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Profile of patients with bucket handle injury at Dr. Soetomo General Hospital Surabaya from 2020 to 2024

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Abstract: Bucket handle injury tear is a traumatic injury to the abdomen where mesenteric avulsion of a segment of the intestinal loop occurs, potentially resulting in devascularization, ischemia, and hollow organ perforation. A prior systematic review reported 20 cases of mesenteric avulsion after blunt abdominal trauma and found that only 25% of cases exhibited symptoms of shock and/or hemodynamic instability. The objective of this study is to describe the profile of patients with bucket handle injury at Dr. Soetomo General Hospital, Surabaya, from 2020 to 2024. This study is descriptive research with a retrospective study design. Data will be collected from the medical records of patients treated at Dr. Soetomo General Hospital during the 2020–2024 period. Various parts of the intestine were affected, with the ileum being the most commonly involved in 10 patients (50%). Trauma to the transverse colon was observed in 5 patients (25%), the sigmoid colon in 4 patients (20%), and the jejunum in 1 patient (5%). The most commonly performed procedure was resection and stoma, carried out in 11 patients (55%). This was followed by damage control surgery in 3 patients (15%), resection and EEA in 2 patients (10%), Hartmann's sigmoidectomy in 2 patients (10%), and other procedures in 2 patients (10%). After treatment, 11 patients survived (55%), while 9 patients passed away (45%). A common location for bowel wall hematoma (BHMT) in blunt abdominal trauma is near the junction of fixed and mobile bowel segments, such as the proximal jejunum and distal ileum.

Keywords: *Blunt Abdominal Trauma, Bowel Wall Hematome, Bucket Handle Injury.*

1. Introduction

Bucket Handle Injury Tear is a traumatic injury to the abdomen where mesenteric avulsion of a segment of the intestinal loop occurs, potentially resulting in devascularization, ischemia, and hollow organ perforation. Previous studies indicate that injuries to the mesentery or hollow organs contribute to approximately 6% of all blunt abdominal injuries in the UK [1]. Clinical diagnosis of mesenteric injuries and imaging diagnosis can be challenging. One of the most frequently undetected injuries on CT scans by experienced radiology departments in the trauma context is injuries to the bowel and mesentery. A prior systematic review reported 20 cases of mesenteric avulsion after blunt abdominal trauma and found that only 25% of cases exhibited symptoms of shock and/or hemodynamic instability. Previous research also suggests that up to 58% of mesenteric avulsion injuries may be missed during the initial clinical and imaging assessment.

Bowel perforation can occur due to direct trauma or delayed perforation in devascularized segments due to necrosis within 48 to 72 hours, which is associated with significant morbidity and mortality [3]. Mesenteric injuries are often misdiagnosed as peritonitis, hollow organ perforation, or traumatic abdominal wall hernia [2].

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Among motor vehicle accident patients, higher morbidity and mortality are associated with high-speed collisions and lack of seat belt use. Worse outcomes are also observed in elderly patients and those with higher injury severity scores. Although the incidence is higher, fewer than 10% of patients with blunt abdominal trauma require surgery.

2. Method

This study is a descriptive research with a retrospective study design. Data will be collected from the medical records of patients treated at Dr. Soetomo General Hospital during the 2020–2024 period. The study sample consists of patients diagnosed with Bucket Handle Injury who have been treated at Dr. Soetomo General Hospital during the same period. Data for this research will be obtained from the medical records of patients with Bucket Handle Injury at Dr. Soetomo General Hospital from 2020 to 2024. Data analysis will be conducted to describe the patient profiles, risk factors, management, treatment outcomes, and prognosis of patients with Bucket Handle Injury.

3. Results

The following describes the profile of the study samples that were analyzed. In this study, patients of various ages were included. The majority of trauma cases occurred in the 21–30 years age group, with 5 patients (25%), and the 31–40 years age group, also with 5 patients (25%), which are considered productive age groups. Additionally, the patients were predominantly male, with 16 patients (80%), while the remaining 4 patients (20%) were female.

Table 1.
Demographics of the study sample.

Variable	N	Percentage (%)
Gender		
Male	16	80
Female	4	20
Total	20	100
Age (Years)		
11-20	3	15
21-30	5	25
31-40	5	25
41-50	2	10
51-60	3	15
61-70	1	5
71-80	1	5
Total	20	100

In these trauma cases, various parts of the intestine were affected, with the ileum being the most commonly involved in 10 patients (50%). Trauma to the transverse colon was observed in 5 patients (25%), the sigmoid colon in 4 patients (20%), and the jejunum in 1 patient (5%).

Table 2.
Types of intestine involved.

Intestine Types	N	Percentage (%)
Jejunum	1	5
Ileum	10	50
Colon Transversum	5	25
Sigmoid	4	20
Total	20	100

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The patients underwent various surgical techniques for treatment. The most commonly performed procedure was resection and stoma, carried out in 11 patients (55%). This was followed by damage control surgery in 3 patients (15%), resection and EEA in 2 patients (10%), Hartmann's sigmoidectomy in 2 patients (10%), and other procedures in 2 patients (10%).

Table 3.
Types of surgery.

Types of surgery	n	Percentage (%)
Resection and EEA	2	10
Resection and Stoma	11	55
Damage Control Surgery	3	15
Sigmeoidectomy Hartmann	2	10
Others	2	10
Total	20	100

The surgeries were performed at different times following the incident. On the day of the incident, 3 patients underwent surgery immediately (15%). Surgery was performed on 7 patients one day after the incident (35%), another 7 patients two days after the incident (35%), 1 patient four days after the incident (5%), and 2 patients five days after the incident (10%).

Table 4.
Timing for surgery

Timing	n	Percentage (%)
Day of the accident	3	15
Day of the accident + 1	7	35
Day of the accident + 2	7	35
Day of the accident + 4	1	5
Day of the accident + 5	2	10
Total	20	100

After treatment, 11 patients survived (55%), while 9 patients passed away (45%).

Table 5.
Outcome.

Outcome	n	Percentage (%)
Survived	11	55
Died	9	45
Total	20	100

4. Discussions

Severe injuries are a leading cause of death and disability in general. Abdominal trauma occurs in less than 10% of all trauma patients, with one-third of them experiencing severe injuries, particularly involving the liver, spleen, and kidneys. The true incidence of abdominal trauma and its epidemiological variations are rarely explained. Previous research has shown that mesenteric or hollow organ injuries contribute to approximately 6% of all blunt abdominal injuries in the UK [4]. Mesenteric bucket-handle injury is a traumatic injury to the abdomen where mesenteric avulsion from a segment of the intestine occurs, potentially leading to devascularization, ischemia, and hollow organ perforation. This injury is associated with significant morbidity and mortality and is a major cause of missed bowel and mesenteric injuries. The ileum is the most common site for mesenteric tears due to its anatomical position and the vulnerability of the mesentery in this region. The mesentery of the ileum is more mobile and less protected by surrounding structures compared to the rest of the intestine, making it more prone to injury during trauma [2].

Among 7,202 trauma patients treated, 449 (6.2%) suffered from abdominal trauma. The average age

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was 31, with a significant increase in age over time (from an average of 25 years to an average of 38.5). Patients with ASA scores of 2 and 3 also increased significantly over time. Men accounted for 70% of the patients. In this study, patients ranged in age, with the majority of trauma cases occurring in the 21–30 years age group (5 patients, 25%) and the 31–40 years age group (5 patients, 25%), which are considered productive age groups. Additionally, the patient population was predominantly male, with 16 male patients (80%) and 4 female patients (20%). Bucket-handle mesenteric tear are more commonly seen in men, particularly due to the higher incidence of traumatic events they are involved in, such as motor vehicle accidents, physical confrontations, or high-impact sports. Men, especially those between the ages of 20-40, are at higher risk due to their increased engagement in risky activities and higher exposure to blunt abdominal trauma [5]. In these cases, different parts of the intestine were affected, with the ileum being the most commonly involved in 10 patients (50%). Trauma to the transverse colon was observed in 5 patients (25%), the sigmoid colon in 4 patients (20%), and the jejunum in 1 patient (5%). The resulting tears can lead to full-thickness laceration of the bowel wall and mesenteric vessel lacerations, resulting in bleeding and infarction. Degloving of the bowel and omentum may occur. The common location for bowel wall hematomas in blunt abdominal trauma is near the junction of fixed and mobile bowel segments, such as in the proximal jejunum and distal ileum. Surgeries were performed at different times following the incident. On the day of the injury, 3 patients underwent surgery immediately (15%). Seven patients were operated on 1 day after the incident (35%), another 7 patients 2 days after the incident (35%), 1 patient 4 days after the incident (5%),

and 2 patients 5 days after the incident (10%). Morbidity and mortality are associated with delayed operative intervention beyond 24 hours from the time of injury, the severity of duodenal injury, associated pancreatic injuries, and the choice of surgical intervention [6]. A more specific but rarely encountered sign is free oral contrast extravasation and focal wall defects. The CT scan of the presented patient shows nonspecific signs such as free fluid and wall thickening. The false negative rate of CT in detecting intestinal injuries can reach 15%, so relying solely on CT cannot be trusted to detect intestinal injuries, and exploratory laparotomy remains necessary There was a significant increase in morbidity related to laparotomy delays of more than 24 hours [7]. Studies have found that not only is morbidity increased, but there is also a significant increase in mortality when diagnostic delays last even 8 hours.

After treatment, 11 patients survived (55%) and 9 patients died (45%). The mortality **References** rate for mesenteric bucket-handle injuries, also known as devascularization injuries, can reach 10–20%. This is due to delayed diagnosis and the limitations of imaging examinations.

5. Conclusion

Bucket handle mesenteric injury is one of the manifestations of abdominal trauma with a relatively high mortality rate due to the difficulty in establishing a diagnosis. A common location for Bowel Wall Hematoma (BHMT) in blunt abdominal trauma is near the junction of fixed and mobile bowel segments, such as the proximal jejunum and distal ileum. Morbidity and mortality are associated with delays in operative intervention beyond 24 hours from the time of injury, the severity of duodenal injury, the presence of accompanying pancreatic injuries, and the choice of surgical intervention.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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