RESULTS

Between 16 July 1977 and 23 October 1977, 12177 patients were admitted to Manial University Hospital. Four thousands and four patients were surgical emergencies Table 1)

Table 1 : Surgical emergency admissions in relation to total hospital admissions from 16 July 1977 to 23 October 1977.

Admissions	No. of cases	Percentage
Total hospital admissions	12177	
Surgical ~~trauma~~ emergency admissions	4004 ~~4565~~	32.8% ~~37%~~

The 4004 Surgical emergencies include 1936 orthopedic casualties, 172 burns, and 1896 patients were admitted to the general surgery emergency unit (Table 2)

Table 2 : Types of Surgical ~~trauma~~ emergency admissions.

Admission	No. of cases	Percentage
Surgical emergencies	4004 ~~4565~~	
Orthopedic cases	1936	~~42.4%~~ 48.3%
Burn cases	172	~~3.7%~~ 4.2%
General Surgical trauma	1896 ~~2457~~	~~53.9%~~ 47.5%

Trauma was responsible for the admission of 457 patients to the gereral surgical emergency unit, in fifty five patients the abdomen was the site of injury (Table 3).

Table 3 : Abdominal trauma cases in relation to general surgical emergency cases

Admission	No. of cases	Percentage
General Surgical emergency cases	1896	
- Diseases	1439	75.9% of surgical cases
- Traumatic	457	24.1% ,, ,, ,,
- head injuries	273	59.7% ,, ,, trauma
- wounds	113	24.7% ,, ,, ,,
- chest injuries	16	3.5% ,, ,, ,,
- abdominal injuries	55	12 % ,, ,, ,, 457
		2.9% ,, ,, cases 15
		1.3% ,, total casualty 4004
		0.45% ,, ,, admission 12177

The age and sex distribution of patients with abdominal injuries are shown in Fig. 8 Male children and adults are the usual victims.

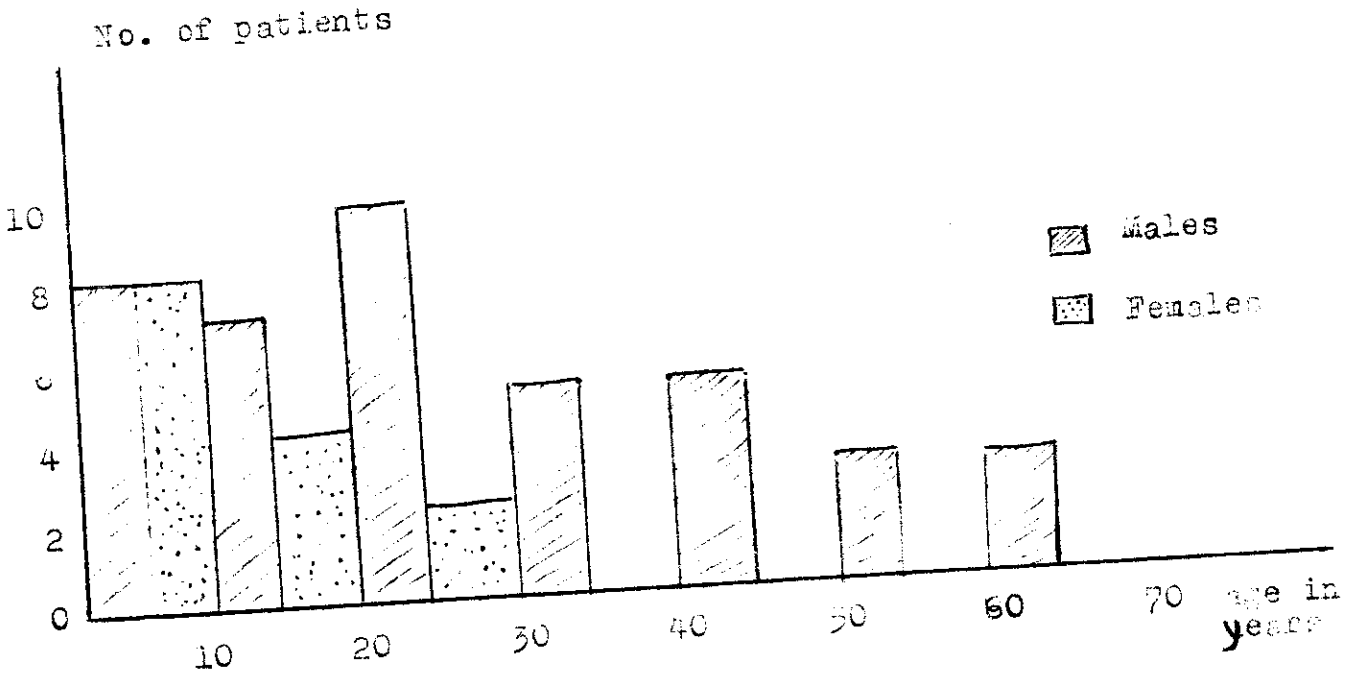

Fig 8: Age and sex distribution in 59 patients with abdominal trauma.

Table 4 : Sex incidence

Sex	No. of cases	Percentage
Male	41	74.5 % of total
Female	14	25.5 % ,,

The majority of abdominal injuries were due to blunt trauma mainly due to car accidents. Penetrating injuries due to stabs and missiles were uncommon (Table 5).

Table 5 : Causative trauma in 55 patients with abdominal injuries.

Injury	No. of cases	Percentage
Blunt	45	81.8% of total
- car accident	30	54.5 % total
- cartwheel	2	3.6 % ,,
- falling	8	14.5 % ,,
- heavy object	3	5.4 % ,,
- Kick	2	3.6 % ,,
Penetrating	10	18.2 % ,,
- stab	8	14.5 % ,,
- missile	2	3.6 % ,,

Associated injuries (Table 6), occured in 31 out of 55 patients 16, 14, & 13 patients suffered from associated head, limb and chest injuries respedtively. Some of these patients suffered from multiple associated injuries.

Table 6 : Frequency of associated injuries

Associated injuries	No. of cases	Percentage
Total	31	56.3 % of total
head injuries	16	29 % ,,
limb ,,	14	25.4 % ,,
chest ,,	13	23.6 % ,,

Examination and Diagnosis.

34 out of 55 patients were shocked on admission (Table 7). 2 patients died immediately following admission inspite of all resuscitation measures.

Table 7 : Frequency of Shock on admission

Shock	No. of cases	Percentage
Total	34	61.8 % of total

In 11 patients the diagnosis of abdominal injury was clinically definite on admission because of shock, rigidity, shifting dullness, silent abdemen, eviscerated omentum or bowel, failed catheterization, extravasation of urine, and palpable rectoveginal tear on rectal examination.

The diagnosis was doubtful in 42 patients (Table 8), in one patient of this group (case No. 11) abdominal injury was not apparent clinically, and abdominal tap was not performed although the patient was shocked on admission, but this shock was attributed to the external bleeding from an injury of his tongue; later on the patient develeped the picture of delayed rupture spleen.

In the remaining 41 patients with doubtful diagnosis, abdominal tap was performed (34 with blunt and 7 with penetrating trauma) and proved to be positive in 16 and negative in 25 patients respectively.

Exploration was performed in 15 out of the 16 positive cases, it proved to be truely positive in 14 cases and negative (false pesitive tap) in one case. The sixteenth patient withpositive tap was not explored. This patient presented 10 days later with fever, dehy dration, and shock;

the patient improved under conservative measures and was not explored. He developed later a left inguinal abscess which was incised and this was followed by fecal fistula (case No. 50). (Fig.15).

Table 8 : Diagnosis of abdominal injuries on admission

Diagnosis	No. of cases		Percentage
Definite	13		23.6% of total
- definite clinically		11	20% ,,
- death on admission		2	3.6% ,,
Doubtful	42		76.4% ,,
proved to be+ve (abdom. injury).		26	47.3% ,,
- by tap		15	27.3% ,,
- by lavage		2	3.6% ,,
- by exploration-immediate		8	14.5% ,,
-delayed		1	1.8% ,,
proved to be-ve (no abdom. injury).		16	29 % ,,
- by tap,lavage & conservation.		11	20 % ,,
- by exploration		5	9 % ,,
Total	55		100%

In the 25 negative tap cases, 6 were explored because of clinical suspicion of abdominal injury, 4 of them proved to have abdominal injuries, while in the other 2 cases exploration was negative. In the remaining 19 of these 25 negative tap cases peritoneal lavage was performed and proved to be positive in only 2 cases; the remaining 17 cases were re evaluated clinically, 11 cases were apparently free, conservative measures were continued and all of the cases passed smoothly. The other 6 of these 17 negative tap and lavage cases were still clinically suspicious because of the nature of the accident (runover), or the presence of initial shock without other associated extre abdominal injuries. These clinically suspicious 6 cases were explored, 4 of them were positive, the other 2 cases were negative.

The results of abdominal tap and peritoneal lavage are shown in tables 9, 10 & 11.

Table 9 : Results of abdominal taps done in 41 cases with doubtful abdominal injury.

Abdominal tap	No. of cases		Percentage
+ve results	16		39% of all doubtful cases
True + ve		15	93.7% of + ve taps 60% of+ve injuries in doubtful cases (Tap accuracy = 60%
False + ve (by exploration)		1	6.3% of + ve taps
-ve results	25		61% of all doubtful cases
True - ve		15	60% of - ve taps
False-ve(by lavage & exploration)		10	40% of - ve taps 40% of + ve injuries indoubtful cases
Total+ve abdom.inj. in all doubtful cases	25		61% of all queery cases.
True + ve taps		15	
False - ve taps		10	
Complications of abdom. tap	—		0 %

Table 10 : Findings in 16 positive tap cases

Finding	No. of cases
Non clotting blood	11
Clotting blood (false+ve)	1
Gas	1
Pus	1
Urine	1
Intestinal fluid	1

Table 11: Results of peritoneal lavage

Peritoneal lavage	No. of cases	Percentage
Done in cases of - ve tap	19	34.5% of total cases 55
+ ve results	2	10.5% of lavage cases 19
false+ve results	-	33.3% of 6+ve cases
- ve results	17	89.5% of lavage cases 19
false-ve results (by exploration)	4	21% " " " " 66.4% of 6+ve cases
Total + ve abdom. inj. in lavage cases.	6	31.6% of lavage cases 19
complications of lavage.	-	0 %

Time lag

The time lag between trauma and arrival at the hospital, and between arrival and surgery was studied. The average time between trauma - arrival was found to be 11.7 hours per case for all cases. The time lag between arrival - surgery was 7.8 hours/case in the immediate exploration cases while it was 7 and 20 days in the 2 delayed exploration cases respectively. Considering these 2 cases, the average time between arrival - surgery for all explored cases becomes 22.9 hours per case. (Table 12).

Table 12 : Time lag

	Trauma-arrival	Arrival-Surgery		
	all patients	Allexplorations	immediate	delayed
total time	645 hours	962 hours	314 hours	27 days (648hr)
No. of cases	55	42	40	2
Average	11.7 hr/case	22.9 hr/case	7.8hr/case	13.5 d/ case (324hr)

This time lag was further analysed relating it to the incidence of complications and mortality as shown table 13.

Table 13 : Analysis of time lag in relation to morbidity and mortality.

cases	No	Trauma - arrival			arrival - Surgery		
		Total cases		average	Total cases		average
Uncomplicated	31	92 h	31	2.9h/case	156 h.	21	7.4 h/case
Complicated	11	375 h	11	34 ,,	735 h.	10	73.5 ,,
Death	13	178 h	13	13.6 ,,	67 h.	11	6 ,,

Exploration

Abdominal exploration was performed in 42 patients, immediately in 40 patients and delayed in 2 patients. No exploration was done in 13 cases.

In the immediate exploration group, exploration was based on definite clinical examination, + ve abdominal tap, and + ve peritoneal lavage in 11, 15, and 2 patients respectively. Immediate exploration was done in 6 patients who showed - ve tap on clinical grounds. The remaining 6 cases of the immediate group showed - ve tap and lavage results but were still clinically suspicious and were explored (Table 9 and 15).

Exploration was delayed in 2 patients, as mentioned before, the first case (No 11) who developed delayed rupture spleen, and the second case (No 50) who developed fecal fistula.

In the 13 patients who were not explored, 2 died on admission, while the other 11 patients were not explored because of - ve tap and lavage together with repeated observations (Table 9).

Table 14 : Number of explorations

Exploration	No. of cases	Percentage
Total	42	76.4% of all cases (55)
+ ve cases	36	58.7% of all explorations (42)
-bve cases	6	14.3% ,, ,, ,,

Table 15 : Basis of Explorations

Basis	Explorations		
	Total	+ ve cases	- ve cases
A) Immediate exploration	40	34	6
- Definite clinical diagnosis	11	10	1
- Tap + ve	15	14	1
- Lavage + ve	2	2	-
- Tap - ve & cinically suspicious	6	4	2
- Tap & lavage - ve & clinically suspicious	6	4	2
B) Delayed exploration	2	2	-
- Definite clinical diagnosis	2	2	-

One case of delayed explorations showed a + ve tap on admission (case No 50), although the tap revealed intestinal fluid yet the patient was not explored, he later developed fecal fistula.

Organ iujury

Some patients had more than one abdominal organ injured (Table 16).

Table 16 : Frequency of multiple abdominal injuries.

No. of patients	No. of organs injured/case
3	4
3	3
9	2
21	1
Total 36	60

This table shows that 41.7% (15 out of 36 positive explorations) of cases had more then one abdminal organ injured. In all 36 positive explorations the average number of organ injured per case = 60 / 36 = 1.7 organ / case.

The commonest organ involved was the spleen followed by the liver, and the small intestine. The incidence of injury of various organs, its relation to the type of trauma and its management, are summarized in table 17.

Table 17: Organ injury and arrangement.

Organ injury	No. of cases +	Percentage ++	type of trauma closed	type of trauma open	Management	
Spleen	10	27.7%	10	—	Splenectomy	10
Liver	6	16.6%	3	3	Suture & drainage	6
Small intestine	5	13.8%	3	2	Suture	5
Kidney	4	11.1%	3	1	Nephrectomy	2
					Drainge of loin	1
Stomach	2	5.5%	1	1	Suture & drainage	2
Duodenum	2	5.5%	2	-	,, ,,	2
Colon & rectum	1	2.7%	-	1	Colostomy	1
Gall bladder	1	2.7%	-	1	cholecystectomy	1
Retrop. hemat.	7	19.4%	7	-	Not explored	7
Fr. pelvis	5	13.8%	5	-	Rest in bed	5
U. bladder	3	8.3%	3	-	Suture & drainage	3
Urethra	5	13.8%	5	-	Suprapubic cystostomy	4
					Catheter splintage	1
Male genital	2	5.5%	1	1	Evacuate hematocele	1
					Repair cord	1
Female genital	1	2.7%	-	-		
Diaphragm	2	5.5%	-	2	Suture	1
Abdominal wall	4	11.1%	-	4	Repair& drainage	4

++ Percentage is from 36 cases with + ve findings on exploration Table 14).

+ Some patients suffered from more than one organ injury.

Fluids infused during resus citation (including blood) were related to the type of organ injury found on exploration.

The amount of blood and other fluids given in hollow viscus, solid organ, and skeletal injuries, are shown in table 18.

Table 18 : Fluids given in different injuries

Organ	Amount (Liter / case)	
	Blood	Other fluids
Hollow viscus	0.4	0.8
Solid organ	1	0.6
Skeletal injury	1·3	1.4

Results (Table 19)

In our series, the results in 55 cases are :

2 patients died immediately on admission

11 Patients not explored, but treated conservatively, all passed smoothly.

42 patients explored, smooth post operative course occured in 21 patients, 10 patients passed into complications, while 11 patients died.

Table 19 : Results in abdominal trauma cases

Result	No. of case	Percentage
Death on admission	2	3.6 %
Non explored cases (smooth course)	11	20 %
Explored cases	42	76.4 %
- Smooth course	21	38.2 %
- Complicated course	10	18.2 %
- Death	11	20 %

Total smooth 58.2

Total mortality 23.6

Table 20, illustrates the types and frequency of complications.

Table 20 : Types and frequency of complications

Complications	No. of cases	Percentage
Total	10++	18.2% of total & 23.9% of explor.
Wound infection	3	
Stricture urethra	3	
Burst abdamen	2	
Complic. of head injuries	1	
Paralytic ileus	1	
Jaundice	1	
Fecal fistula	1	
Chest infection	1	

++ Some cases suffered from more than one complication.

The total mortality rate considering the 2 cases died on admission and the 11 deaths in the explored cases, i.e: deaths are 13 out of total 55 cases which equals 23.6%.

The causes of deaths and the factors affecting the mortality rate are shown in table 21.

Table 21 : Factors affecting mortality.

No	Patient	Age	Sex	Injury	Time lat.	Shock	Abdom. injury	Sur-geon	Assoc. injury	Time of death	cause of death
1	H.R 26105	2 y	F.	Blunt	22hr	+ve	ileal tear	R.	Head injury	2 d. post op.	hyperpyrexia
2	F.I. 34106	3 y	F.	Blunt	16hr	+ve	liver	S.	Head injury	10hr. post op.	post op. shock
3	H.R. 34951	5 y	F.	Blunt	5hr	+ve	Spleen	S.	chest injury	20hr. post op.	Tension pneumo-thorax
4	A.A. 26427	5y	F.	Blunt	7hr	+ve	liver R.P. hema-toma	R.	—	9 d. post op.	peritonitis
5	A.K. 26115	9 y	F.	Blunt	27hr	+ve	duod-enum (perit-onitis)	R.	—	3 d. post op	Septic shock
6	F.R. 25131	10y	F.	Blunt	15hr	+ve	stomach duode-num	R.	—	1 d. post op.	Pulm. collapse
7	E.M.	30y	F.	Blunt	0.5hr	+ve	int.hge fr.pel-vis.	—	head injury fr.lt humerus	on admission	shock

Table 21 (cont.)

8	M.F. 29453	8 y	M.	Blunt	6 hr.	+ve	Liver R.P. hematoma	R. Head injury fr. Rt humerus fr. Rt 9th rib	3 hr. post op. head injury
9	T.A. 35152	15 y	M.	Blunt	3 hr.	+ve	ileal tears comp.fr. pelvis R.P. hemat.	R. head injury wounds	3 hr. post op. post op. shock
10	H.R. 26979	30 y	M.	Blunt	0.5hr	+ve	int. hge	-- head injury chest injury	on admission shock
11	E.M.	30 y	M.	Blunt	5 d.	+ve	ileal tear S. (peritonitis)	-------	15 d. post op septic shock
12	A.H. 23492	35 y	M.	Blunt	8 hr	+ve	urethra	R. Ureamia	15 d. post op. renal failture
13	M.K. 24290	57 y	M.	Blunt	14 hr	+ve	urethra fr. pelvis R.P. hematoma	S. ------	2 hr. post op. Cardiac arrest

R = Resident

S = Staff.

Period of hospital stay (Table 22).

Study of the period of hospital stay showed that the average period was 13.5 days in all cases. This was further analysed and found to be 9.8, 34.6, and 4.6 days in the uncomplicated, complicated, and death cases respectively

Table 22 : Period of hospital stay

Patients	No. of cases	Period of hospital stay	
		Total	Average
All cases	55	745 days	13.5 days/case
Uncomplicated	31	304 days	9.8 days/case
Complicated	11	381 days	34.6 days/case
Death	13	60 days	4.6 days/case