the studied patients according to age

Distribution of the studied patients according to mechanism of trauma: (Table 7, Figure 10)

The most common mechanism of trauma was road traffic accident, which included 286 patients (66.5%), then 82 patients falling from height (19.1%), then 62 patients assault by blunt object (14.4 %).

Table (7): Distribution of the studied cases according to mechanism of trauma:

Mechanism of trauma	No.	%
Road traffic accident (RTA)	**286**	**66.5**
Falling from height	82	19.1
Assault by blunt object	62	14.4

Values in bold are most common

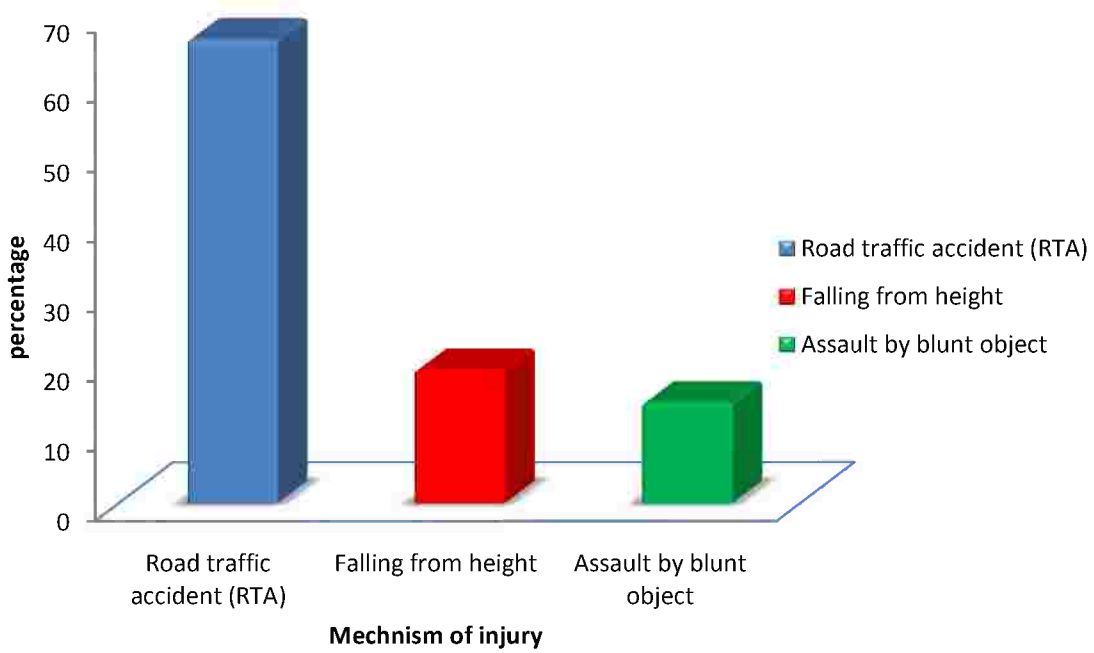

Figure (10) Distribution of the studied cases according to mechanism of trauma

Distribution of the studied cases according to other associated injuries: (Table 8)

The majority of patients (218 patients) had associated orthopedic fractures (50.7 %), then 150 patients had associated central nervous system injuries (34.8%), then 144 patients had associated cardiothoracic injuries (33.5%).

Table (8): Distribution of the studied cases according to other associated injuries:

Associated Extra-abdominal injuries	No.	%
Orthopaedic fractures	**218**	**50.7**
Fracture pelvis	90	20.9
Closed long bone fracture	116	27.0
Open long bone fracture	12	2.8
CNS injuries	**150**	**34.8**
Traumatic brain injury (TBI)	112	26.0
Spinal injuries	38	8.8
Cardiothoracic injuries	**144**	**33.5**
Fracture Ribs	88	20.5
Pnemothorax	42	9.8
Hemothorax	14	3.2

Distribution of the studied cases according to Glasgow Coma Scale (GCS): (Table 9, Figure 11)

Also among the studied patients, 320 had Glasgow Coma Scale (GCS) equal 15 (74.4 %) and 110 patients had with (GCS) equal or less than 14 and more than 8 (25.6 %)

Table (9): Distribution of the studied cases according to Glasgow Coma Scale (GCS):

GCS	No.	%
15	320	74.4
14 – 8	110	25.6

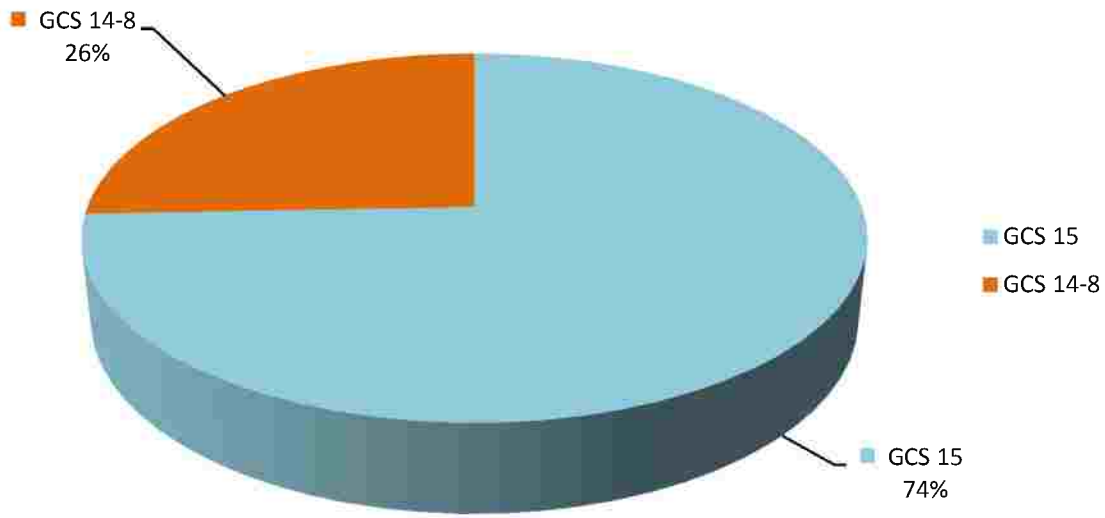

Figure (11) Distribution of the studied cases according to Glasgow Coma Scale GCS

Distribution of the studied cases according to outcome: (Table 10, Figure 12)

The outcome of this study was 312 patients with abdominal injuries treated with successful non-operative management (NOM-S) (72.6 %), 2 patients needed surgical intervention after failure of NOM (NOM-F) (0.5 %) then discharged, 68 patients operated immediately at admission (OP) (15.8 %), 48 patients died (11.2 %).

Table (10): Distribution of the studied cases according to outcome:

	No.	%
Outcome		
(NOM-S)	312	72.6
(NOM-F)	2	0.5
(OP)	68	15.8
Death	48	11.2

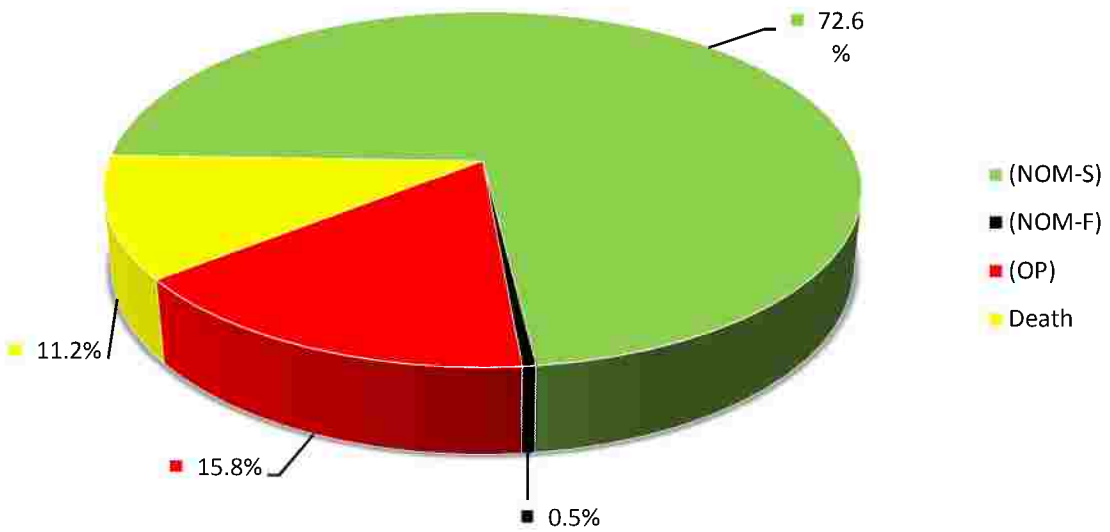

Figure (12) Distribution of the studied cases according to outcome

Relation between the outcome and admission blood pressure, and heart rate: (Table 11)

The majority of patients (252 patients) had successful NOM their **admission SBP was ≥ 90 mmHg** (80.8%), while 60 patients had an admission SBP < 90 mmHg (19.2 %).

Regarding heart rate (HR), 187 patients with successful NOM had **HR ≥ 100 beats/ minute** (60%) and 125 patients had HR < 100 beats/ minute (40 %).

The majority of deaths were hemodynamically unstable, 42 patients with admission SBP < 90 (84.5 %) and 48 patients with HR > 100 (100 %).

Table (11): Relation between outcome and admission blood pressure, and heart rate:

	NOM-S (n=312)		OP (n=68)		Death (n=48)		χ^2	P
	No.	%	No.	%	No.	%		
SBP								
≥90	**252**	**80.8**	7	10.3	6	12.5	173.587*	<0.001*
<90	60	19.2	**61**	**89.7**	**42**	**84.5**		
HR								
≥ 100	187	60	**68**	**100.0**	**48**	**100.0**	93.119*	<0.001*
< 100	125	40	0	0.0	0	0.0		

χ^2: Chi square test
*: Statistically significant at $p \leq 0.05$

Relation between the outcome and Revised Trauma Score (RTS): (Table 12)

All studied patients who had blunt abdominal trauma were subjected to RTS, 185 patients (59.3%) had score ≤ 11 with NOM-S, while most patients (61 patients) (89.7%) with operative intervention and all deaths (100%) had score ≤ 11.

Table (12): Distribution of the studied cases according to Revised Trauma Score:

	Abdominal injuries				Death (n=48)		χ^2	P
	NOM-S (n=312)		OP (n=68)					
	No.	%	No.	%	No.	%		
RTS								
12	127	40.7	7	10.3	0	0.0	98.179*	<0.001*
≤ 11	185	59.3	61	89.7	48	100.0		

χ^2: Chi square test
*: Statistically significant at p ≤ 0.05

Distribution of the studied cases according to isolated BAT and BAT associated injuries: (Table 13, Figure 13)

There were 103 patients with isolated blunt abdominal trauma (24.0 %), and 327 patients with BAT with associated injuries (76.0 %).

Table (13): Distribution of the studied cases according to associated injuries:

	No.	%
Isolated BAT	103	24.0
BAT with associated injuries	327	76.0

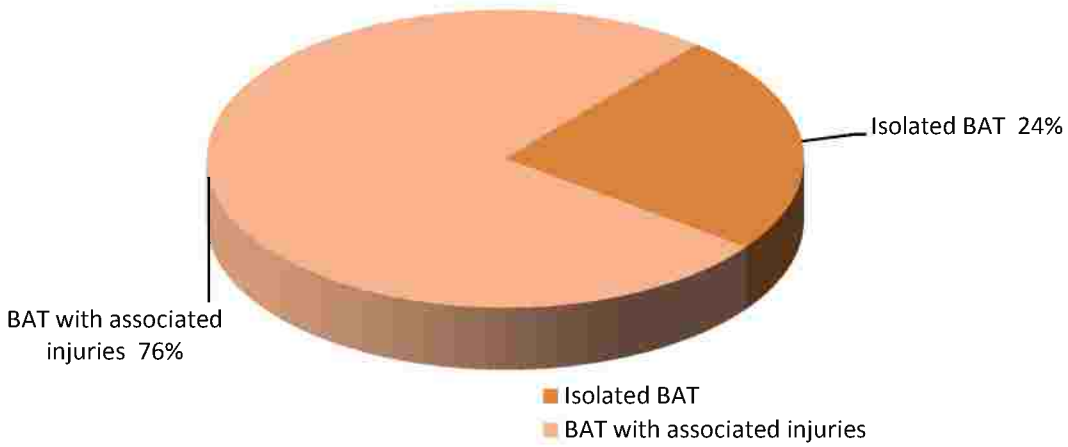

Figure (13) Distribution of the studied cases according to associated injuries

Relation between outcome and blunt abdominal trauma with associated injuries: (Table 14)

- 245 patients with BAT with associated injuries were managed with successful NOM (74.9%) while 67 patients had isolated BAT (65.1 %).
- Patients who needed surgical intervention at admission 38 patients had associated injuries (11.7 %) and 30 patients with isolated BAT (29.1 %)
- Most of deaths (48 patients) had BAT with associated injuries (42 patients).

Table (14): Relation between outcome and blunt abdominal trauma with associated injuries:

	BAT with associated injuries (n=327)		**Isolated BAT (n=103)**		χ^2	P
	No.	**%**	**No.**	**%**		
NOM-S (n=312)	**245**	**74.9**	**67**	**65.1**		
OP (n=68)	38	11.7	30	29.1	19.622*	<0.001*
Death (n=48)	42	12.8	6	5.8		

χ^2: Chi square test
*: Statistically significant at $p \leq 0.05$

Relation between outcome and abdominal examination: (Table 15)

About clinical examination of patients with BAT, 149 patients (47.8 %) of NOM-S had external wounds or bruises on inspection, compared to (49 patients) 72.1 % of OP group and 44 patients (91.7) of deaths

As regard palpation, 217 patients (69.9 %) with NOM-S had rigid abdomen while (100 %) of patients with OP group and deaths had rigid abdomen

As regard percussion, 195 patients (62.5 %) with NOM-S had dullness on percussion, compared to 56 patients (82.4 %) of patients with OP group and 48 patients (100%) of deaths

As regard auscultation, 214 patients (68.6%) of NOM-S had heard peristalsis, while 44 patients (64.7%) of OP and 44 patients (91.7%) of deaths had no heard peristalsis.

Table (15): Relation between outcome and abdominal examination:

	Abdominal injuries				Death (n=48)		χ^2	P
	NOM-S (n=312)		OP (n=68)					
	No.	%	No.	%	No.	%		
Inspection								
No external wounds or brusies	163	52.2	19	27.9	4	8.3	65.942*	<0.001*
Presence of external wounds or brusies	**149**	**47.8**	**49**	**72.1**	**44**	**91.7**		
Palpation								
Lax abdomen	95	30.4	0	0.0	0	0.0	97.879*	<0.001*
Rigid & Tender abdomen	**217**	**69.6**	**68**	**100.0**	**48**	**100.0**		
Percussion								
Resonant	117	37.5	12	17.6	0	0.0	95.615*	<0.001*
Dull	**195**	**62.5**	**56**	**82.4**	**48**	**100.0**		
Auscultation								
Heard peristalsis	**214**	**68.6**	24	35.3	4	8.3	64.033*	<0.001*
Not heard peristalysis	98	31.4	**44**	**64.7**	**44**	**91.7**		

χ^2: Chi square test
*: Statistically significant at $p \leq 0.05$

Injuries characteristics according FAST & CT finding: (Table 16)

As detected by FAST and CT abdomen 272 patients with **single organ injury** (63.3%) and 158 patients had **multiple organ injuries** (36.7%).

Table (16): Injuries characteristics according FAST & CT finding:

	No.	%
Single organ injury	**272**	**63.3**
Free fluid collection without organ injury	125	29.0
Splenic injury	74	17.2
Liver injury	26	6.0
Kidney injury	18	4.2
Bowel injury	5	1.1
Retro peritoneal hematoma	24	5.6
Multiple organ injuries	**158**	**36.7**
Liver + Splenic injuries	48	11.1
Liver + Splenic + Kidney injuries	27	6.2
Kidney + Bowel injuries	6	1.4
Liver + Kidney injuries	32	7.4
Liver + Pelvic collection	20	4.6
Kidney injuries + Retro peritoneal hematoma	25	5.8

Relation between the outcome and laboratory investigations: (Table 17)

The majority of patients (212 patients) with successful NOM their Hct value was ≥ 30 % (67.9%). Patients who needed surgical intervention at admission 62 patients (91.2 %) of those Hct value < 30 %.

- 307 patients (98.4%) with successful NOM didn't have **grosshematuria**, while 5 patients had grosshematuria (1.6%).
- 245 patients (78.5) with successful NOM didn't have **microhematuria**, while 67 patients had microhematuria (21.5 %).
- The majority of patients (300 patients) with successful NOM didn't have **coagulopathy** (96.2%) and 12 patients had coagulopathy (3.8%).

Table (17): Relation between the outcome and laboratory investigations:

	Abdominal injuries				χ^2	Test of sig.
	NOM-S (n=312)		OP (n=68)			
	No.	%	No.	%		
Hct						
≥ 30 %	**212**	**67.9**	6	8.8	134.220*	P <0.001*
< 30 %	100	32.1	**62**	**91.2**		
Grosshematuria						
-ve	**307**	**98.4**	61	89.7	76.886*	MCp<0.001*
+ve	5	1.6	7	10.3		
Microhematuria						
-ve	**245**	**78.5**	49	72.1	35.468*	χ^2p<0.001*
+ve	67	21.5	19	27.9		
Coagulopathy						
-ve	**300**	**96.2**	43	63.2	69.471*	χ^2p<0.001*
+ve	12	3.8	25	36.8		

χ^2: Chi square test
*: Statistically significant at p ≤ 0.05
Microhematuria level > 25 red blood cells/high powered field
Coagulopathy = Prothrombin activity < 60 %

Relation between outcome and (need for blood transfusion, place and length of hospital stay: (Table 18)

The majority of patients with successful NOM (246 patients) didn't need more than 2 packed RBCs (84.6%) while 68 patients (100%) with OP needed more than 2 packed RBCs (15.4%).

Patients managed with NOM, 277 patients stayed in hospital ≤ 5 days (88.7%) while 35 patients stayed 6- 15 days (11.2%).

Among patients who were managed with NOM, 293 patients stayed at the surgical ward (96.1%), 12 patients were admitted to Intensive Care Unit ICU (3.9%).

For patients who needed surgical intervention at admission 12 patients (17.6%) stayed at surgical ward ≤ 5days while 56 patients (82.4%) were admitted to ICU for 6-15 days.

Table (18): Relation between outcome and (need for blood transfusion, place and length of hospital stay):

	Abdominal injuries				**χ^2**	**Test of sig.**
	NOM-S (n=312)		**OP (n=68)**			
	No.	**%**	**No.**	**%**		
Transfusion of ≤ 2 packed RBCs						
Yes	**264**	**84.6**	0	0.0	256.158*	χ^2p<0.001*
No	48	15.4	**68**	**100.0**		
Hospital stay						
≤ 5 days	**277**	**88.7**	12	17.6	242.740*	MCp<0.001*
6 -15 days	35	11.2	56	82.4		
Place of hospital stay						
Surgical ward	**293**	**96.1**	12	17.6	269.404*	χ^2p<0.001*
ICU	12	3.9	56	82.4		

χ^2: value for Chi square
MC: Monte Carlo test
*: Statistically significant at p ≤ 0.05