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Original Article

Intra- Abdominal Injuries Following Blunt Abdominal Trauma-Analysis of 100 cases.

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Abstract

With the advent of industrialization, accelerated social violence, increasing road traffic accident and increasing use of machineries trauma has become the leading cause of mortality and disability. Considering trauma abdominal trauma is one where early diagnosis and accurate assessment and timely intervention can save the life of the victim in most of the instances. This is a prospective observational study that represents the experience of 100 consecutive patients of blunt abdominal trauma with suspected intra-abdominal injuries admitted in surgical words of RMCH, Rajshahi. The most of the patients were male (87%) and in active phase of life. RTA (53%) was the most common cause of blunt abdominal trauma and majority of the patients (38%) arrived in the hospital within 7-24 hours. Major clinical signs of intra-abdominal injuries were signs of peritonitis. The main investigation done was plain X-ray abdomen (71%) in erect posture, of which 55% cases showed free gas under the done of the diaphragm. Out of 100 cases 77 patients were operated upon and 23 patients were managed conservatively. The incidence of hollow viscus injury (57%) was higher than solid organs (36%) injury but only five patients came out to be a negative laparotomy. Of all operated cases fifty one were recovered uneventfully and only twenty three patients developed various postoperative complications. The most of the patients (40%) left the hospital within 11-14 days. Seven patients died on the day of admission but total mortality was nine (9%) in number.

Key words: Intra-Abdominal injury, Blunt Abdominal Trauma.

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Introduction

Trauma is the principal public health problem in every country regardless of the level of socioeconomic development[1].In civilian life, the majority of abdominal injuries are due to blunt trauma. This is in part related to the consequences of road traffic accident, although assault, fall from height and industrial accident contribute significanty[2].

Patients with abdominal trauma are always a challenge in our day to day hospital practice. History and physical examination are usually accurate in determing intra-abdominal injury in the awake and responsive patient, although the clinical evaluation of the abdomen by means of physical examination is inadequate to indentify intra-abdominal injuries in a significant percent of cases, this is due to altered mental status secondary to head trauma, alcohol or drugs, and because of inaccessibility of the pelvic, upper abdominal and retroperitoneal organs to palpation[1].

Patient sustaining blunt abdominal trauma die due to unrecognized intra-abdominal injuries in some cases. In most of the instances intra-abdominal injuries if detected early and managed properly give excellent results. Delay in the diagnosis and treatment is a major contributor to morbidity and mortality.

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Material and Methods

This study was carried out with patients of blunt abdominal trauma suspected visceral injury admitted in surgical wards of Rajshahi Medical College Hospital, Rajshahi. A total number of 100 consecutive patients were studied starting from January 2006 to May 2007. This study includes all the patients with blunt abdominal trauma, most of whom underwent laparotomy but a significant number was managed with non-operative approach. Patients with injuries to other parts of the body were excluded from this study.

Immediately after admission, the patients were subjected to a thorough and detailed history taking and clinical examinations. But if needed immediate resuscitative measures were instituted before going for detailed history and clinical examinations. In those patients requiring urgent laparotomy, all routine investigations were not possible because of lack of urgent laboratory facilities, but relevant investigations as far as possible were done and recorded. The pre-operative management given to the patients were recorded and as well as detailed operative technique and findings were also recorded. A careful record of the hospital stay, the post operative events and their management and mortality rate also noted.

Results

Figure 1 shows that majority of the study subjects belonged to the age group of 21-30 years (30%) followed by the age group 31-40 years (23%). The age of the study subjects who fulfilled the inclusion criteria ranged from 3-75 years.

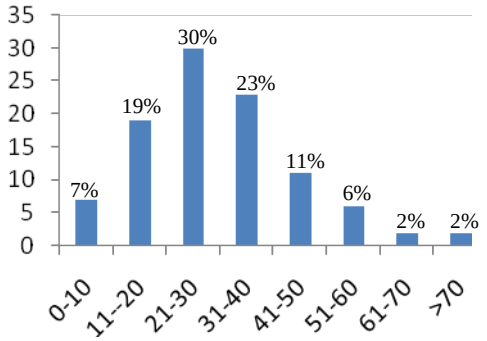

Fig 1: Age group distribution of study patients (n=100).

Figure 2 shows that 87% of the study subjects were male, while remaining 13% of them were female. The male and female ratio is 6.69:1

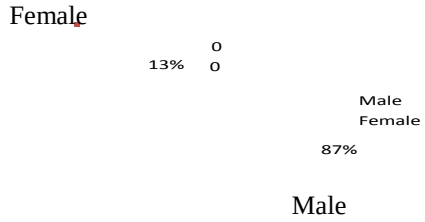

Fig 2: Sex distribution of study patients (n=100).

Figure 3 shows was the most common cause of BAT (53%) followed by assaults (21%). BAT resulted fall from height occured in 15% and sports injuries in 7% of cases.

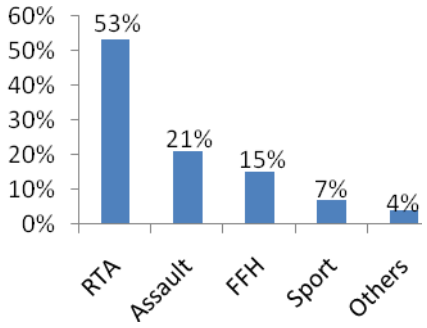

Fig 3: Causes of BAT (n=100).

Figure 4 shows the majority of the patients arrived in the hospital within 7-24 hours (38%). 26 patients reported between 25-48 hours and 19 cases within 6 hours of incidence. A significant number of patients (17%) presented after 48 hours.

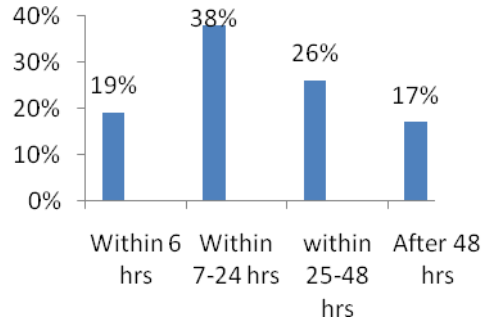

Fig 4: Time lapsed to reach hospital (n=100).

Table-I

Clinical features of the study patients (n=100).

Clinical features		No. of patients	Percentage
Symptoms			
Abdominal pain		All	All
Vomiting	Frank blood	00	00
	Blood mixed with gut content	02	02
	Non bloody	17	17
Urinary retention		13	13
Signs			
Abdominal distension	Severe	15	15
	Moderate	38	38
	Not apparent	21	21
Muscle guard/Rigidity		76	76
Tenderness		92	92
Rebound tenderness		69	69
Obliteration of liver dullness		55	55
Absent of bowel sound		69	69

All patients complained of abdominal pain, vomiting was complained by 19 patients, urinary retention was noted in 13 patients. Major clinical signs of intra-abdominal injuries were signs of peritonitis. Obliteration of liver dullness was found in 55 cases and absent of bowel sound was noted in 69 cases.

Table- II

Organ injuries of the study patients (n=100).

Organ involved		No. of patients	Percentage
Small intestine		53	53
Large intestine		02	02
The mesentery		12	12
Liver		09	09
Spleen		07	07
Pancreas		04	04
Kidney		04	04
Urinary bladder and urethra		05	05
No injury	On laparotomy	05	16
	Clinically+investigations	11	

Small intestine injury (53) occupies the top list.Other organs involved were large intestine (02),the mesentery (12), liver (09), spleen (07), pancreas (4), kidney (4), urinary bladder and urethra (5). Multiple organs injuries were found in only (13%) of cases. No viscus injury was found in 16 cases.

Figure 5 shows out of 100 cases 23 patients were treated conservatively and 77 patients were operated upon.

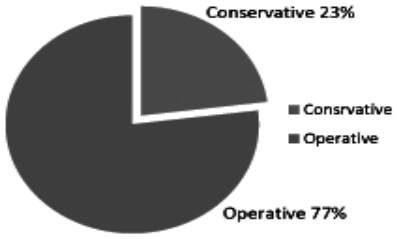

Figure 5: Treatment approach of the study patients (n=100).

Figure 6 shows among 77 operated patients 51 (66.23%) patients ended up well and went home without complications.Only 23 (29.87%) patients developed various post operative complications. One patient died per-operatively and rest two patients died post-operatively.

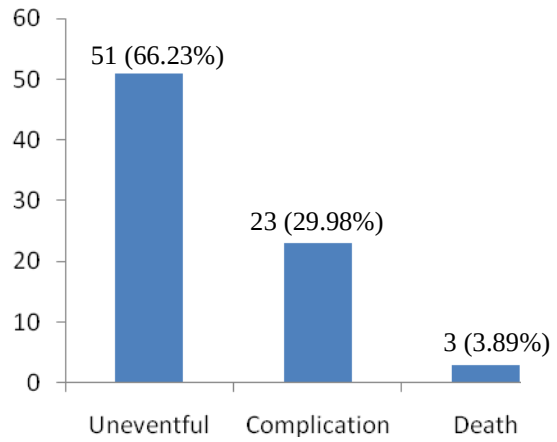

Figure 6: Immediate outcome of operative patients (n-77).

Figure 7 shows mortality rate of the study patients. Out of 100 cases total mortality was nine in number.

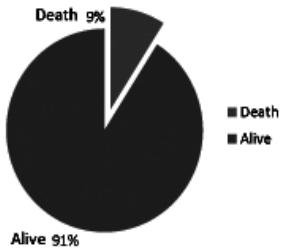

Figure 7: Mortality rate of the study patients (n=100).

Figure 8 shows that most of the patients (37) left the hospital within the period of 11-14 days (40%). Only nine patients stayed more than 20 days (10%).Seven patients died on the day of admission and their hospital stay was not considered in this calculation.

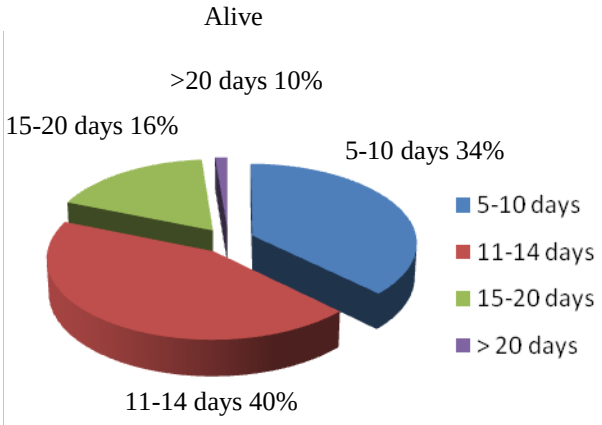

Fig 8: Duration of hospital stay of the study patients (n=93).

Discussion

Abdominal trauma is a very common day to day incidence in our society occurring both accidentally (i.e; Road Traffic Accident) and incidentally (i.e; assault)[1]. Blunt trauma produces a spectrum of injury from minor, single-system injury to devastating, multi-system trauma. Trauma surgeons must have the ability to detect the presence of intra-abdominal injuries across this entire spectrum[3].

In this study that the majority of patients were of the active phase of life, they were responsible for running their families by their earnings and as such subjected more to the various traumatic agents in their daily life both on the road and in the working place as well.

The total male patients were 87 (87%) and only 13 (13%) patients were female. This figure shows a male sex predilection possibly because of the exposure of the male to external environment more frequently.

Motor vehicle collisions are a common source of blunt abdominal trauma[4]. Seat belts reduce the incidence of injuries such as head injury and chest injury, but present a threat to such abdominal organs as the pancreas and the intestines, which may be displaced or compressed against the spinal column[4]. Sports injuries can affect abdominal organs such as the spleen and kidneys[5]. Falls and sports are also frequent mechanisms of abdominal injury in children[6]. Fitzerald JB[7] et al showed the causes of BAT, motor vehicle accident (83.5%), blunt weapond (assault) 6.5%, fall from height 5% and others 5%. RTA was the majore cause of BAT in our study and it matches with the study by Fitzerald JB et al though percentage distribution in this study is much less e.g 53% in compared to 83.5%. In this study a significant number of patients (17) presented after 48 hours. Because of the lack of medical facilities, transport and communication problem, poverty, lack of medical knowledge are the various reasons for delayed presentation of these patients.

Three patients were grossly disoriented and four patients were unconscious, and in the unconscious patients intra-abdominal injury was suspected from signs of continued hemorrhage not evident externally, signs of injury on the abdominal wall (bruise, abrasions, lacerations etc), rib fracture and peritoneal tap. Diagnostic paracentesis was done in nineteen cases and found to be positive in sixteen cases in this study. Although diagnostic peritoneal lavage is universally accepted as a diagnostic procedure in suspected case of blunt abdominal trauma[8,9,10] no cases were subjected to diagnostic peritoneal lavage in this study due to lack of facilities.

The evaluation of the patients with blunt abdominal trauma begins with a careful history and physical examination. But the physical evaluation has been rated unreliable in indentifying patients with serious intra -abdominal injury by Mackersie RC et al[11], Mc Anena OJ et al[12] and Rodriguez A et al[13] in their studies, but it was found to be much effective in this study. This might be due to the fact that most of the patients arrived after a long delay with late features of trauma.

One study found that ten percent of polytrauma patients who had no clinical signs of abdominal injury did have evidence of the such injuries using radiological imaging[14]. Most important investigation done in our study was plain X-ray abdomen in errect posture. It was done in 71 cases of which 55 X-ray film showed free gas under done of the diaphragm and having rupture intestine. Plan X-ray has been found to be very helpful in the diagnosis of fracture bones (e.g; long bones, pelvic fracture), hollow viscus injury and diaphragmatic ruptures[15]. Ultrasonography has been used more frequently in recent years for evaluation of blunt abdominal trauma patient. It can detect fluid such as blood or gastrointestinal contents in the abdominal cavity[14]. Ultrasonography was carried out in this study in seventeen patients. But no patients underwent sonographic study who needed immediate laparotomy for reason that it was unnecessary as the diagnosis was so obvious.

Initial treatment involves stabilizing the patient enough to ensure adequate airway, breathing and circulation, and indentifying other injuries[5].

Laparotory is often performed in blunt abdominal trauma[14] and is urgently required if an abdominal injury causes a large, potentally deadly bleed[4]. The main goal is to stop any sources of bleeding before moving onto any definitive find and repair any injuries that are found[16]. The choice of operative approach is straightforward midline incision in blunt abdominal trauma[1].In this study midline incision was made in fifty six cases but uppper and lower midline incision was decided on clinical background.

In the study series of Bross PLO et al[15], Fitzerald JB et al[7], Shires GT et al[17] and Mackersie RC et al[11], all of them showed the predominace of solid organs (spleen, liver) injury following blunt abdominal trauma. Whereas in this study, small intestine injury (53) occupied the top of the list followed by the mesentery (12), liver (9), spleen (7), kidney (4) successively. As the situation of western countries where lap type and shoulder type seat-belt restraints imparts the trauma during sudden deceleration so is so commonly injured solid organs are. But in this study solid organs injury was less common than hollow viscus injury, probaly due to early death of the patients with liver or spleen injury on the spot or way to hospital due to lack of medical facilities, transport and communication problem. The reasons may also be the lack of facilities of diagnosis of minor injuries to solid organs in present setup of our medical service.

Intra-abdominal injuries are also frequently successfully treated non-operatively[5,6] as there is little benefit shown if there is no known active bleeding of potential for infection[18]. Meredith JW et al[19] had great experience in the non-operative management of blunt hepatic trauma. They concluded that the grade of hepatic injury as diagnosed by CT scan does not predict the need for surgery. In this study liver injury was noted in nine cases, none of them were investigated by CT scan, it was due to haemodynamic unstability and poverty of the patient.

A study by Crookes et al[20] suggests that the true morbidity of a negative laparotomy may not be as high as previously believed. Only five patients came out to be a negative laparotomy i.e. no intra-abdominal injury was found on laparotomy but all of them had reactive exudation and free fluid in the abdomen. Negative laparotomy are not rare in clinical practice, even after DPL, an 8% incident of negative laparotomy has been reported by Miller et al[21] in blunt abdominal trauma.

In the study of Crowford ES et al[7], the survival of the patient was related to the extent of blood loss and varied with the level of blood pressure on admission. All patient died in pre-operative and per-operative period and one patient who died in post- operative period, all had poor hemodynamic condition from the very onset. Again in the study by Donovan TB et al[22] showed that increase intestinal permeability led to irreversible shock and septicemia following blunt and penetrating abdominal trauma and ultimately patients may died. So for better result much emphasis should be put in the diagnosis and correction of poor haemodynamic status of every patients with blunt abdominal trauma. Most deaths resulting from abdominal trauma are preventable[4]; abdominal trauma is one of the most common causes of preventable, trauma-related deaths[5].

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