Journal of Cardiovascular Disease Research
ISSN: 0975-3583,0976-2833 VOL 15, ISSUE 9, 2024

ORIGINAL RESEARCH

Comprehensive Assessment of Therapeutic Approaches for Abdominal Traumatic Injuries: A Prospective Observational Study at Government Medical College Jammu

[1]Dr. Diksha Sharma, [2]Dr. Sanjay Sharma, [3] Dr. Priya Manhas, [4]Dr. Ananya Sharma, [5]Dr. Ekta Uniyal

[1]Senior Resident, Department of Surgery, Govt. Medical College, Jammu
[2]Associate Professor, Department of Surgery, Govt. Medical College, Jammu
[3,4,5]Post Graduate, Department of Surgery, Govt. Medical College, Jammu

Corresponding author:
Dr. Diksha Sharma
Senior Resident, Department of Surgery, Govt. Medical College, Jammu
Email ID: diksha1302.ds@gmail.com

Received Date : 26 July 2024 Accepted Date : 14 August 2024

Abstract
This study systematically evaluates therapeutic approaches for abdominal traumatic injuries, encompassing surgical and non-surgical interventions. It aims to contribute valuable insights for clinicians by examining the effectiveness and outcomes associated with various modalities. **Methods:** Conducted over one year at Government Medical College Jammu, a prospective observational study involved patients with a history of abdominal trauma. Inclusion criteria covered all ages, admission to surgical units, and clinical/radiological indications of hollow viscus injuries within the gastrointestinal tract. Exclusion criteria were established, emphasizing precise anatomical definitions for trauma management. **Results:** Data analysis revealed a predominance of male patients (82%) from rural areas (71%). Blunt trauma constituted 92% of cases. Various management strategies were employed based on factors such as clinical condition, injury severity, and anatomical location. Primary closure of perforation was the most prevalent approach (39%), with other strategies including omental patch closure, resection and anastomosis, loop ileostomy, and colostomy. Complications occurred in a minority of cases, including wound infection (12%), sepsis (9%), burst abdomen (3%), stoma retraction (2%), and atelectasis (2%). **Conclusion:** This study provides valuable insights into the diverse therapeutic approaches for abdominal trauma, emphasizing the need for individualized management. The findings contribute to guiding clinicians in decision-making and optimizing patient outcomes.
Keywords: Abdominal Trauma, Therapeutic Approaches, Surgical Interventions, Non-surgical Interventions, Hollow Viscus Injuries

Introduction:

Abdominal trauma, frequently arising from vehicular accidents, falls, or penetrating injuries, persists as a paramount medical emergency carrying the potential for life-threatening ramifications.[1,2] Within this clinical landscape, injuries affecting the hollow viscera within the abdominal cavity present substantial challenges attributable to their intricate nature and the inherent complexity of associated complications. Trauma constitutes a predominant contributor to both mortality and morbidity in contemporary society, a consequence of advancements in industries and evolving human lifestyles. Among the injuries incurred, abdominal trauma ranks as the third most prevalent, following injuries to extremities and the head.[3] Motor vehicle accidents emerge as the leading cause of abdominal injuries. Notably, the majority of injuries, with the exception of abdominal injuries, manifest discernible symptoms early in their course. Conversely, blunt abdominal injuries, though initially asymptomatic, may progressively lead to adverse fetal outcomes over time.[4]This underscores the imperative for vigilance in monitoring and timely intervention. Furthermore, it is imperative to recognize the intrinsic limitations associated with physical examination findings when dealing with cases of abdominal trauma.[3] These findings are widely acknowledged within the medical community for their inherent unreliability, prompting the need for an increased dependence on supplementary diagnostic modalities. Notable among these modalities are Fast Ultrasound (FAST USG) and Computed Tomography (CT), both of which play pivotal roles in enhancing diagnostic accuracy.[5,6] A nuanced and comprehensive approach to clinical assessment is paramount, integrating these advanced diagnostic tools to ensure a thorough evaluation of abdominal trauma cases.

The management of abdominal trauma with hollow viscus injuries demands a comprehensive understanding of the available treatment modalities and their corresponding outcomes. The initial management of trauma patients is

focused on swiftly stabilizing the individual and identifying life-threatening injuries, in accordance with the established protocols outlined in Advanced Trauma Life Support (ATLS) guidelines. The primary assessment, known as the primary survey, adheres to the ABCDE pattern: airway, breathing, circulation, disability (neurologic status), and exposure.[7] The choice of management strategy is contingent upon various factors, including the patient's clinical condition, the severity and location of the injury, as well as any involvement of organs or associated solid organ or vascular injuries. In instances of severe injury and hemodynamic instability, a damage control approach may prove efficacious. This involves securing the injured bowel to halt bleeding from the mesentery or prevent gastrointestinal leakage from a perforated bowel. Definitive repair or resection can be deferred for a period of up to 24 hours or until the patient attains stability.[8] However, such postponement should not exceed 48 to 72 hours post-injury, as prolonged delay may exacerbate the situation due to bowel distension. The prognosis of patients undergoing treatment for abdominal trauma is intricately linked to the severity of the injuries sustained and the prompt initiation of therapeutic interventions.[9] The broader landscape of abdominal trauma reveals an overall mortality rate of 7.7%, as reported in the National Trauma Data Bank annual report of 2009.[10] Within the subset of patients with hollow viscus injuries, mortality rates are influenced by factors such as the Overall Injury Severity Score (ISS), concomitant injuries to solid organs and vasculature, and the presence of additional comorbidities. A comprehensive understanding of these variables is essential for accurately assessing and prognosticating outcomes in cases of abdominal trauma involving hollow viscus injuries.

The multifaceted nature of abdominal trauma underscores the importance of a multidisciplinary approach in its management. Surgeons, emergency physicians and radiologists collaborate closely to tailor treatment plans to the specific needs of each patient. This study seeks to systematically assess the diverse therapeutic approaches employed in addressing these injuries, encompassing both surgical and non-surgical interventions. By examining the effectiveness and outcomes associated with various modalities, the research aims to contribute valuable insights that can guide clinicians in making.

Methods

Conducted over the span of one year, from November 2021 to October 2022, a prospective observational study was undertaken at Government Medical College Jammu, involving patients who presented with a history of abdominal trauma.

Inclusion criteria for the study encompassed all patients, irrespective of age, admitted to various surgical units at Government Medical College, Jammu, identified as cases of abdominal trauma. These cases exhibited clinical and/or radiological indications suggestive of hollow viscus injuries within the gastrointestinal (GI) tract, ranging from the gastro-oesophageal junction to the anorectum. Confirmation of these injuries was subsequently achieved through laparotomy.

Exclusion criteria were established to exclude patients meeting the following conditions: exclusive solid visceral injuries resulting from abdominal trauma, documented oesophageal injuries, genitourinary trauma, incomplete medical records, patients who died before resuscitation, and those who voluntarily discharged against medical advice or were lost to follow-up.

The study emphasized a precise anatomical definition for the purpose of trauma management. The abdomen was defined as extending anteriorly from the nipple (specifically at the fourth intercostal space) down to the inguinal creases and posteriorly from the inferior border of the scapulae to the gluteal creases. The flanks were situated between the anterior and posterior axillary lines from the sixth intercostal space to the iliac crests. Notably, it was highlighted that the chest is not confined to the front only but includes the back, bounded by the clavicle to the xiphoid process and both posterior axillary lines.The patient's history encompassed pertinent details such as loss of consciousness, vomiting, seizures, ENT bleed, chest pain, breathlessness, abdominal pain, and hematuria, alongside the mechanism and timing of injury, alcohol or drug use, and known comorbidities. Physical examination, following established protocols, meticulously assessed parameters including GCS, pupils, pulse, blood pressure, respiratory rate, SpO2, crepitus, cyanosis, abdominal tenderness/distension, signs of peritonitis, associated injuries, and specifics of local wounds. Diagnostic investigations, ranging from routine blood tests and X-rays to eFAST and CT scans, were employed, with surgical interventions conducted for unstable patients and those with symptoms of hollow viscus injuries. Stable patients underwent meticulous management, including local wound exploration and further investigations, with laparotomy reserved for cases with radiological evidence of hollow viscus injury, recording perioperative complications and outcomes.

Statistical Methods

The acquired data underwent consolidation and entry into a spreadsheet using Microsoft Excel, following which it was transferred to the data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA) for further analysis. The

statistical analysis of the data was conducted utilizing both the SPSS software (version 20.0) and Microsoft Excel. Continuous variables were articulated as Mean±SD, while categorical variables were succinctly summarized as percentages. The presentation of the data was carried out graphically through the utilization of bar and pie diagrams.

Results

The examination of the data indicated that, with an average age of (38.4±12) years, the majority of patients (34%) belonged to the age group of (31-40) years. This was followed by 21% in the age range of 41-50 years, 17% in the age group of 21-30 years, 13% in the age group of 51-60 years, 10% of patients were aged ≤ 20 years, and 5% of patients were aged above 60 years. It was observed that there was a male predominance, with 82% of the patients being male compared to 18% females, resulting in a male-to-female ratio of 4.6:1. Additionally, the majority of patients (71%) hailed from rural areas, while 29% were from urban backgrounds. The prevalent type of injury noted in the studied patients was blunt trauma, constituting 92% of the cases, with only 8% of cases involving penetrating injuries.

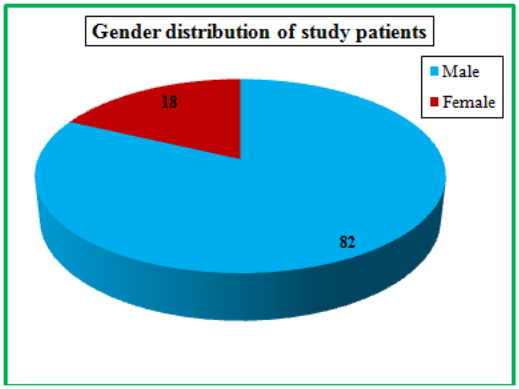

Table 1: Modes of management		
Mode of management	**Number**	**Percentage**
Primary closure of perforation	39	39%
Omental patch closure of perforation	13	13%
Resection and anastomosis	19	19%
Loop Ileostomy	21	21%
Colostomy	8	8%
Total	100	100%

The selection of a management strategy was contingent upon diverse factors, encompassing the patient's clinical condition, the severity and anatomical location of the injury, and the presence of any involvement of organs, as well as associated solid organ or vascular injuries. Table 1 outlines the various modes of management employed in the studied cases. The most prevalent approach was primary closure of perforation, implemented in 39% of cases. Omental patch closure of perforation was utilized in 13% of cases, while resection and anastomosis were carried out in 19% of instances. Additionally, 21% of patients underwent the creation of a loop ileostomy, and colostomy was performed in 8% of cases. In total, these management strategies collectively account for 100% of the cases examined.

Table 2: Postoperative complications in study patients		
Complications	**Number**	**Percentage**
Wound infection	12	12%
Sepsis	9	9%
Burst abdomen	3	3%
Stoma retraction	2	2%
Atelectasis	2	2%

Table 2 provides a comprehensive overview of the distribution of postoperative complications within the study patient population. Wound infection was noted in 12 cases, representing 12% of the total postoperative cases, while sepsis occurred in 9 cases, constituting 9% of complications. A burst abdomen was observed in 3 cases, equivalent

to 3% of postoperative instances. Stoma retraction occurred in 2 cases, contributing to 2% of complications, and atelectasis was identified in 2 cases, making up 2% of the postoperative cases.

Discussion

In the present study, which centers on the evaluation of the role of various modalities of treatment and their outcomes in cases of abdominal trauma with hollow viscus injuries, we conducted an exhaustive analysis of patient data. Our examination encompassed demographic aspects, the type and mode of injury, subsequent management strategies, and an assessment of post-operative complications. In our study, the demographic analysis revealed an average age of (38.4±12) years among the patients with abdominal trauma and hollow viscus injuries. The majority of cases (34%) were observed in the age group of (31-40) years, followed by 27% in the age group ≤ 30 years, 21% in the age group of 41-50 years, 13% in the age group of 51-60 years, and 5% in patients aging above 60 years. This age distribution aligns with findings from other studies investigating abdominal trauma. Notably, Olaofe et al. (2017) reported a similar age pattern in their study on abdominal tumors, with the commonest age group being (30–40) years, reinforcing the consistency observed in our study.[11] Similarly, Sanjay et al. (2014) noted a prevalence of abdominal trauma among individuals aged 18 to 45 and 21 to 40, respectively.[12]Egenti et al. (2015) also reported frequent occurrences of abdominal trauma in patients between the ages of 20 and 29, emphasizing the impact of this age group.[13] The tendency for abdominal injuries to concentrate within the age range of 20-40 years is attributed to the demographic characteristic of frequent relocations for familial or socioeconomic reasons within this age group. Reddy et al. (2014), in a study from South India, reported a comparable trend, where 50% of abdominal injuries were observed in the age group of (21-40) years.[14] This demographic pattern underscores the socio-economic dynamics and mobility prevalent among individuals in the 20-40 age range. Furthermore, the literature suggests that trauma, particularly abdominal injuries, tends to affect the young and productive age group, thereby imposing financial burdens on both national economies and families (Chalya et al., 2012).[1] The propensity for individuals aged 20-40 years to engage in frequent relocations likely contributes to their higher vulnerability to abdominal injuries. The pattern highlights the importance of considering age-specific risk factors and mobility trends when addressing and preventing abdominal trauma in clinical and public health settings. Furthermore, our findings demonstrated a discernible male predominance, constituting 82% of the patients compared to 18% females, resulting in a male-to-female ratio of 4.6:1. This observation aligns with prior research by Ntundu et al. (2019), supporting the notion that males are more susceptible to abdominal injuries.[15] Similarly, a study by Kundlas et al. (2020) reported a significant majority of male cases, reinforcing the consistent trend observed in our study.[16] The heightened incidence among males is attributed to their increased activity levels, engagement in motorized vehicle use, and a higher propensity for involvement in physical altercations.

Abdominal trauma, a critical medical concern, is traditionally categorized into two primary types: blunt abdominal trauma (BAT) and penetrating abdominal trauma (PAT). In our current investigation, we discerned that blunt injuries predominated, constituting 92% of the observed cases, whereas penetrating injuries were less frequent at 8%. This distribution aligns with findings from previous studies, emphasizing the recurring prevalence of blunt trauma in abdominal injuries. Notably, research conducted by Ntundu et al. (2019) similarly identified blunt trauma as the predominant form of abdominal injury, reporting a ratio of 75% blunt trauma to 25% penetrating trauma.[17] This correlation reinforces the consistency of our observations with existing literature. Furthermore, the study by Kulndas et al. (2020) found that 87% of patients presented with BAT, in contrast to 13% with PAT, mirroring the pattern observed in our study.[16] A parallel trend emerges from a study in Egypt by Saleem et al. (2016), where 77.5% of cases exhibited BAT compared to 22.5% with PAT.[18] Similarly, Panchal et al. (2016) reported BAT and PAT in 74% and 26% of cases, respectively.[19] These findings resonate with our own, underscoring the recurrent prominence of blunt abdominal trauma in diverse geographical and demographic contexts. The study by Gad et al. (2017) further supports this pattern, consolidating the evidence that blunt injuries significantly outweigh penetrating injuries in the spectrum of abdominal trauma.[20] This consistent prevalence of blunt abdominal trauma across multiple studies reinforces the importance of understanding and effectively managing this predominant type of injury, contributing to the broader knowledge base in abdominal trauma research.

The choice of management strategy in abdominal trauma was multifaceted and relied on a comprehensive assessment of various factors. Key considerations included the patient's clinical condition, the severity and specific location of the injury, as well as the potential involvement of organs, solid organ injuries, and vascular injuries. This nuanced approach acknowledged the heterogeneity of abdominal trauma cases and underscored the importance of tailoring management to the individualized needs of each patient. Physical examination findings, while valuable, can be notoriously unreliable, particularly in cases of blunt abdominal injury, which may remain silent initially but lead to adverse outcomes over time. Advanced diagnostic modalities such as FAST ultrasound and CT scans play a crucial role in enhancing diagnostic accuracy, enabling healthcare professionals to make informed decisions

regarding the appropriate course of action. In the context of our study focusing on the evaluation of various treatment modalities and outcomes in cases of abdominal trauma with hollow viscus injuries, it is noteworthy that surgical intervention emerged as the sole viable option for treatment. However, the initial and foremost priority for these patients was resuscitation, involving the administration of intravenous fluids, blood, and blood products.Therapeutic interventions encompassed primary perforation closure, omental patch perforation closure, and resection and anastomosis, each carefully selected based on considerations such as etiology, organ involvement, injury location, preexisting comorbidities, and, most crucially, the patient's overall condition. In the majority of cases (39%), primary closure of perforation was employed, followed by 21% of patients managed through loop ileostomy, and 19% undergoing resection and anastomosis. This distribution aligns with findings in the literature, where primary simple closure of perforation has been consistently documented as the most common mode of management, followed by resection and anastomosis (Kurane et al., Dongo et al., and Kulkarni et al., 2014).[2,21,22]Comparative studies by Amritha et al. (2019) and Khalilur et al. (2018) reveal similarities in the therapeutic approaches, with primary closure of perforation being a commonly employed method.[23,24]Amritha et al. (2019) reported primary closure as the predominant procedure (44%), followed by resection and anastomosis (20%), and omental patch closure (14%), findings which align with our patient management.[23] Similarly, Khalilur et al. (2018) noted that primary perforation closure and ileostomy were prevalent, and patients with multiple perforations underwent resection and anastomosis, mirroring our study's observations.[24]Wadhwa et al. (2021) reported an entirely surgical approach in their study, with primary repair of the perforation being the most widely employed method, consistent with our findings.[25] They also highlighted that patients with specific conditions, such as ileal damage, colonic injury, cecal injury, rectal injury, mesenteric injury, and those with significant comorbidities or hemodynamic instability, underwent diversion ileostomy, aligning with our study's observations. The choice of repair method was influenced by local factors such as vascularity, extent, timing of presentation, peritoneal contamination, and the patient's overall health. However, the preferred technique for hollow viscus perforation remained primary simple closure. These findings underscore the importance of individualized and context-specific treatment decisions in the management of abdominal trauma with hollow viscus injuries.

In our study cohort of 100 patients, we observed that 26 individuals, constituting 26% of the cohort, developed postoperative complications. This finding aligns with the study conducted by Ntundu et al. (2019), which reported an overall postoperative complication rate of 41.91%. However, our observed rate is notably lower than their reported figure.[17] Conversely, Suthar et al. (2012) documented a postoperative complication rate of 12.64%, which is comparatively smaller than the 26% observed in our present study.[26] Roy et al. (2022) reported a remarkably higher postoperative complication rate of 70%, while Ayoade et al. (2006) observed a rate of 23.37%, consistent with our findings.[27,28] The disparities in reported overall postoperative complication rates across studies can be attributed to several factors. These include variations in the severity of injuries, differences in the prevalence of comorbidities, the heterogeneous nature of patient populations, and variances in surgeon expertise. In the subset of patients who experienced postoperative complications in our study, specific complications were identified. Notably, 12% of these patients developed wound infections, 9% experienced sepsis, 3% encountered burst abdomen, 2% had stoma retraction, and another 2% presented with atelectasis. These findings are in concordance with the observations made by Roy et al. (2022) and Ntundu et al. (2019), who also identified wound infection as the most common form of postoperative complication.[17,27] This consistency in findings across studies underscores the significance of addressing and mitigating wound infections in the postoperative period following abdominal trauma with hollow viscus injuries.

Conclusion

The study identified a range of management modalities, including primary closure, omental patch closure, resection and anastomosis, loop ileostomy, and colostomy. Tailoring the management approach to individual patient characteristics is crucial for addressing the diverse nature of injuries encountered in abdominal trauma cases. Specifically, the occurrence of wound infections, sepsis, burst abdomen, stoma retraction, and atelectasis as postoperative complications underscores the importance of vigilant postoperative care. Addressing the specific needs of patients through tailored management and implementing rigorous postoperative monitoring are imperative for improving outcomes in this challenging clinical scenario.

References

1. Chalya PL, Mabula JB, Dass RM, Mbelenge N, Ngayomela IH, Chandika AB *et al.* Injury characteristics and outcome of road traffic crash victims at Bugando medical Centre in Northwestern Tanzania. *J Trauma Manag Outcomes.* 2012;6(1):1
2. Kulkarni SH. A study of traumatic perforation peritonitis in a rural medical college hospital with identification of risk factors. *Int J Health Care Biomed Res.* 2014;2(3):201-9
3. Jain S, Maske D, Songra MC. Clinical study of hollow viscus injury in abdominal trauma. IntSurg J 2018;5:39-44
4. Dhaded RB, Malra S. Clinical Study, Evaluation and Management of Blunt Abdominal TraumaHollow Viscus and Solid Organ Injuries. SAS J Surg. 2016;2(1):53-59.
5. Davis JJ, Cohn Jr IS, Nance FC. Diagnosis and management of blunt abdominal trauma. Ann Surg. 1976 Jun;183(6):672.
6. Chaudhry R, Galagali A, Narayanan RV. Focused Abdominal Sonography in Trauma (FAST). Med J Armed Forces India. 2007 Jan;63(1):62-3. doi: 10.1016/S0377-1237(07)80113-4. Epub 2011 Jul 21. PMID: 27407941; PMCID: PMC4921723.
7. Diercks DB, Clarke S, Moreira M. Initial evaluation and management of blunt abdominal trauma in adults. Waltham (MA): UpToDate. 2016.
8. Rossaint R, Bouillon B, Cerny V, Coats TJ, ET et al; Task Force for Advanced Bleeding Care in Trauma. Management of bleeding following major trauma: an updated European guideline. Crit Care. 2010;14(2):R52. doi: 10.1186/cc8943. Epub 2010 Apr 6. PMID: 20370902; PMCID: PMC2887168.
9. Shahani R, David Galla J. Penetrating chest trauma. Milliken J C, chief editor.*emedicine.medscape.com*, 2017.
10. Committee on Trauma, American College of Surgeons: National Trauma Data Bank annual report 2009, Chicago, 2009, American College of Surgeons.
11. Olaofe OO, Odesanmi WO, Adelusola KA, Komolafe AO, Sabageh D. An autopsy review of abdominal injuries resulting from road traffic accidents: The Ile-Ife experience. *Sahel Med J* 2017; 20:187-91.
12. Devarshi R, Sanjay M, Vineet S, Girish KS. Epidemiology of patients admitted to a major trauma centre in northern India. *Chinese Journal of traumatology.* 2014;17(02):103-7.
13. Egenti, Bibiana. Profile of Abdominal Trauma In Federal Teaching Hospital, Gombe, North-East, Nigeria: A Cross Sectional Study. *International Journal of Innovative Medicine and Health Science.* 2015;41 – 45.
14. Reddy NB, Madithati P, Reddy NN, Reddy CS. An epidemiological study on pattern of thoraco-abdominal injuries sustained in fatal road traffic accidents of Bangalore: Autopsy-based study. *Journal of emergencies, trauma, and shock.* 2014;7(2):116.
15. Ntundu SH, Herman AM, Kishe A *et al.* Patterns and outcomes of patients with abdominal trauma on operative management from northern Tanzania: a prospective single centre observational study. *BMC Surg* 2019; 19:69.
16. Kundlas R, Rajagopalan G, Alexis J, Jagadish S, Elamurugan TP. Clinico – epidemiological profile, pattern and outcome of abdominal trauma in a level 1 trauma centre in South India. *International Journal of Contemporary Medical Research* 2020;7(5):E1-E5.
17. Ntundu SH, Herman AM, Kishe A *et al.* Patterns and outcomes of patients with abdominal trauma on operative management from northern Tanzania: a prospective single centre observational study. *BMC Surg* 2019; 19:69.
18. Saleem A-E-A, Abdul Raheem O, Abdallah H, Yousef Am. Epidemiological evaluation and outcome of pure abdominal trauma victims who underwent surgical exploratory laparotomy. Al-AzharAssiut Med J 2016;14:24
19. Panchal H, Ramanuj A. The study of abdominal trauma: patterns of injury, clinical presentation, organ involvement and associated injury. *IntSurg J* 2016;1392–8
20. Gad MA, Saber A, Farrag S, Shams ME, Ellabban GM. Incidence, Patterns, and Factors Predicting Mortality of Abdominal Injuries in Trauma Patients. *North Am J MedSci* 2012; 4:129–34
21. Dongo AE, Kesieme EB, Irabor DO, Ladipo JK. A review of posttraumatic bowel injuries in Ibadan. *International Scholarly Research Notices.* 2011;2011.
22. Kurane SB, Ugane SP. A clinical study of hollow viscus injury due to blunt trauma abdomen. *Int J Res Med Sci*. 2017; 5:5017-20
23. Amritha S. A. Clinical study on Hollow Viscus Injuries in Abdominal Trauma (Doctoral dissertation, Tirunelveli Medical College, Tirunelveli; 2019).
24. Khalilur RA, Krishnaswamy J, Muthukumaran G, Prakash SJ. A comparative study on outcome of ileal perforation after primary perforation closure and resection and ileostomy. *IntSurg J*. 2018; 5:445-51.
25. Wadhwa M, Kumar R, Trehan M, et al. (Blunt Abdominal Trauma With Hollow Viscus and Mesenteric Injury: A Prospective Study of 50 Cases. 2021) Cureus. 13(2): e13321. DOI 10.7759/cureus.13321
26. Suthar KD, Mewada BN. Abdominal injuries: an experience of 87 cases. *J Int Med Res.* 2012; 1:1–8.
27. Roy SK, Akter MB, Arshad BS. Post-Operative Complications and Outcome of 150 Traumatic Gut Injury Cases. *SAS J Surg.* 2022; 9:606-12.
28. Ayoade HA, Salami BA, Tade AO. Abdominal injuries in OlabisiOnabanjo University teaching hospital Sagamu, Nigeria: pattern and outcome. *Niger J Orthop Trauma.* 2006;5(2):45–9.