

## Efficacy of Revised Trauma Score in Assessing Severity in Blunt Injury Abdomen

<sup>1</sup>Dr Sivaraja P.K., <sup>2</sup>Dr Prassanna Venkatesh.G, <sup>3</sup>Dr Venu S, <sup>4</sup>Dr Meghana Perla

Sri Ramchandra Institute of Higher Education and Research, Chennai, Tamil Nadu

**Corresponding Author:** Dr Sivaraja P.K., Sri Ramchandra Institute of Higher Education and Research, Chennai, Tamil Nadu

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### Introduction

Motor vehicle accidents are the commonest causes of blunt injury abdomen. Blunt injury abdomen poses a great challenge to the surgeon. Not only does the surgeon have to manage this sometimes perplexing injury, but also has to decide his priorities in dealing with associated injuries to other areas of the body. Due to inadequate treatment of the abdominal injuries, most of the cases are fatal<sup>1</sup>.

India has one of the highest accident rates in the world. More than 70% of our population dwells in villages where very few trauma care centers are available. Thus, the care of abdominal injury patients is far from satisfactory. As abdominal injuries are mainly seen in young and economically productive individuals, we need to develop effective trauma care and save many innocent lives<sup>2,3</sup>.

An accurate method for quantitatively summarizing injury severity has many potential applications. The ability to predict outcome from trauma (ie, mortality) is perhaps the most fundamental use of injury severity scoring, a use that arises from the patient's and the family's desires to know the prognosis.

The Revised Trauma Score (RTS) is one of the more common physiologic scores. It uses 3 specific physiologic parameters Glasgow Coma Scale (GCS), systolic blood pressure (SBP), and respiratory rate (RR). The magnitude of physiologic derangement in each parameter is scored from 0-4. The RTS has 2 forms

depending on its use. When used for field triage, the RTS is determined by adding each of the coded values together. Thus, the RTS ranges from 0-12 and is easily calculated and can be used to assess the severity of the blunt injury abdomen<sup>4</sup>.

### Aims and Objectives of the Study

- To analyze the severity of blunt injury using a scoring system – Revised Trauma Score (RTS)
- To correlate the overall outcome with RTS.

### Materials and Methods

This study is a prospective study of non-penetrating abdominal injuries during the period from April 2016 to August 2019 in Sri Ramachandra Medical Center.

Data were collected from the patients by their clinical history, clinical examination with appropriate investigations on those patients who were admitted.

Revised Trauma Score was calculated based on systolic blood pressure, respiratory rate and GCS. After initial resuscitation of the trauma victims, a careful history was taken to document any associated medical problem. Routine blood and urine tests were carried out in all the patients. Documentation of patients, which included, identification, history, clinical findings, diagnostic tests, operative findings, operative procedures, were all recorded on a proforma specially prepared. Demographic data collected included the age, sex, and nature of accident leading to the injury.

The Revised Trauma Score (RTS) is one of the more common physiologic scores. It uses 3 specific physiologic parameters, as follows:

- (1) Glasgow Coma Scale (GCS)
- (2) Systolic blood pressure (SBP)
- (3) Respiratory rate (RR).

The magnitude of physiologic derangement in each parameter is scored from 0-4. Thus, the RTS ranges from 0-12 and is easily calculated.

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

The decision for operative or non-operative management depended on the outcome of the clinical examination and results of diagnostic tests. Patients selected for non-operative or conservative management were placed on strict bed rest, were subjected to serial clinical examination which included hourly pulse rate, blood pressure, respiratory rate and repeated examination of abdomen and other systems. Appropriate diagnostic tests especially ultrasound of abdomen was repeated as and when required.

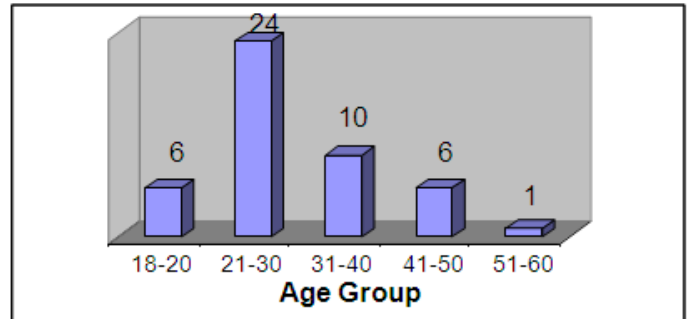
### Results

A total of 47 patients were included in the study.

#### Age Incidence

Age Group	Number of Trauma Cases
18-20	6
21-30	24

31-40	10
41-50	6
51-60	1

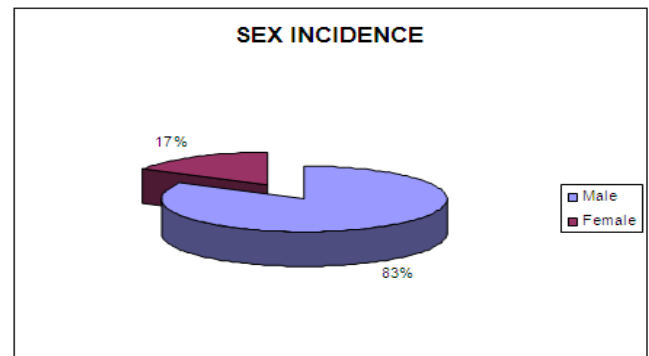


The maximum incidence of blunt injury abdomen in our study was in the age group 21-30, which was 51.06%.

#### Sex Incidence

Sex	Number of Trauma Cases
Male	39
Female	8

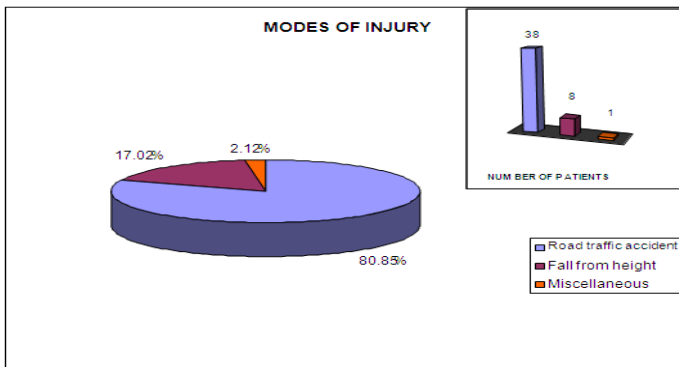
Sex Distribution



In our study out of 47 cases Incidence was more among male patients – 82.97%.

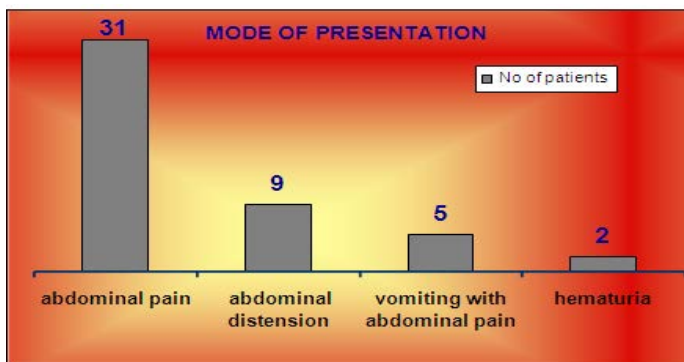
#### Modes of Injury

Causative Agent	Number of Patients
Road traffic accident	38 (80.8%)
Fall from height	8 (17.02%)
Miscellaneous	1



In our study out of 47 cases Road Traffic Accident was the most common mode of injury (80.8%)

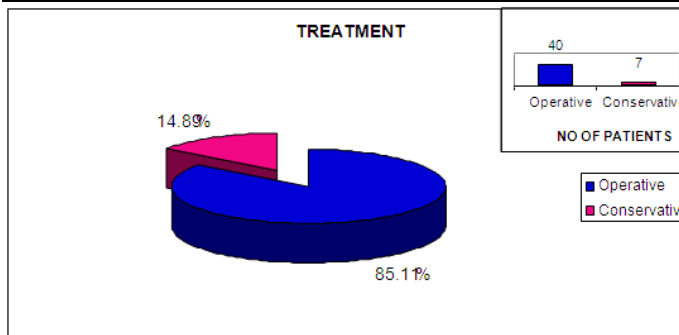
### Presenting Complaints



In our study majority of the patients presented with abdominal pain (63.8%)

### Treatment

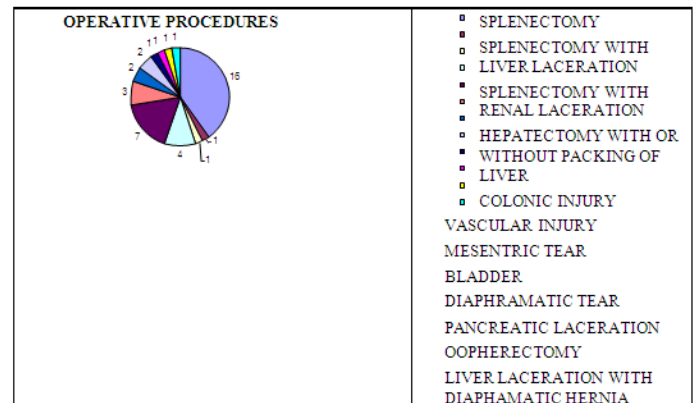
Treatment	No Of Patients
Operative	40
Conservative	7



In our study out of 47 cases 40 cases underwent operative procedures whereas 7 patients were managed conservatively.

### Operative Procedures

Organs Involved	No of Patients
Splenectomy	16
Splenectomy with liver laceration	1
Splenectomy with renal laceration	1
Hepatectomy with or without packing of liver	4
Colonic injury	7
Vascular injury	3
Mesentric tear	2
Bladder	2
Diaphragmatic tear	1
Pancreatic laceration	1
Oophorectomy	1
Liver laceration with diaphragmatic hernia	1

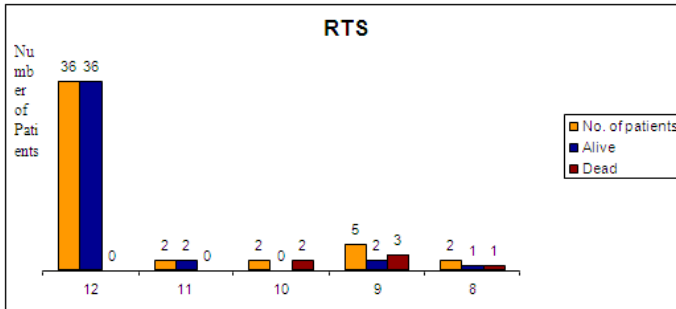


In our study out of 47 patients, most common procedure performed was Splenectomy (38.2%) followed by surgeries for colonic perforation and abdominal vascular injuries

### Revised Trauma Score

RTS	No. of Patients	Alive	Dead
12	36	36	0
11	2	2	0

10	2	0	2
9	5	2	3
8	2	1	1
<b>Total</b>	<b>47</b>	<b>41</b>	<b>6</b>



- In our study out of 47 patients 36 patients were found to have a RTS of 12, 2 patients with RTS of 11, 2 patients with RTS of 10, 5 patients with RTS of 9, 2 patients with RTS of 8.
- Patients with a RTS of 10 and above were found to have good outcome whereas patients with score of less than 10 were found have increased mortality

**Discussion**

**Age incidence**

The following table compares the incidence of blunt injury abdomen in various age groups in the present series to that of the Davis et al

Age Group (Yrs)	Present Series	Davis Et Al
18- 20	13%	19%
21-30	51%	24%
31-40	22%	15%
41-50	13%	13%
51-60	3%	6%

It can be seen from the above table that the majority of patients belonged to 21-30 years of age group, followed by 31-40 years age group. In Davis et al<sup>15</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 non-penetrating abdominal trauma.

**Sex incidence**

Gender	Present Series	Davis Et Al
Male	83%	70%
Female	17%	30%

From the above table, it can be seen that the males are the more common victims of non-penetrating abdominal trauma. When compared to other studies the incidence of males is much more than those of the females.

**Mode of injury**

Causative Agent	Present study	Davis et Al	Khanna et Al(1992-97)
Road traffic accident	78.7%	70%	57%
Fall from height	17.02%	6%	15%
Miscellaneous	2.12%	17%	33%

The above table clearly depicts that the road traffic accident is the most common mode of injury. 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.

**Ratio of Operative to Conservative Management:**

Treatment	Present study	Davis et Al	Khanna et Al (1992-97)
Operative	85.11%	77%	58%
Conservative	14.89%	23%	42%

The above table shows that there is an increasing trend towards conservative management; Davis et al<sup>15</sup> showed 23% and Khanna et al<sup>37</sup> showed that 43% of patients were subjected for conservative management. Non operative management is gaining increasing acceptance mainly because of the easy availability of better imaging modalities like Ultrasound and CT scan. With the aid of

CT scan it is possible to accurately grade the extent of injury to solid organs like liver and spleen. Minor lacerations and capsular tears, difficult to diagnose clinically can be easily demonstrated by CT scan and selected for non operative management.

The disadvantages of non operative management are those of missed injuries and delayed treatment resulting in excessive morbidity and even mortality.

The revised trauma score was found to be a reliable predictor of prognosis of polytraumatized patients but a potentially weak predictor for those patients having severe injury involving a single anatomical region.

The higher the RTS, the better was the prognosis of polytrauma patient and vice versa.

In a study by Hafiz Naweed Ahmad et al found that **Revised Trauma Score** < 8 turned out to be an indicator of severe injury with high mortality and morbidity and overall mortality in polytrauma patients was 26.66%. , RTS-6 was associated with 50% mortality. In a similar study done by Jin-fen and Shao Ju-fen<sup>40</sup> in 2003 patients with an RTS less than 6 had serious injury, those with 6 to 7 had severe injury.

An RTS of 8 to 10 indicated moderate injury, while RTS of 11 to 12 indicated slight injury. However in the present study the lowest RTS noted was 8, which in itself was associated with a mortality of close to 50%. In comparison, the overall mortality was 12.76%.

### Conclusions

- Road traffic accidents form the most common mode of injury.
- Males are predominantly affected.
- Age incidence of 51.06% was seen in the age group of 21-30.
- An RTS score of 11 and above was suggestive that the patient's survival chance was good.

- Even when the line of management of the patient tended towards conservative treatment, patients with an RTS score of 11 and above did well ( seen in 7/47 patients)
- The present study shows a mortality of 12%.
- An RTS score less than 10 was more detrimental to patient outcome.
- The drawback of this scoring system was that it could not be logically used in head injuries and in patients with an altered state of consciousness like alcohol intoxication. However RTS is useful in distinguishing the potentially fatal trauma from all kinds of injury and help them to be treated preferentially. It is a useful tool to estimate the survival of the patients.
- With RTS , not only patients with severe trauma could be treated preferentially, but also patients with slight wound could be selected efficiently
- RTS helps to utilize the emergency resource and lessen burden of the patients

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