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Analysis of Abdominal Trauma

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ABSTRACT
AIM:
To analyse the incidence,type, etiology, clinical presentation,grading of abdominal trauma in relation to abdominal organs and its morbidity and mortality in RMMCH.To emphasise the management protocol of various abdominal injuries.
METHODS:*The study population includes 50 patients admitted with history of blunt injury abdomen from May 2012 to April 2014. Careful history was elicited and recorded. Simultaneously resuscitative measures and baseline investigations were carried out.Age, sex, hospital number, date, time of admission, nature and time of injury were recorded.Through clinical examination of the patient including general examination for level of consciousness, pallor, hydration, head injuries and skeletal injuries were examined.Through abdominal examination was done and signs of peritonitis or internal hemorrhage was looked for and recorded. Serial abdominal and half hourly BP chart was maintained.Base line blood investigations, radiological examinations and ultrasonogram was done in all cases.Tetanus toxoid given to all cases.All cases were administered parenteral broad spectrum antibiotics.Decision for conservative management or laparotomy was taken after considering the clinical examination and investigation reports.During laparotomy, the viscera were examined, injuries were noted and the treatment was given accordingly.All cases managed conservatively or by surgery were followed till discharge. The length of hospital stay, post operative complications, improvement or deterioration of the condition, date of suture removal and the date of discharge were recorded.*
RESULTS : *In this study 50 cases with abdomen trauma were studied.the incidence of male was high .The most affected age group were less than 40 years.patients with blunt injury abdomen also associates with other system injury mostly being orthopaedic injury.from the study the most common presentations being abdomen pain and distension. splenic injury is the most common organ to be involved most patients had multiorgan injury.From the study ,it is found that the morbidity and mortality was higher in patients ith multiorgan and multisystem injury.among the 50 patients 28 were managed conservatively and 22 were taken for laparotomy.*
CONCLUSION: *Road traffic accidents are the most common cause of blunt injury abdomen constituting 52% cases.Young people who are less than 40 years are affected more frequently, i.e. two times more than older age groups.The most common associated injury was orthopedic injury followed by chest injury and head injury.Ultrasound and CT have been very useful for assessing the severity of injury and the need for laparotomy.The organs most commonly involved in abdominal trauma are spleen, liver and gastrointestinal viscera..these were managed by splenectoy,spleenoraphy,hepatoraphySmall bowel injury was effectively treated with double layer closure. Multiple perforations underwent resection anastomosis. Isolated bowel injuries showed better prognosis when compared with associated multi-organ or multi-system injuries.Post-operatively 42% cases had complications. The common complications were pyrexia, wound infection and chest infection.The mortality rate in this study group was 14%. It was even noted that increased mortality is more often associated with multi-system injuries.*

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I. Introduction

Abdominal trauma continues to account for a large number of trauma related injuries and death.Motor vehicle accidents and urban violence are the leading causes of blunt and penetrating trauma to the abdomen. Others being fall from height, kick by animals, building collapse, industrial accidents and so on.Trauma is a major health problem. Statistics show that nearly 5 million trauma cases are being reported annually and it is the leading cause of morbidity and mortality. It is the leading common cause of death overall and for each traumatic death there are 10 seriously disabled. 7% of the total number of cases involved trauma to abdomen.When the diagnosis is in doubt and clinical judgment suggests surgery, exploration provides definitive treatment as well as

diagnosis. Moreover, the risks of negative exploration have become acceptable.Lack of literacy and fear of hospitalization in the absence of external injuries among the people delay their treatment. Though newer techniques and diagnostic tools are available now, it still depends on the experience and clinical judgment for their application and determination of the best care for the injured patient.This study was undertaken to evaluate the entire profile of abdominal trauma, the essential diagnostic measures undertaken and the eventual management. The data is compared with literature available in evaluation of abdominal trauma.

II. Materials And Method

AIM

To study the incidence and etiology of abdominal trauma during the period May 2012 to April 2014 at Rajah Muthiah Medical College & Hospital.

To analyse the incidence,type, etiology, clinical presentation,grading of abdominal trauma in relation to abdominal organs and its morbidity and mortality.To emphasise the management protocol of various abdominal injuries.

STUDY AREA AND POPULATION:

All cases of blunt injury abdomen admitted in surgical unit of RMMCH were taken up for study during the period May 2012 to April 2014.

Study period: May 2012 to April 2014.

INCLUSION CRITERIA:

All patients admitted with history of blunt injury abdomen.

EXCLUSION CRITERIA:

Patients with GI perforations due to malignancy,ulcer

Patints with pathological splenic rupture

Abdomen organ pathology not due to trauma

SAMPLE SIZE:50

STUDY DESIGN:A Prospective study

III. Methods:

Careful history was elicited and recorded. Simultaneously resuscitative measures and baseline investigations were carried out.Age, sex, hospital number, date, time of admission, nature and time of injury were recorded.Through clinical examination of the patient including general examination for level of consciousness, pallor, hydration, head injuries and skeletal injuries were examined.Through abdominal examination was done and signs of peritonitis or internal hemorrhage was looked for and recorded. Serial abdominal and half hourly BP chart was maintained.Base line blood investigations, radiological examinations and ultrasonogram was done in all cases.Tetanus toxoid given to all cases.All cases were administered parenteral broad spectrum antibiotics.Decision for conservative management or laparotomy was taken after considering the clinical examination and investigation reports.During laparotomy, the viscera were examined, injuries were noted and the treatment was given accordingly.All cases managed conservatively or by surgery were followed till discharge. The length of hospital stay, post operative complications, improvement or deterioration of the condition, date of suture removal and the date of discharge were recorded.

IV. Results:

The data obtained from 50 cases of traumatic abdominal injury is listed below.

Causes	No. of cases	Percentage
RTA	26	52%
Fall	8	16%
Assault	14	28%
Others (sports, industrial)	2	4%
Total	50	

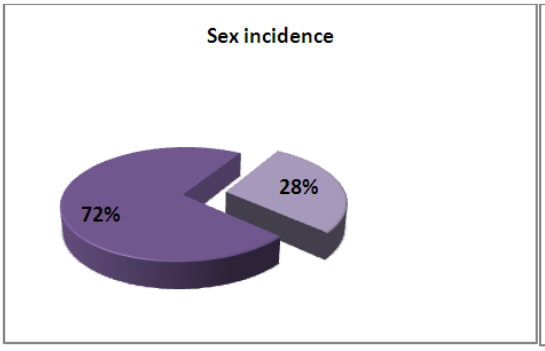
52% of the abdominal injury was due to RTA.

AGE INCIDENCE:

Age in years	No. of cases	Percentage
<40	34	78%
>40	16	32%

It is seen that abdominal injury is more common in young active people, resulting in loss of life and resources.

SEX INCIDENCE



Male preponderance(72%) is seen in this study and it is probably due to their hard outdoor occupation and profession.

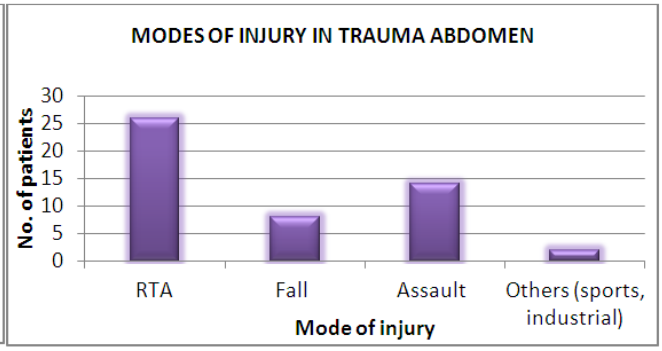


Figure showing different modes of injury to abdomen.

MODE OF INJURY AND ITS AGE DISTRIBUTION:

Age	No. of cases	%	Mode of injury			
			RTA	Fall	Assault	Others
0 – 20	6	12%	4	1	1	0
21 – 40	28	56%	16	4	7	1
40 – 60 & above	16	32%	6	3	6	1

Age and Mode of injury

- Nearly 60% of RTA cases occurs predominantly in the age group of 21 – 40 years.
- 50% of assault cases occur in the age group og 21 – 40 years.
- Fall from height was also seen mostly in the age group of 21 – 40 year

X-RAY ANALYSIS OF INJURED PATIENTS:

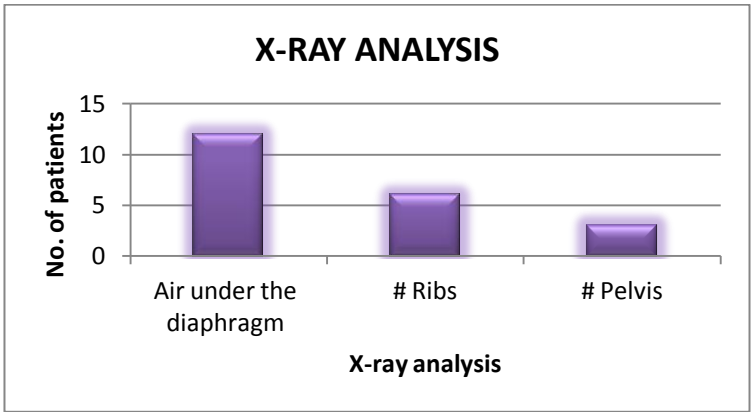
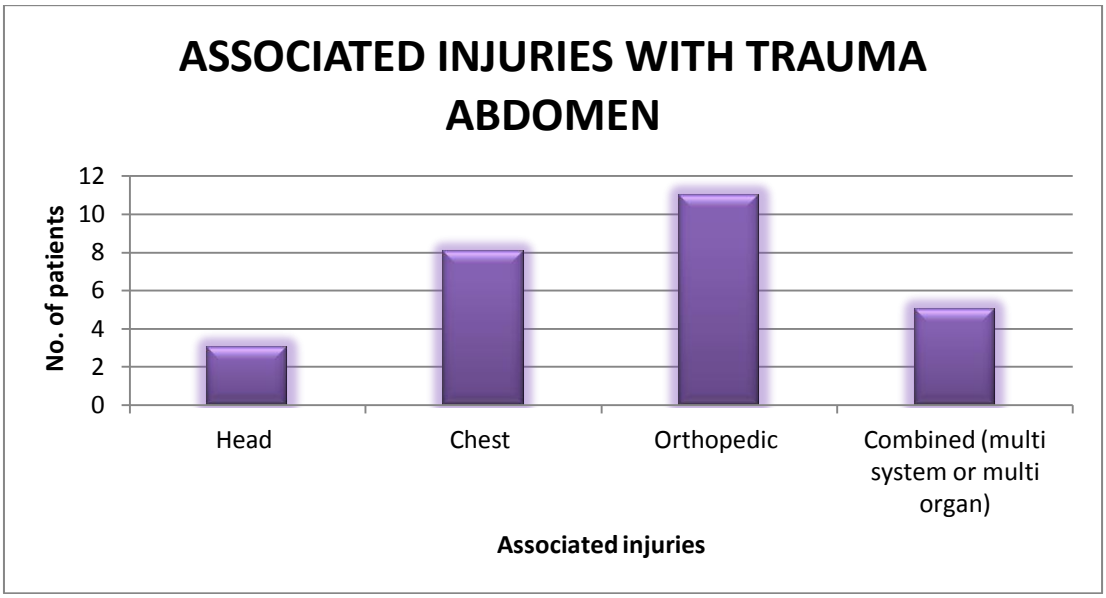
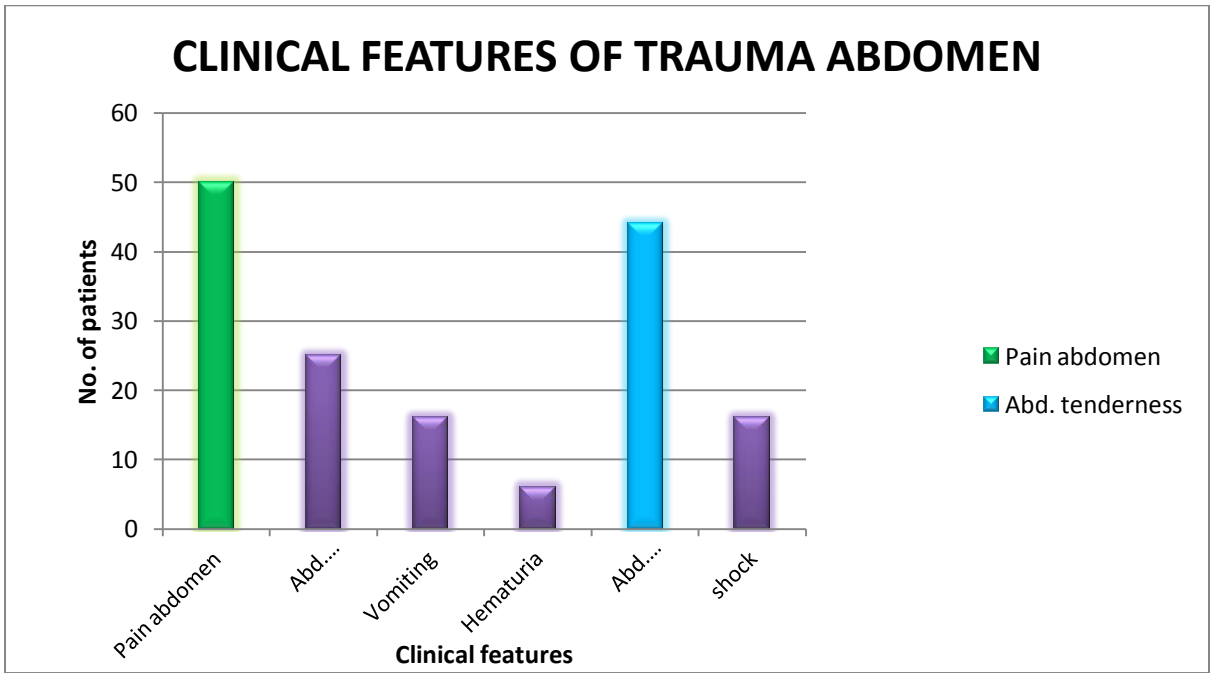


Figure showing X-ray findings other than abdomen.

Xray also reaveals ribfractures , pelvic fracture inaddition to bowel injury which is identified by air unfer diaphragm.



In this study, it is estimated that other systems were involved in 54% of the cases of abdomen trauma.



Pain and tenderness are the cardinal manifestations in abdomen trauma.

ANALYSIS OF NEEDLE PARACENTESIS:

No. of cases 13	**True +ve**	**True -ve**	**False +ve**	**False -ve**
	8	**5**	**0**	**3**
Sensitivity	72%			
Specificity	100%			
Positive predictive value	100%			
Negative predictive value	40%			
% of false negatives	27.27%			
% of false positives	0%			

13 patients were subjected to needle paracentesis. Sensitivity was low and produced 100% specificity.

A STUDY ON ULTRASOUND:

No. of cases 50	True +ve	True -ve	False +ve	False -ve
	40	**8**	**0**	**2**
Sensitivity	95.23%			
Specificity	100%			
Positive predictive value	100%			
Negative predictive value	80%			
% of false negatives	4.76%			
% of false positives	0%			

All the 50 cases were subjected to ultrasonogram. Of which, two cases were not visualized and results came contradictory. One case of pancreatic injury and one case of renal injury were not visualized in USG and were confirmed by CT.

COMPUTED TOMOGRAPHY – AN ANALYSIS:

It was carried out in 30 cases mostly as an adjunct to USG. It helped to rule out solid organ involvement and retroperitoneal hemorrhage.One case with normal USG with high index of suspicion of renal injury was subjected to CT. This patient was found to have an intracapsular contusion of right kidney which was managed conservatively. In three cases free fliud was picked up by ultrasound and CT detected multiple areas of laceration in spleen.

DIAGNOSTIC PERITONEAL LAVAGE

DPL was done in 5 cases. It was positive in 3 cases and at laparotomy two patients had splenic injury and one had injury to liver. In the remaining two cases DPL was negative and the patients were managed conservatively.

MANAGEMENT – AN ANALYSIS:

Management	**No. of cases**	**Percentage**
Conservative	22	44%
Laparotomy	28	56%

44% were managed conservatively and 56% underwent laparotomy, giving a ratio 1**:**1.27.

INDIVIDUAL VISCERAL INVOLVEMENT:

Organ	**No. of cases**	**Percentage**
Liver	11	22%
Spleen	15	30%
Combined spleen & liver	1	2%
G.I tract	10	20%
Combined liver & G.I.T	2	4%
Pancreas	1	2%
Vessel injury	1	2%
RP hematoma	1	2%
Kidney	2	4%
Bladder & urethra	3	6%
Abdominal wall hematoma	2	4%
Perineum	1	2%

Figure Showing individual visceral involvement

The most common organ injured is spleen and the second most common is liver and the GIT follows.

V. Discussion:

In this study 50 cases with abdomen trauma were studied.among them male incidence were high.the most involved age group were less than 40 years.the cardinal symptoms were found to be abdomen pain and distension.abdomen trauma also associates with other system involvement also.xray shows other injuries like rib fractures and pelvic fracture.usg had 100%specificity.diagnostic peritoneal lavage aids in diagnosis of injured organ ,CT plays an important role in identifying the injured organ,it helps in following patiens on conservative management.Most of the patients suffered individual organ injury but few suffered from multi-organ as well as multi-system injuries. Of those with, multi-organ or multi-system injuries few succumbed to death.

SPLEEN

Spleen was the most frequently injured organ in this study. Out of the 16 cases, 9 cases were due to RTA; 3 cases were after assault and 3cases following fall and one case was following industrial injury.

Associated fracture of the left lower ribs were found in 3 cases. Almost all the patients got admitted immediately to the hospital without any significant time lag. By clinical examination and supporting signs like fracture ribs and investigations like needle paracentesis and ultrasonogram, decisions for management was taken. 7 cases underwent laparotomy.Amog them only two cases were amenable to splenorrhaphy. Routine vaccination against the deadly infections like Streptococcal pneumoniae, Neisseria meningitidis and Hemophilus influenzae are being prescribed. Broad spectrum antibiotics are also being provided to prevent the development of OPSI

LIVER:

13 cases of liver injury were reported in this study. Of which, 3 cases had associated rib fracture on right side. 8 cases were managed conservatively. 5cases were taken up for laparotomy as there were signs of hemodynamic unstability.Among the 5 two survived and three died.among the three ,one associated with small bowel injury.Isolated hepatic injuries can be managed better with good survival rate when compared with the hepatic injuries associated with multi-system involvement.

GASTRO INTESTINAL TRACT INJURIES:

12 cases were encountered in this study. Two cases had ileal perforation; 3cases had jejunal perforation; 5 cases had gastric injury and 2 cases had sustained rectal injury following fall & assault.Of the 3 jejunal injuries, one case was associated with hepatic injury and was simultaneously treated with double layer closure. The remaining two cases also underwent double layer closure.Of the two ileal injury cases, one case presented with multiple perforation of the ileum and underwent resection anastomosis. The other case was a simple perforation and that case also underwent resection anastomosis.5 cases of gastric perforation was reported in this study. Of which one case had associated hepatic injury and was simultaneously treated with primary closure & omentoplasty. One case was found to have gastric hematoma and evacuation of hematoma was done followed by primary closure of the tear. Another case underwent a partial gastrectomy with GJ. 2 more cases underwent simple primary closure with omentoplasty. Two cases died in post-operative period due to other associated multi-system injuries.

PANCREAS:

One case of pancreatic injury was studied and CT showed distal pancreatic injuryDistal pancreatectomy was done. Post-operatively, the patient was normal.

KIDNEY:

Two cases were studied. One was managed conservatively with CT and USG support and the other had a grade II renal injury. On laparotomy exploration, no active bleeding was there and hence the procedure was deferred.

VESSEL INJURY:

One case of isolated hepatic artery avulsion was encountered with normal solid organsOn laparotomy, both clotted and fresh bleed was noted and the bleeding vessel was identified and simple ligation of hepatic artery was done. Patient was hemodynamically stable post-operatively and his liver function tests are also within normal range. The patient was discharged on his 12^{th} post-operative day.

RETROPEITONEAL HEMATOMA:

One patient with massive expanding retroperitoneal haematoma underwent explorative laparotomy. Unfortunately the patient collapsed on table itself. Later revealed a tear in the inferior vena cava

POST-OPERATIVE COMPLICATIONS:

The following complications were noted in the post-operative period.

Complications	**No. of cases**	**Percentage**
Fever	8	16%
Respiratory infections	4	8%
Wound infections	4	8%
Wound dehiscence	2	4%
Fistula	1	2%
Pelvic abscess	2	4%
Total	**21**	**42%**

Morbidity Assessment Following Laparotomy

Injury to spleen and liver were often associated with lower lobe atelectasis or pneumonia.
Wound infection occurred in cases with faecal contamination of peritoneal cavity.

VI. Conclusion

- 50 cases of blunt injury abdomen were studied in RMMCH from May 2012 to April 2014.
- Road traffic accidents are the most common cause of blunt injury abdomen constituting 52% cases.
- Young people who are less than 40 years are affected more frequently, i.e. two times more than older age groups.
- The ratio of male to female is 2.57 : 1.
- The most common associated injury was orthopedic injury followed by chest injury and head injury.
- Abdominal pain and tenderness are the cardinal manifestations.
- Ultrasound and CT have been very useful for assessing the severity of injury and the need for laparotomy.
- 22 cases have been managed conservatively while 28 cases underwent laparotomy giving a ratio of 1 : 1.27.
- The organs most commonly involved in abdominal trauma are spleen, liver and gastrointestinal viscera.
- Among them, spleen is the commonest to get injured. Most of the cases underwent splenectomy.
- Next common injury in this study is the hepatic injury which was managed both conservatively and also with hepatorrhaphy.
- Small bowel injury was effectively treated with double layer closure. Multiple perforations underwent resection anastomosis. Isolated bowel injuries showed better prognosis when compared with associated multi-organ or multi-system injuries.
- Post-operatively 42% cases had complications. The common complications were pyrexia, wound infection and chest infection.
- The mortality rate in this study group was 14%. It was even noted that increased mortality is more often associated with multi-system injuries.

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