Road traffic accident (RTA) was the most common cause (78.18%), mostly involving pedestrians or two wheeler riders, followed by fall from from height(7.2%)(Table no.2).

Table 3: Associated Injury

	Associated injury.	No. of patients. %
1	Head injury:	07(12.7%)
2	Chest injury(Ribs)	18(32.72%)
3	Spine injury	02(3.63%)
4	bone fracture(Long& short):	22(40%)
5	Fracture of pelvis:	11(20%)

Bony injury was the most common associated extra-abdominal injury (40%) followed by chest injury (32.7%), pelvis injury and head injury (12.7%) (Table no.3).

Table 4: Clinical Presentation

	Signs and Symptoms:-	No. of patients. N-55%
1	Chest pain	20(36.3%)
2	Abdominal pain:	43(78.1%)
3	Abdominal distension:	09(16.6%)
4	Signs of Peritoneal irritation (guarding, rigidity, rebound tenderness):	20(36.36%)
5	Shock	20(36.3%)

The most common symptom of BAT was abdominal pain (78.1%) Surprisingly, a sizeable proportion of cases presented with predominant chest complaints (36.1%). Some of the patients presented with non-specific / minimal abdominal complaints

Abdominal tenderness and guarding were the most common signs (36%) of BAT and36.3% had hypotension on admission (Table no.4).

Table 5: Diagnostic Aids Used

	Diagnostic aids used	No. of patients. %
1)	Paracentesis:(DPC)	29(52.7%)
2)	Peritoneal lavage:	2(3.6%)
3)	Plain x-ray:	43(78.1%)
4)	IVP & urethrography:	2(3.6%)
5)	Angiography:	0
6)	USG:	46(83.6%)
7)	CT Scan:	12(21.8%)

Correlation of 4-Quadrant Diagnostic Paracentesis results with USG & Laprotomy findings (N-55)

Result	*No. of cases*	*Documented visceral injury*	
		present	*absent*
Positive	29	24	5
Negative	26	4	22
Total	55	28	27

X-ray and USG were the most common investigation followed by DPC and CT scan (Table no. 6). Abdominal X-ray was inconclusive in 64% of cases, but accurately diagnosed 5 cases of hollow visceral injury. Four-quadrant DPC had a sensitivity of 85%, specificity of 81% and diagnostic accuracy of 90%, in detecting hemoperitoneum Abdominal USG was 100% accurate and specific in diagnosing abdominal SVI with a sensitivity of 89%, when correlated with laparotomy findings. However, it was inconclusive in 28% cases of BAT. It was most sensitive for renal injuries (100%) and least so for hollow visceral injury (33%). Average organ-specific sensitivity of abdominal USG was 80%

Based on the aforementioned criteria for surgical triage, 35 patients (63.6%) were initially chosen for non-operative management with 3 (8.5%) failures (converted to laparotomy). 56% patients were ultimately subjected to laparotomy.

Most common indication for surgery was positive results of diagnostic aids followed by hypovolemic shock and clinical signs of peritoneal irritation (Table No.6).

Table 6: Indication for surgery

	Clinical features	No. of patients.
1	Hypovolumic shock:	20(58.8%)
2	Signs of peritoneal irritation:	20(58.8%)
3	Positive results of diagnostic aids:	26(76.4%)

Right paramedian incision (44.1%) was used most commonly. Midline incision was used in 35.2% cases.

Table 7: Distribution of injuries to various abdominal viscera

	Organ	No. of cases. %
1	Liver	11(20%)
2	Spleen	15(27.2%)
3	Small intestine(Jejunum-8, Ileum-6)	14(25.4%)
4	Stomach	3(5.4%)
5	Large bowel	6(10.9%)
6	Urinary bladder	6(10.9%)
7	Kidney	5(9.09%)
8	Mesentery	8(14.5%)
9	Pancreas	4(7.2%)
10	Urethra	2(3.63%)
11	Retroperitoneal haematoma	10(18.18%)
12	Rectum & Anal canal	2(3.63%)
13	Diaphragm	2(3.63%)
14	Vascular injury	3(5.45%)
15	Abdominal wall	2(3.63%)

Overall, the Spleen was the most frequently injured solid organ (27.2%) in BAT followed by Liver (20%), kidney (9%) and pancreas (7.2%) (Table no.7).

Grade III injuries predominated at laparotomy (38.7%), with the proportion of major injuries (Grade III) higher for spleen (78%) than for liver (65%). Concomitant hollow visceral injury was present 25.4% in BAT (4%). Electrocautery and surgicel pack were the most common haemostatic methods employed, especially for minor (Grade II) injuries.

Table 8: Complication

	Post-operative complication:- **Some patients with multiple Complication**	No. of patients%.
1	Shock:	3(8.8%)
2	Primary haemorrhage:	1(2.9%)
3	Anastomotic leak:	1(2.9%)
4	Secondary haemorrhage	2(5.8%)
5	Wound dehiscence:	2(5.8%)
6	Burst abdomen:	1(2.9%)
7	Wound infection:	10(29.4%)
8	Abscess: Abdominal or Pelvic:	3(8.82%)
9	Relaparotomy:	2(5.8%)

Sr. No.	Complications in admitted blunt abdominal trauma cases.	No.of Patient .N-55%
1	Jaundice	8(14.54%)
2	D.I.C	5(9.09%)
3	Haemothorax	20(36.36%)
4	Septicaemia	7(12.7%)
5	ARDS	4(7.27%)
6	Pancreatitis	1(1.81%)
7	CNS Complication	3(5.45%)
8	ARF	2(3.6%)
9	Diabetic Ketoacidosis	1(1.81%)

Infection prevailed as the most common cause of postoperative morbidity (29.4%), predominantly wound and abdominal infections. Other complications were primary and secondary haemorrhage, septicaemia, fistula formation, wound dehiscence and burst abdomen (Table no.8).

The total number of patients developing various complications in the non-operative group was 10, with a morbidity rate of 20%. This included failure of non-operative management: due to uncontrolled secondary haemorrhage (2 cases), and delayed splenic rupture (1 case). Other complications were due to intra-abdominal or chest infections. Most common complication due to associated injury was haemothorax, followed by jaundice. Other complications include septicaemia, ARDS, ARF, Diabetic ketoacidosis, CNS complications and pancreatitis (Table no.8).

Mortality was 17.9% in the operative group and 19.4% in the non-operative group with an overall mortality of 18.18% from BAT. All deaths in the non-operative group were due to associated cranio-cerebral and ploytrauma, whereas haemorrhagic shock, septicaemia, uraemia and postoperative complications equally contributed to the deaths in the operative group.

The average number of blood transfusions received by patients in the operative group was 5.8 units and for those in the non-operative group, it was 6.27 units. Average 7 units of blood transfusion were given in this study. 18.18% of patients do not have blood transfusion. The average duration of hospital stay was 15 days for the non-operative group and 21 days for the operative group. The average duration of hospital stay in BAT was 30.4 days for the polytrauma patients.

5. Discussion

This study reflects poor road condition and lack of transport facility with inadequate primary resuscitation in India. Gupta S [(2)] and Mohapatra et al [(3)] in their study had predominantly male population with male: female ratio of 7:1 and maximum population in 21 yrs-30 yrs of age. Fitzgerald Mark et al [(4)] observed mean age of 31.8 yrs in his Indian road crashes studies. The present study also showed the maximum incidence in the same decade. This is because they form the major proportion of the population who had active participation in society and traveling makes them more prone to accidents.

Deodhar SD[(5)] in their study had 60% & 85 % of trauma cases are because of road traffic accidents. In various studies About 2/3rd of trauma cases are because of RTA.

In this study pre-hospital patient care was almost nil due to lack of trained paramedical workers and lack of basic knowledge of resuscitation in society, also there was lack of transportation which caused delay in shifting the patients to our hospital. Some of the patient received preliminary aid in the form of I.V. fluids and Antibiotics at primary health centers and private clinics.

In Fitzgerald Mark et al [(4)] study 30% of deaths in RTA patients in India are before they reach a hospital. It is known that the first hour after injury is critical to both the survival of the injured and their injury outcome.

A Mumbai study by Murlidhar V et al [(6)] observed. Head injury (76%) as most common associated injury with severe injuries accounting for 47% of all patients. Severe thoracic and abdominal injuries were 0.6% and 8.2% of all the thoracic and abdominal injuries, respectively. This again indicates the need for compulsory use of helmet and seat belts while driving. Due to high rate of associated injuries a high index of suspicion is therefore of utmost importance in diagnosing an intra-abdominal injury especially in patient with polytrauma and in patients with altered sensorium.

Repeated clinical assessment and high index of suspicious for abdominal injury in polytrauma patients is very important for better outcome in terms of mortality and morbidity. In patient of polytrauma, development of shock after initial resuscitation clearly indicates a slow but continuous intra-abdominal bleeding

The most common presentation was abdominal pain (78 %) followed by signs of peritoneal irritation and abdominal distension. sizeable amount of patients had predominant chest symptoms. Joe Jack Davis[(7)] observed generalized abdominal tenderness and abdominal guarding the most frequent physical findings, both signs being present in more than 75% of all patients. Rebound tenderness and abdominal rigidity were present in 28% of patients. 43% of the total patient population had no specific complaints and no signs or symptoms of intra-abdominal injury when they were first seen in the emergency room.
DiVincenti et al [(8)] stressed to carry out abdominal paracentesis in all cases which present with diagnostic problems. In 52% cases we are able to diagnose the intra-abdominal injuries with paracentesis. Gupta S et al [(9)] series abdominal paracentesis revealed haemoperitoneum in 63% cases which was subsequently confirmed on laparotomy in all the cases. The sensitivity, specificity and accuracy of diagnostic paracentesis in detecting hemoperitoneum, was 82%, 86% and 90% respectively in study Mohapatra et al [(3)] .

Diagnostic peritoneal lavage however has not been popularly followed in our study due to the easy and rapid access to the ultrasound and CT scan which are non invasive. Four quadrant abdominal paracentesis is easy and bedside method for detection of intra-peritoneal bleed. The

accuracy of DPL has been reported between 92% and 98 % by Smith SB et al [10].

Ultrasonography was done in all our patients on admission with suspected BAT. It allows detection of free fluid, solid organ injury, retroperitoneal space assessment, bladder and kidney in noninvasive manner. Also it is free from radiation exposure and results are available in minutes. Patients with free fluid in abdomen had injury which was detected on CT scan. Patients with only free fluid on USG should therefore undergo CT scan abdomen to rule out organ injury. However USG is technician dependent and results can vary. It was 100% accurate in detecting free fluid in abdomen.

Rozycki et al [11] studied 1540 patients and reported that ultrasound was the most sensitive and specific modality for the evaluation of hypotensive patients with BAT (sensitivity and specificity, 100%). He suggested use of bedside ultrasonography by trauma surgeons to detect haemoperitoneum.The advantages of the FAST examination have been clearly established. FAST is noninvasive, may be easily performed and can be done concurrently with resuscitation. In addition, the technology is portable and may be easily repeated if necessary. In most cases, FAST may be completed within 3 or 4 minutes.

CT Scan was done primarily for the purpose of confirmation of the ultrasonography findings and to detect those lesions missed on the USG, CT Scan permits identification of abnormalities as small as 1 cm and is very sensitive in detecting both inhomogenicity within solid organs and free intra-peritoneal fluid which helps in deciding whether to treat a patient operatively or conservatively. This clearly depicts the role of computerized tomography in the non operative management of blunt abdominal trauma. However CT scan is not without its drawbacks like Radiation exposure, Economic restraints, time consuming (without spiral CT) and May miss bowel injury. However diagnostic laparoscopy is being used with excellent results in several centers around the world. [Berci G et al in [12], Gordie K. et al [13]]

There are number of injuries which are not identified and missed by laparoscopy. The incidence of missed injuries in their study was 16% which involved the liver, pancreas, small bowel mesentery, ureter and urinary bladder. There are areas within the abdominal cavity that cannot be accurately visualized with laparoscopy e.g. retro peritoneum. 20.68% of patients were subjected to non-therapeutic laparotomies in Alli N. et al [14] series, when this is compared to present study it tells about importance of imaging modalities, like CT scan.

J.David Richardson [15] reported the occurrence of major hepatic injuries ranging from 15% to 12%. Omental flaps were rarely used before the mid-1980s but were used in approximately 10% of patients treated since then. In the late 1970s, there were virtually no patients treated by packing and planned reoperation. In the latter periods, 8% of patients were treated by packing and planned reoperation as a part of a “damage control” strategy. In present study liver packing was used in one patient, pack was removed after 24 hours.

Gupta SS et al [16] described as Simple hepatorrhaphy and use of topical haemostatic agents, the only modes of treatment for 72% cases, hepato-omentorrhaphy was used in 11.4% cases and hepatotomy with selective vascular ligation and resectional debridement were carried out in remaining 16.19% cases. Mortality was 36.2% (38/105), 78.14% patients died of shock in the perioperative period. There was a marked decline in death rates during the 25-year period. Total death rates declined from 19% to 9% as reported by J. David Richardson [15]

In Marmorale C et al [17] study the overall success rate of non-operative management was 98.5%, with individual success rate 96.3% for spleen, 96.9% for liver and 100% for pancrease.

Upadhaya and Simpson’s [18] pioneered non-operative management for selected cases of splenic injury in children at Toronto hospital. While in other study 52% of multiple traumatized patients with blunt splenic, 75% with liver and 26% with combined spleen and liver injuries were successfully managed nonoperatively[19].In Peitzman AB et al [20] study 10.8% cases failed conservative management and required laparotomy. In the present study there was no significant difference between operative & nonoperative group. **(P>0.05)**

Bala M et al [21] concluded that the need for blood transfusion was a strong predictor for splenectomy. In literature complication of NOM includes delayed haemorrhage (4-8 days) in 1.7% cases, splenic abscess in 0.7% cases and missed intra-abdominal injury in 1% cases.

McAninch and Federle et al [22] demonstrated the usefulness of computerized tomography in differentiating minor from major renal injuries. All the patients underwent CT scan in present study. Nash et al [23] examined the reasons for nephrectomy in cases of renal injuries and found that 23% required nephrectomy in otherwise reconstructable kidneys because of intraoperative haemodynamic instability. The rate of Nephrectomy was lower with expectant management than after an immediate operation. The overall incidence of pancreatic injury has been estimated to be 1% to 2% in patients with blunt or penetrating trauma and can be as high as 3% to 12% in patients with other intra-abdominal injuries. Pancreatic injuries have a prevalence of 0.4 per 100,000 hospital admissions, and two thirds of these cases are from penetrating pancreatic injuries. Overall mortality was 14 %[24].

Diaphragmatic injury affected predominantly males (male: female = 4:1) in the third decade of life, and is often caused by blunt trauma (75%) The mortality was 17% in those in whom acute diagnosis was made. 89% of patients with this injury have an associated intra-abdominal injury [25]. In present study both patients were male had left sided rupture but Pantelis D et al [26] found right sided rupture more common in contrast to all other studies.

The frequency of isolated SBI in blunt abdominal trauma reported in the literature ranges from 31.4% to 59%. Robb’s et al [27] observed that multiple injuries carried a mortality rate of 57.8%, which was significantly greater than the

21.2% that attended isolated jejunal perforations, and that the mortality was significantly higher in patients not treated within 24 h of injury. The mortality rate in present study with associated injury is comparable with isolated jejunal perforation mortality in above study.
Fang et al [28] observed that a delay in surgery of more than 24 h after the injury in patients with perforated SBI did not significantly increase mortality, but was associated with a dramatic increase in the incidence of complications. We had same observation in present study. Malhotra AK et al [29] concluded that helical scanners have high accuracy in detecting Blunt bowel & mesenteric injuries. Single versus multiple findings are useful in managing these injuries. Even relatively brief delays (as little as 8 hours) result in increased morbidity and mortality [30]. Shebrain S [31] review indicates that a delay in the diagnosis of mesenteric injuries results in significantly increased morbidity and hospital and intensive care unit lengths of stay.

There was 25% incidence of intra-peritoneal bladder rupture [32]. All the patients with bladder contusion & haematoma were having haematuria (micro & mild degree). In this study all the urethral injuries were in the membraneous urethra.18% cases had retroperitoneal haematoma. All these haematomas have significant association with pelvic fractures. **($p<0.001$).** This association was observed in many studies [32].

Morbidity is slightly higher in the present study because of prolonged delay in admission & more number of associated injuries resulting in prolonged hospital stay.

Mohapatra et al [3] reported average duration of hospital stay 7.8 days for the non-operative group and 10.4 days for the operative group. Longer duration in present study was due to polytrauma (Long bone & Pelvic fractures), pre-hospital delay in transportation of patient, reluctance by outstation patients to go home because of inconveniences to follow up regularly.

The median length of stay in hospital was significantly higher in the operative group than in the nonoperative group (21 days v. 14 days ($p < 0.001$) respectively.

In Mohapatra[3] study the average number of blood transfusions received by patients in the non-operative and operative groups were 0.5 and 3.0 respectively. But in present study more number of transfusion were given due to prolonged delay in hospital admission, polytrauma, like long bone fractures and maximum number of cases presented with shock. There was 18.18% overall mortality. Operative group has 17.9% mortality and nonoperative group has 19.4% mortality. This mortality rate is comparable to similar reviews from literature [3].

6. Conclusion

Road traffic accident and automobile accident have been responsible for most of the cases of blunt abdominal trauma. Men in age group of 20-40 years are found to be mainly affected as they form the majority of the working population who are exposed to accident during travel or at place of work. This age group should have compulsory awareness programmes by government and NGO organization. Strict quality control should be in place regarding health of vehicles.

It is seen that there is a delay in bringing the patient to the hospital and there is lack of pre-hospital care to the trauma patients. It is important to realize the importance of the golden hours in the management of patients with trauma.

Management of BAT requires high degree of motivation, Team work by Surgeon, Intesivest & physician. Such a team work in this rural place will help to reduce the mortality in RTA patients as proved by this study.
For decreasing the morbidity and mortality of trauma patients there should be-

1. Proper pre-hospital resuscitation by trained paramedical persons so as to avoid haemodynamic instability.
2. Improved transport systems should be available so that patients can be transported as early as possible
3. Road conditions should be improved along with strict traffic rules.
4. More specialized trauma centers with availability of general surgeons trained in handling trauma patients, orthopaedicians, radiologists and trauma trained nursing staff.
5. Availability of good helical CT scan, portable x-ray and ultrasound machine.
6. Good blood bank facility.

Proper patient selection aided by good imaging technique has led to successful conservative management of the patients with blunt abdominal trauma. Non operative treatment avoids unnecessary surgical stress on the patient and thus reduces the morbidity and the hospital stay. Road trauma in India is a significant social burden which requires urgent attention. There is need for development of appropriate training and India-specific education schemes, such as the Primary Trauma Care course, Public training of first aid and public awareness, mandatory seat-belt , compulsory helmets, random alcohol breath testing, speed cameras, Transport facility for trauma victims by trained paramedical staff and more specialized trauma centers.

References

[1] **William Haddon** (Jr. first director of national highway traffic safety Administration) Schwartz's principles of surgery, 8th edition: Trauma chapter-6 John M Burch E. Moore page-129
[2] ***Gupta* S**, *Talwar* S, *Sharma* RK, *Gupta* P, *Goyal* A, *Prasad* P: Blunt trauma abdomen : a study of 63 cases; Year : 1996 | Volume : 50 | Issue : 8 | Page : 272-6.
[3] **Mohapatra Srikant**, Pattanayak Siba Prashad, Rao K. Raja Ram Mohan, *Bastia* Balakrishna: Options in the management of solid visceral injuries from blunt abdominal trauma. Indian J of surgery; Year : 2003 | Volume : 65 | Issue : 3 | Page : 263-268.
[4] **Fitzgerald Mark,** Dewan Yashbir, O'Reilly Gerard, Mathew Joseph, McKenna Carmel: India and the management of road crashes: Towards a national trauma system; Indian J of surgery; Year : 2006 | Volume : 68 | Issue : 4 | Page : 226-232.
[5] **Deodhar SD**, Patel NP, Shah KB, Jammihal HJ: Blunt and penetrating abdominal injuries (a study of 51 cases).; J. of

postgraduate medicine; Year : 1983 | Volume : 29 | Issue : 2 | Page : 96-9

[6] **Murlidhar V**, Roy N. Measuring trauma outcomes in India: An analysis based on TRISS methodology in a Mumbai university hospital. Injury 2004; 35:386-90.

[7] **Joe Jack Davis**, M.D., Isidore Cohn, JR., M.D., Francis C. Nance, M.D. Diagnosis and Management of Blunt Abdominal Trauma; Ann. Surg. o June 1976 Vol. 183 No. 6; 672-77.

[8] **DiVincenti,** F. C., Rives, J. D., Laborde, E. J., et al.: Blunt Abdominal Trauma. J. Trauma, 1968, 8:1004.

[9] ***Gupta* S**, *Talwar* S, *Sharma* RK, *Gupta* P, *Goyal* A, *Prasad* P: Blunt trauma abdomen : a study of 63 cases; Year : 1996 | Volume : 50 | Issue : 8 | Page : 272-6.

[10] **Smith SB,** Andersen CA: Abdominal trauma: the limited role of peritoneal lavage. *Am Surg*1982, 48: 514-517.

[11] **Rozycki GS,** Ochsner MG, Schmidt JA, et al: A prospective study of surgeon performed ultrasound as the primary adjuvant modality for injured patient assessment. *J Trauma,* 1998 39: 492-500, 1995.

[12] **Berci G**, Sackier JM, Paz-Partlow M: Emergency laparoscopy. *Am J Surg,* 1991 161: 332- 335.

[13] **Gordie K. Kaban:** Use of Laparoscopy in Evaluation and Treatment of Penetrating and Blunt Abdominal Injuries; Surgical Innovation, 2008 Vol. 15, No. 1, 26-31.

[14] **Alli N**.: Management of blunt abdominal trauma in Maiduguri: a retrospective study; Niger J Med. 2005 Jan-Mar; 14(1):17-22.

[15] **J. David Richardson**, Glen A. Franklin, , James K. Lukan, , Eddy H. Carrillo, David A. Spain, . Evolution in the Management of Hepatic Trauma: A 25-Year Perspective. Ann Surg. 2000 September; 232(3): 324–330.

[16] **Gupta SS,** Ahluwalia SM, Anantharam PP :Liver trauma (management in 105 consecutive cases).; Indian J of surgery; Year : 1990 | Volume : 36 | Issue : 3 | Page : 131-5.

[17] **Marmorale C**, Guercioni G, Siquini W, Asselhab S, Stortoni P, Fianchini M, Fianchini A, Landi E.: Non-operative management of blunt abdominal injuries]; Chir Ital. 2007 Jan-Feb;59(1):1-15.

[18] **Upadhyaya P**, Simpson JS. Splenic trauma in children. Surg Gynecol Obstet. 1968 Apr; 126(4):781–790.

[19] **Kirshtein Boris,** Roy-Shapira Aviel, Lantsberg Leonid, Laufer Lie, Shaked Gad, Mizrahi Solly. Nonoperative management of blunt splenic and liver injuries in adult polytrauma: Indian J. of surgery; Year : 2007 | Volume : 69 | Issue : 1 | Page : 9-13.

[20] **Peitzman AB**, Heil B, Rivera L,Shapiro MB & associates:. Blunt splenic injury in adults: Multi-institutional Study of the Eastern Association for the Surgery of Trauma.; J Trauma. 2000 Aug;49(2):177-87; discussion 187-9.

[21] **Bala M, Edden Y**, Mintz Y, Kisselgoff D, Gercenstein I, Rivkind AI, Farugy M, Almogy G.: Blunt splenic trauma: predictors for successful non-operative management; Isr Med Assoc J. 2007 Dec;9(12):857-61.

[22] McAninch JW**, Federle MP. Evaluation of renal injuries with computed tomography. J Urol 1982; 128: 456-9. [PUBMED]**

[23] **Nash PA,** Bruce JE, McAninch JW. Nephrectomy for traumatic renal injuries. J Urol 1995: 153: 609-11.

[24] **J. Anane-Sefah**, L. W. Norton and B. Eiseman: Operative choice and technique following pancreatic injury; Archives of surgery Feb-1975; Vol. 110, No. 2.

[25] **Shah R,** Sabanathan S, Mearns AJ, Choudhury AK: Traumatic rupture of diaphragm. *Ann Thorac Surg* 1995, 60:1444.

[26] **Pantelis D**, Burger C, Hirner A, Wolff M.: Trauma mechanism and diagnosis of blunt diaphragmatic rupture; Chirurg. 2006 Apr;77(4):360-6

[27] **Robbs JV,** Moore SW, Pillay SP. Blunt abdominal trauma with jejunal injury: A review. J Trauma. 1980; 20(4):308-11.

[28] **Fang JF,** Chen RJ, Lin BC, Hsu YB, Kao JL, Kao YC, Chen MF. Small bowel perforation: is urgent surgery necessary? J Trauma. 1999; 47(3):515-20.

[29] **Malhotra AK**, Fabian TC, Katsis SB, Gavant ML, Croce MA.: Blunt bowel and mesenteric injuries: the role of screening computed tomography.; J Trauma 2000 Jun;48(6):991-998.

[30] **Fakhry SM,** Brownstein M, Watts DD, Baker CC, Oller D. Relatively short diagnostic delays (<8 hours) produce morbidity and mortality in blunt small bowel injury: an analysis of time to operative intervention in 198 patients from a multicenter experience. J Trauma. 2000; 48(3):408-15.

[31] **Shebrain S**, Zelada J, Lipsky AM, Putnam B.: Mesenteric injuries after blunt abdominal trauma: delay in diagnosis and increased morbidity; Am Surg. 2006 Oct;72(10):955-61.

[32] **Carroll PR**, McAninch JW: Major bladder trauma: Mechanisms of injury and a unified method of diagnosis and repair. 1984 J Urol, 132: 254-257.

Abbreviations

BAT- Blunt abdominal trauma**, CT-** Computed tomography**.**
MRI- Magnetic resonance imaging**, ICU-** Intensive care unit**.**
RTI- Road traffic injury**, TRISS-** Trauma resuscitation & injury severity score**.**
AAST- American Association for the Surgery of Trauma, NOM- Non operative management.
OPSI- Syndrome of overwhelming postsplectomy infection, **ISS-** Injury Severity Score,

SBI- Small bowel injury**, BBMI-** Blunt bowel & mesenteric injury.

DPL- Diagnostic peritoneal lavage, **FAST-** Focused Abdominal Sonography for Trauma.

Author Profiles

Dr. Nandkishor Sude has done his postgraduation from NBE New Delhi. He is presently working as assistant professor in department of General Surgery at MGM medical college Aurangabad.

Dr. Pravin Suryawanshi has done his post graduation from NBE New Delhi. He has special interest in Hepato-pancreatobiliary surgery. He is presently working as HOD and Professor in department of General Surgery at MGM medical college Aurangabad.