

## Traumatic Hollow Viscus Injuries Analysis and Management

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### Abstract

Abdominal injuries are not so common as that of orthopedic injuries or head injuries following trauma ( Road traffic accidents fall or hit).When it occurs it need a quick investigation and surgical intervention to reduce the Mortality and Morbidity. For that we need to to know the probabilities of hallow viscus injury following trauma.

**Keywords:** Injury; Solid organs; Hallow Viscus; Perforation; Management; Anastomosis.

### Introduction

60 to 70 % of all emergencies is due to trauma. Abdominal injuries include both solid organ and hallow viscus injuries, and the later forms a major chunk. It need to be addressed early since the delay in intervention become fatal. A detailed clinical examination, investigations, and appropriate intervention, is the need of the hour.

### Aim of the Study

Complete systemic examination of all trauma patients admitted to triage ward.

Identifying patients having or suspected to have abdominal injury.

Appropriate investigations for those patients.

To analyse mechanism of injury, organs involved and accompanying injuries in traumatic hollow viscus injuries.

To analyse the different surgical procedures and finally the post operative outcome.

### Materials and Methods

#### Case Selection

The study population are those patients admitted in surgical triage ward in Government medical college Hospital Thiruvannamalai with hollow viscus injuries.

#### Inclusion Criteria

All trauma patients with abdomen injury greater than 13 yrs of age Both Blunt injury and Penetrating injury abdomen included.

#### Exclusion Criteria

Patients with isolated solid organ injuries.  
Paediatric age group patients (<12 yrs)

#### Mode of Evaluation

Detailed history and complete physical examination of all the trauma patients.

Blood investigations.(complete blood count, Renal function tests)

Blood grouping and typing.

Chest X-ray PA view

X-ray abdomen erect

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USG abdomen & pelvis  
 CT scan abdomen and pelvis.  
 Paracentesis.

#### *Study Design*

- It is a prospective non randomized descriptive study.
- Duration of study – January 2015 to November 2016.

Ethical committee clearance obtained.

An informed written consent obtained either from the patient or from their reliable attendees'.

Collected data were analyzed using statistical methods.

#### **Observation & Results**

Total number of trauma patients admitted to surgical triage ward during the study period – 9660.

Patients suspected of having abdominal injury – 2070

Patients who were completely evaluated and found to have abdominal injury – 74.

Patients with solid organ injury alone – 26

Patients with hollow viscus injuries – 48.

#### *Age*

There is a wide range in presentation of patients- the youngest patient being 16 years and oldest patient being 65 years of age.

The mean age of presentation of patients is 40 years with a standard deviation of 13.76 years. Traumatic hollow viscus injuries is distributed age wise as follows:

#### *Mortality*

Overall mortality -13 ( 27.08%).

Mortality in isolated injuries -4 (8.33%).

Mortality in poly trauma patients -9 (18.75%).

All the patients admitted to surgical triage ward were analyzed and out of the 9660 trauma patients admitted about 2070 patients were suspected of having abdominal injury and hence were further evaluated. Abdominal injuries were diagnosed in only 74 patients. Of these 74 patients Isolated solid organ injuries were found in 26 patients either pre

operatively or intra operatively. Thus they were excluded from the study and only 48 patients were taken up for the study. This shows that traumatic hollow viscus injuries are more common than solid organ injuries (64.86% Vs 35.13%). Hence the incidence of hollow viscus injuries is more common than solid organ injury.

#### *Age Incidence*

The following table compares the incidence of traumatic hollow viscus injuries in various age groups in the present series to that of the Davis et al. Table 16.

From above table we infer that the majority of patients belonged to 21-30 years of age group. In Davis et al<sup>5</sup> study the majority of patients belonged to 21-30 years age group. Therefore it can be concluded that the young and the productive age group people are the usual victims of traumatic hollow viscus injuries.

In our study there is a clear male sex preponderance (85.42% Vs 14.58%) . The male to female ratio is 5.8 : 1 which is slightly higher than those seen in the western references, as in India males are the chief bread winner for the family and are involved in outdoor activities most of the times.

#### *Signs*

In our study the common signs were tachycardia (56.25%), followed by hypotension (50%), tachypnea (50%) & elevated body temperature (33.34%). In Tripathi et al study hypotension was present in 37.2% of patients and in Mahopatra et al study shock was present in 13.9% of patients

The commonest mode of injury causing injuries in our study is the Blunt abdominal trauma as compared to penetrating abdominal trauma (77.08% Vs 22.92%). The major cause of both blunt and penetrating trauma (>90%) is Road traffic accident (RTA) followed by accidental fall. This is due to the rapid development in technology, in all fields including automobile industry where the first priority has been given to speed rather than safety.

In 24.12% of cases a definitive pre operative diagnosis was possible and in another 34.94% of cases there was only a high index of suspicion.

The most common site of hollow viscus perforation in our study was ileum (35.41%) followed by combined injury of ileum and mesentery (18.75%) as compared to several studies which also small intestine to be the most common site. The descending colon was the least site to be affected (4.16%) .

Isolated perforation is the most common type of injury encountered in our study (64.58%) and hence a simple debridement of the wound edges followed by primary wound closure of the wound was done in 77.08% of cases. This is in accordance with concept of damage control surgery thereby considerably reducing the duration of the surgery comparing to resection and anastomosis of bowel and has shown an increase in the survival rate and decreased incidence of leak in these patients.

The most common associated injuries in our study are the orthopedic injuries (30.30%) followed by neurosurgical injuries (24.24%) as compared to western literatures where it is said that thoracic injuries are the most common of the associated injuries.

In our study the overall complication rate is 41.66%. Respiratory infection (16.67%) is the most common complication followed by wound infection (12.5%) and the leak rate was the least complication in our

study (2.08%). Our study is comparable to a study by Jolly et al which showed wound infection in 14% of cases. Another study by Davis et al showed wound infection as a complication in 15% of the cases.

The commonest morbidity was the prolonged stay in hospital (>14 days) which accounted for 20.83% followed by incisional hernias (10.41%). Long term morbidity could not be exactly studied in our study. But the effects of morbidity on the life style of patients and long term prognosis needs further follow up.

The overall mortality rate was 27.08%. Of this, 70% of deaths occurred in poly trauma cases. Mortality is less in patients who were referred early to our hospital i.e. within two days as compared to those patients referred late (21.05% Vs 50%). This was proved statistically significant with a 'p' value of <0.05. It was also shown that mortality is less in patients who were taken up for surgery early i.e. within five hours of admission triage ward (8.33% Vs 18.75%) which

Table 1:

Age Distribution	Total No of Patients	Percentage
11-20	3	6.25 %
21-30	13	27.08 %
31-40	11	22.91 %
41-50	11	22.91 %
51-60	5	10.41 %
61-70	5	10.41 %

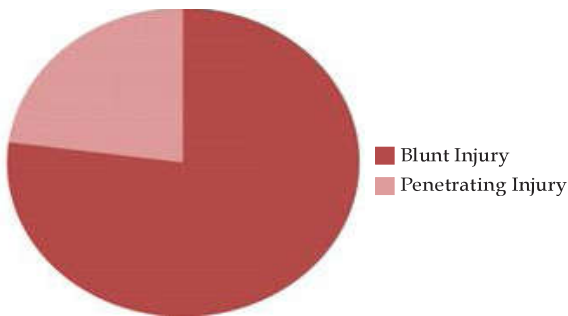
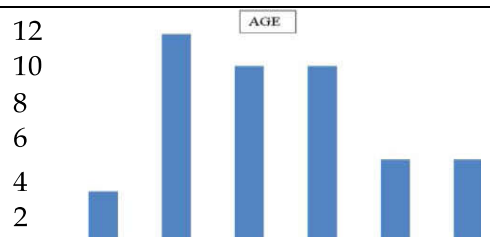


Table 2:

Sex Wise Distribution	No of Patients	Percentage
Male	41	85.42 %
Female	7	14.58 %

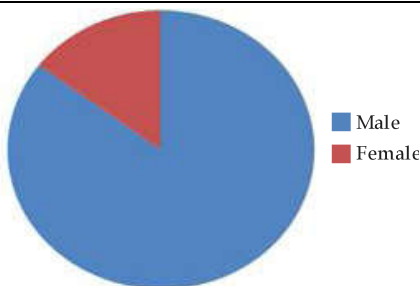
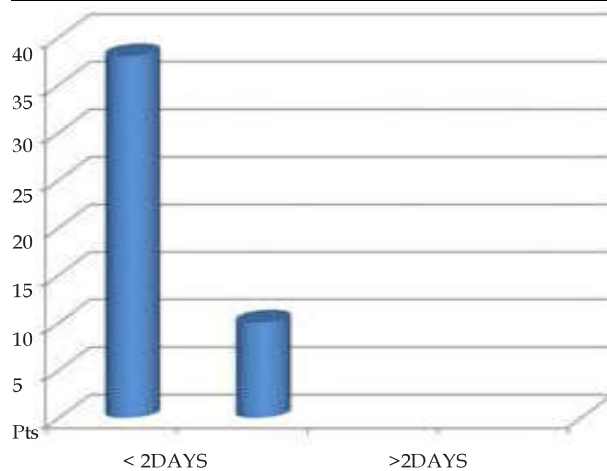


Table 3:

Day of Reference	No. of Patients	Percentage
< Two Days (48 HRS)	38	79.16 %
>Two Days (48 HRS)	10	20.84 %

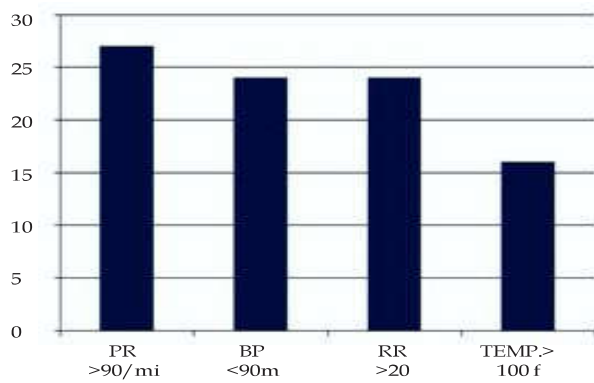


**Table 4:** Chi square test

S. No.	Groups	Death	Alive	$X^2=S(O-E)^2/E$	P Value
1	< 2 DAYS	8	30	3.36	<0.05
2	>2 DAYS	5	5		

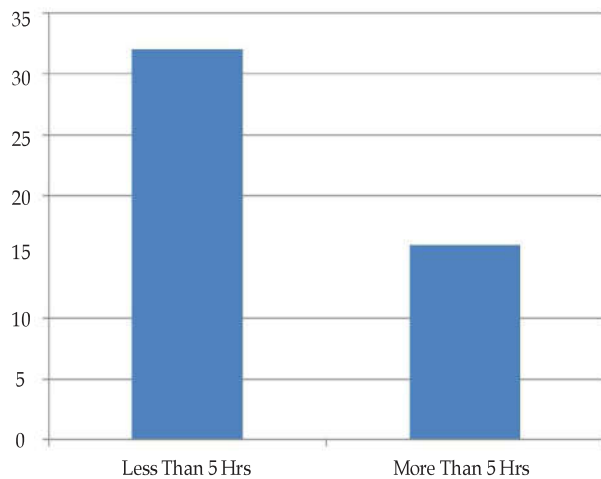
**Table 5:** Associated signs

Signs	No. of Patients	Percent Age
PULSE RATE >90	27	56.25 %
BP <90 mm of Hg	24	50 %
Respiratory Rate > 20/min.	24	50 %
Temperature >100° F	16	33.3 %



**Table 6:**

Time of Surgery	No. of Patients	Percentage
Less than 5 Hrs	32	66.68%
More than 5 Hrs	16	33.33%



**Table 7:** chi Square test

S. No.	Groups	Death	Alive	$X^2=S(O-E)^2/E$	P value
1	< 5 HRS	4	28	10.62	<0.001
2	>5 HRS	9	7		

**Table 8:**

Surgical Procedure	No of Pts	Percentage
Primary Closure	37	77.08%
Resection & Anastomosis	9	18.75%
Ostomies	2	4.16%

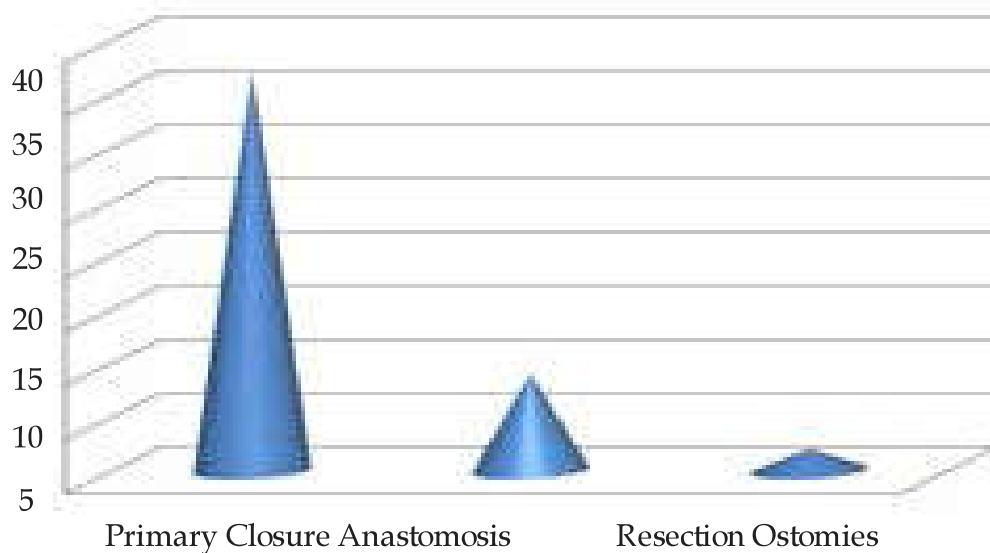


Table 9:

Associated Injuries	No. of PTS	%
Ortho Paedic	10	30.30%
Neuro Surgery	8	24.24%
Solid Organ	6	18.18%
Chest	4	12.12%
Urology	3	9.09%
Plastic	2	

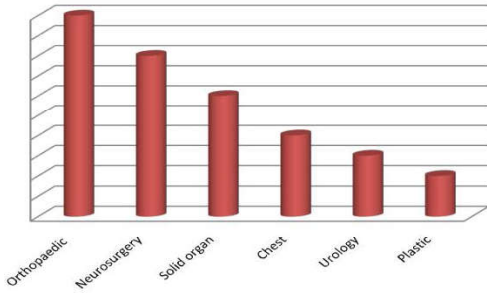


Table 10:

Site of Injury	No. of Pts	Percentage
Ileum	17	35.41%
Ileum With Mesentery	9	18.75%
Jejunum	7	14.58%
Stomach	6	12.50%
Jejunum With Mesentery	5	10.41%
Ascending Colon	2	4.16%
Decending Colon	2	4.16%

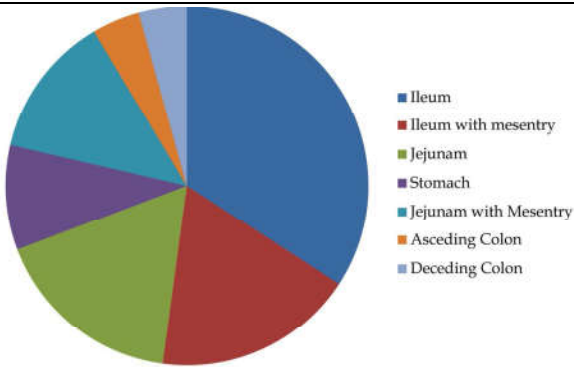


Table 10:

Ventilatory Support	No. of Pts	Percentage
< 2 DAYS	13	27.08%
>2 DAYS	6	12.50%

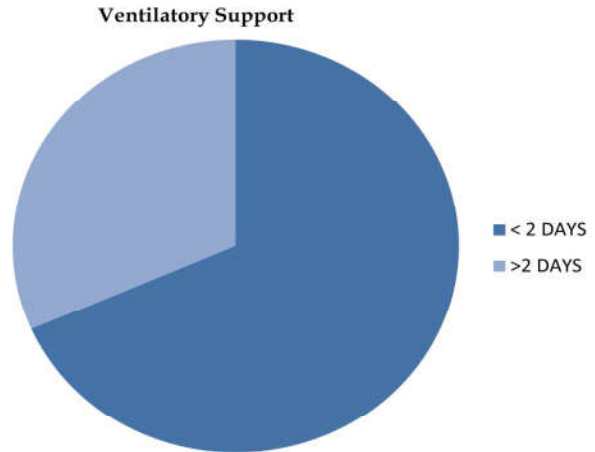
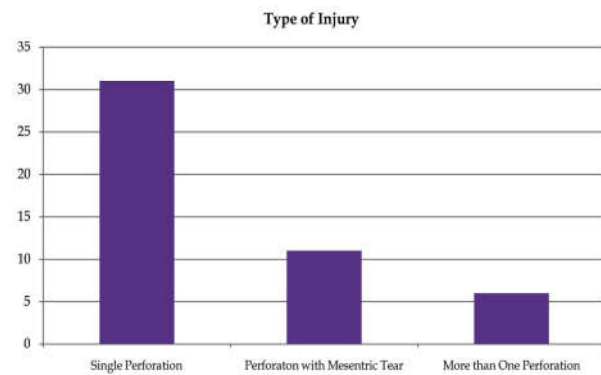
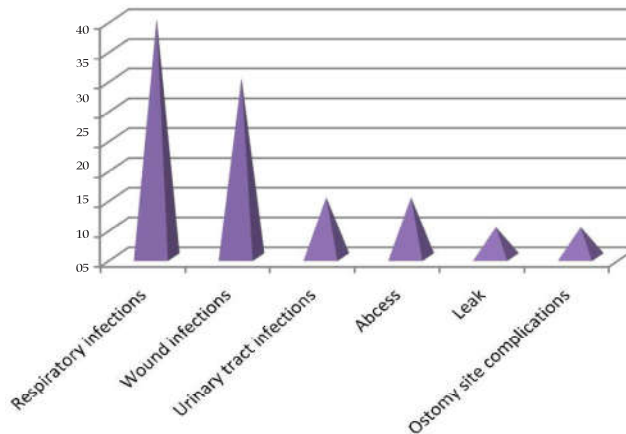


Table 11:

Type of Injury	No. of Patients	Percentage
Single Perforation	31	64.58
Perforaton with Mesentric Tear	11	22.91%
More than One Perforation	6	12.50%



Complications



Graph 12

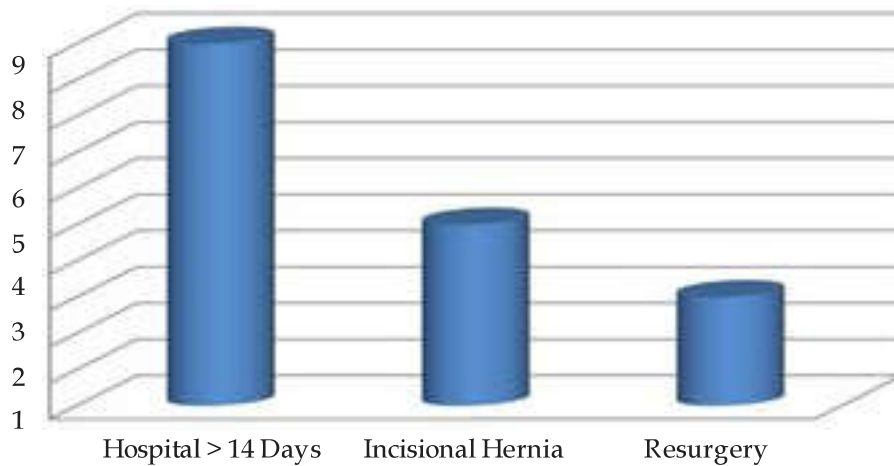
**Table 12:** Total number of post operative patients who had complications-20 (41.66%).

Complication	No. of Pts	Percentage
Respiratory Infection	8	16.67%
Wound Infection	6	12.50%
U T I	2	4.16%
ABSESS	2	4.16%
LEAK	1	2.08%
Ostomy Site Complication	1	2.08%

**Table 13:**

Morbidity	No. of Days	Percentage
Hospital Stay > 14 Days	10	20.83 %
Incisional Hernia	5	10.41 %
Resurgery	3	6.25 %

Morbidity

**Mortality In Relation To Ventilator support**

Ventilatory Support	No. of Pts	Mortality	Percentage
< 2 DAYS	13	2	4.16 %
>2 DAYS	6	3	6.25 %

**Mortality In Relation To Time Of R Eference**

Time of Reference	No of Pts	Mortality	Percentage
<2 DAYS	38	8	21.05 %
>2 DAYS	10	5	50.0 %

Age distribution[ylrs]	Present Series	Davis et al
11-20	6.25%	19%
21-30	27.08%	24%
31-40	22.91%	15%
41-50	22.91%	13%
51-60	10.41%	6%
61-70	10.41%	3%

**Table 17:** Sex Incidence

Sex	Present Study	Davis et al
Male	85.42%	70%
Female	14.58%	30%

**Table 18:** Mode of injury

Mode of injury	Present study	Davis et al	Khanna et al
Road traffic accident	90 %	70 %	57 %
Accidental fall	7 %	6 %	15 %

**Table 19:** Organ injuries

Organ Injured	Present Study	Cusheri	Davis et al	Cox et al	Khanna et al
Small Bowel	49.99%	9%	8%	8%	57%
Small bowel with mesentry	29.16%	5%	4%	10%	47%
Stomach	12.50%	1%	1%	7%	
Colon	8.32%				

**Table 20:** Associated injuries

	Present study	Davis et al	Khanna et al
Orthopedic	30.30 %	15 %	27 %
Neurosurgical	24.24 %	9 %	12 %
Thoracic	12.12 %	27 %	24 %

**Table 21:** Mortality

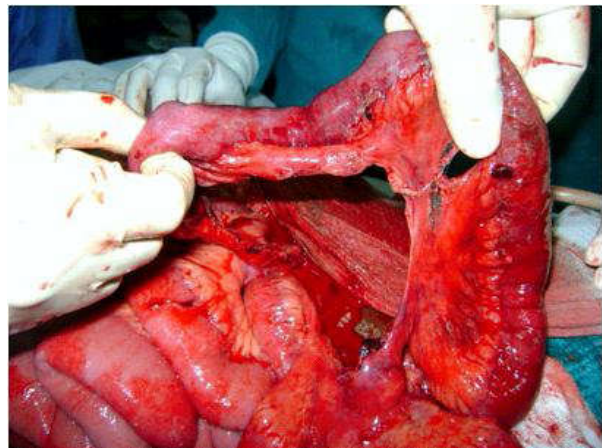
Mortality	Present study	Khanna et al	Davis et al	Di vincenti et al	Cox et al
	27.08 %	14 %	13.3 %	23 %	10 %

**Table 22:** Mortality In Relation To Ventilatory Support

Ventilatory Support	No of patients	Mortality	Percentage
<2 days	13	2	4.16 %
>2days	6	3	6.25 %



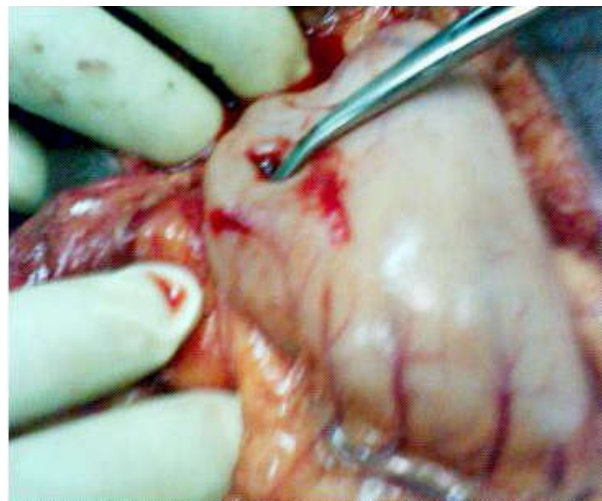
**Fig. 1:** Ant.abdominal injury without organ injury



**Fig. 3:** Mesentry with bowel injury



**Fig. 2:** Mesentery injury



**Fig. 4:** Stomach injury

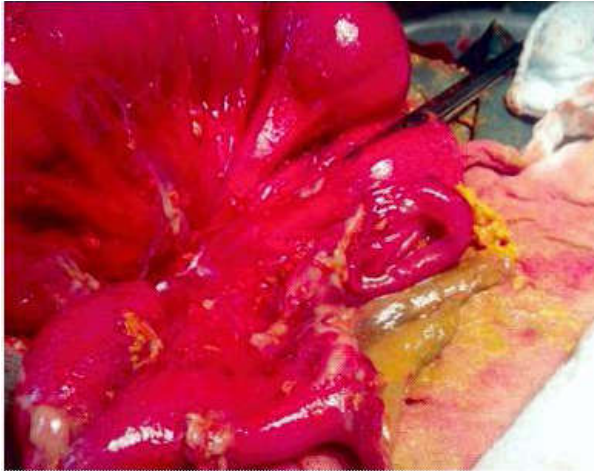


Fig. 5: Complete transaction of intestine

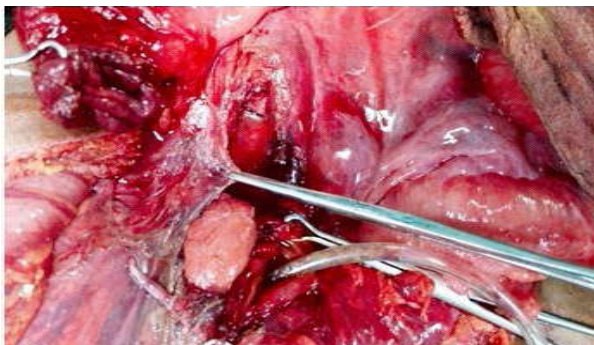


Fig. 6: Duodenum with transverse colon injury

was also proved statistically significant with a 'p' value of <0.001.

In our study it is found that mortality is high in patients who are on prolonged ventilatory support for more than two days (50%), as compared to those patients who were on ventilatory support or weaned from ventilatory support within two days (15.38%). This is due to the development of septicemia as evidenced by persistent hypotension, tachycardia, tachypnea and hyperthermia leading to ARDS, SIRS (Systemic Inflammatory Response Syndrome), MODS (Multi Organ Dysfunction Syndrome) and eventually death.

## Conclusion

From the study conducted on traumatic hollow viscus injuries in Government Medical college Hospital Thiruvannamalai tertiary trauma care centre we have come to the following conclusions. Traumatic hollow viscus injuries are quiet common when compared to solid organ injuries. The most commonly affected group are the economically productive age group people .There is a definite male preponderance

in our study. The most common etiology for the hollow viscus injuries in our setup is the Road traffic accident (RTA).

Since pre operative diagnosis is infrequently done in our study hollow viscus injuries are generally recognized late and hence have a poor prognosis compared to solid organ injuries. Most of the hollow viscus injuries are recognized mainly during exploratory laparotomy only. Small intestine particularly the ileum is the most common hollow viscus to be affected. Since isolated ileal perforation is the most common encountered lesion simple debridement of wound edges followed primary closure of the wound carries a good prognosis in both recovery as well as mortality. Mortality was more or less equal to other studies. The commonest cause of death is associated polytrauma, followed by septicemia owing to delayed referral to our hospital due to the subtle clinical signs seen in these patients or due to misdiagnosis, severe unstable haemodynamic status at the time of presentation leading to delay in surgery for correcting the heamodynamic status, respiratory infections in ventilator support patients, SIRS (Systemic Inflammatory Response Syndrome) leading to MODS (Multi Organ Dysfunction Syndrome) and eventually death.

To reduce the mortality, the recent concept of damage control surgery has to to be stressed strongly whose feasibility and the effectiveness in our setup has to be studied further. So, we conclude that with early diagnosis, timely reference, early surgical intervention and intensive post operative care we can definitely save the life of these trauma patients with these relatively rare injuries.

Adequate knowledge regarding suspecting intra abdominal injuries and timely reference to a tertiary trauma care centre can definitely bring a marked difference in the prognosis of these patients.

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