



PROSPECTIVE STUDY ON ACUTE MESENTERIC ISCHEMIA AT A TERTIARY CARE CENTRE

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ABSTRACT

Background: Mesenteric ischemia develops when your small intestine's blood supply is restricted by narrowed or blocked arteries. The small intestine might suffer severe damage from decreased blood supply. A blood clot that suddenly cuts off the small intestine's blood supply (acute mesenteric ischemia) necessitates emergency surgery. Angioplasty or open surgeries are options for treating chronic mesenteric ischemia. In this study, predictive factors for mesenteric vascular disorders are assessed, with a focus on mesenteric ischemia. **Methods:** All the consecutive cases of Acute abdomen who were diagnosed & treated for acute mesenteric ischemia in the Department of emergency & surgical gastroenterology at Al Ameen Medical Collage and Hospital from July 2021 to Jan 2023 were included in the study. NOMI and low flow / perfusion states were excluded from the study. **Results:** There were 20 patients of acute mesenteric ischemia, of which 17 were males and 3 were female. 12 patients had acute mesenteric ischemia who had undergone surgical management & follow up medication, 5 on medical management with follow up medication & 3 expired. 18 out of 20 patients had risk factors mesenteric thrombosis. 14 required ICU stay, 12 required surgical management, 8 out 20, had undergone stoma reversal after 6 to 8 weeks at the later date. 4 of them had re-admission for dehydration and dyselectrolytemia, TPN and ICU admission. 2 patient had just D LAP & then explored where in segment of the bowel was dusky and congested settled with 100% O₂ & warm saline but he was admitted with chest infection and ARF needing with ICU stay and dialysis. Duration of Hospital stay varied from 1 to 30 days with mean of 15 days in mesenteric vascular diseases. Average incidence of AMI is 18 out of 95 Patients over period of 18 months (8.2% in one year). **Conclusions:** AMI is an uncommon but life-threatening vascular emergency that requires immediate diagnosis and urgent treatment that is more surgical than medical, or in some circumstances, IR guided.

KEYWORDS :**INTRODUCTION:**

Mesenteric ischemia occurs when arteries become restricted or obstructed, limiting blood supply to the small intestine. Reduced blood flow might cause serious harm to the small intestine. A blood clot that causes a sudden loss of blood supply to the small intestine (acute mesenteric ischemia) necessitates rapid surgery. Chronic ischemia of the mesenteric vessels is treated with angioplasty or open surgery. [1]. Chronic mesenteric ischemia, if left untreated, can become acute or result in significant weight loss and malnutrition. Acute mesenteric ischemia symptoms include: sudden, intense stomach discomfort, an urgent need for a bowel movement, fever, nausea, and vomiting. The following are signs and symptoms of chronic mesenteric ischemia: abdominal discomfort that begins around 30 minutes after eating, Pain that worsens over an hour, pain that goes away in one to three hours. A reduction in blood flow to the small intestine causes both acute and chronic mesenteric ischemia. [2].

Acute mesenteric ischemia (AMI) is a common underdiagnosed cause of acute abdomen, with a high mortality and morbidity rate despite intensive care management. [3-5]. AMI is classified into four different types according to its pathophysiology. Embolic and thrombotic occlusion account for around two-thirds of cases, whereas nonocclusive mesenteric ischemia (NOMI) and mesenteric venous thrombosis (MVT) account for one-sixth of cases.

Early diagnosis is frequently hampered by the clinical characteristics' and biomarkers' low sensitivity and specificity. With an estimated sensitivity and specificity of 91 and 99%,

respectively, computed tomography with angiography (CTA) is presently the "gold standard" diagnostic technique in AMI. [6, 7]. However, CTA findings in the early phases of the affection may be milder, and the sensitivity is likely overstated. [8].

A number of risk factors for unfavourable outcomes have been discovered in the literature, with the most prevalent negative predictor being a longer duration of symptoms prior to particular therapy. Furthermore, specific patient characteristics such as basic demographics and comorbidities, as well as laboratory results, have received a lot of attention in recent decades. [10,11,12,13]. Additionally, the group of individuals presenting with MI is also diverse, since the underlying diseases and accompanying subtypes, such as arterial ischemia (AI), venous ischemia (VI), and non-occlusive mesenteric ischemia (NOMI), have varied symptoms and outcomes. [14].

Due to the very heterogeneous character of mesenteric ischemia, only a few research have been conducted to investigate the condition. We analysed clinical outcomes in a cohort of patients getting therapy for mesenteric vasculopathy to further investigate potential predictive markers of surgical morbidity and death.

Objective Of The Study:

- To evaluate prognostic factors affecting acute mesenteric ischemia.

METHODOLOGY

Study Design: Prospective study

Study Duration: 18 months (July 2021 – January 2023)

Study Area: Al-Ameen Medical college Hospital (AMCH), Vijayapura.

Study Participants:

All the cases of Acute abdomen who were diagnosed & treated for acute mesenteric ischemia in the Department of emergency & surgical gastroenterology at Al-Ameen Medical college Hospital (AMCH), Vijayapura.

Inclusion criteria:

All the cases of Acute abdomen who were diagnosed & treated for acute mesenteric ischemia in the Department of emergency & surgical gastroenterology at Al Ameen Medical Collage and Hospital from July 2021 to Jan 2023 were included in the study.

Exclusion criteria:

- I. Chronic pain abdomen,
- II. Acute pain abdomen < 15 yrs of age,
- III. NOMI and low flow / perfusion states were excluded from the study.

The study was conducted in department of surgery, Al-Ameen Medical college Hospital (AMCH), Vijayapura. Clearance from the institutional ethical committee was taken before starting the study. A pre-tested, semi-structured questionnaire was used to collect information on socio-demographic variables and history of acute mesenteric ischemia by interview method.

RESULTS:

The mean age of the study participants with AMI was found to be 57.40 ± 6.065 .

Out of which 85% of the study participants were males and 15% were females.

History of smoking was found to be in 30%, Hypertension (50%) and diabetes (40%) were the most common comorbidities found in this study.

90% and 45% of the study participants with AMI had symptoms of acute abdominal pain and nausea/vomiting/refusal to eat respectively.

100% and 40% of the study participants with AMI had clinical examination signs of diffuse abdominal pain on palpation and abdominal distention respectively.

The mean WBC, Hb and Blood urea of the study participants with AMI was found to be 18.85 ± 4.716 , 10.05 ± 1.538 and 26.15 ± 9.702 respectively.

All the patients had elevated serum amylase and normal serum lipase.

Serum creatinine was higher in 20% of the study participants on presentation. 25% had altered renal parameters and 15% had hyperhomocysteniemia.

40% of the study participants with AMI had arterial thrombosis, 35% of the study participants with AMI had Venous thrombosis.

Small bowel was affected in 50%, colon was affected in 30% and both small bowel and colon were affected in 20% of the study participants with AMI.

70% were managed surgically (diagnostic Laparoscopy Followed By Resection And Anostomois (8 Patients), Exteriorization Of Bowel (4) And Duodenaldudenostomy (1))

and 15% were managed medically ().

90% of the study participants had risk factors mesenteric thrombosis.

70% of the study participants required ICU stay, 50% of the study participants had undergone stoma reversal after 6 to 8 weeks at the later date.

20% of them had re-admission for dehydration and dyselectrolytemia, TPN and ICU admission.

Duration of Hospital stay varied from 1 to 30 days with mean of 14.46 ± 2.73 .

Elevated WBC and Blood urea were found among the study participants who expired and the association was found to be statistically significant between the WBC, Blood urea and the outcome of the study participants with AMI. HB was found to be lower with statistical significance among the study participants who expired.

DISCUSSION:

Managing and reducing perioperative mortality in AMI remains difficult, despite a sophisticated multidisciplinary treatment strategy. As a result, we intended to evaluate the prognostic factors influencing acute mesenteric ischemia.

The mean age of the study participants with AMI was found to be 57.40 ± 6.065 in this study. Aliosmanoglu I et al [11] in his study found a mean age of 68.4 ± 14.4 years (range, 27–92 years). Otto CC et al [15] in his study found a median age of 71 years (range: 61–80), which is in accordance with the findings of the present study. Martini V et al [16] in his study found a mean age of 74 ± 11.4 . AMI appears to be relatively common in elderly patients according to the literature, which is also in accordance with this study's findings [17, 18].

In our study, 85% of the study participants with AMI were males and 30% had history of smoking. Otto CC et al [15] in his study found that 48.6% were males and Martini V et al [16] in his study found that 64% of the subjects were males. Aliosmanoglu I et al [11] in his study found that 58.9% of the subjects were males.

In our study, Hypertension (50%) and diabetes (40%) were the most common comorbidities. Martini V et al [16] in his study found that 60% and 40% of the subjects had hypertension and diabetes respectively. Jagielski M et al [19] found that 93.8% and 50% of the subjects had hypertension and diabetes respectively. The majority of patients with acute intestinal ischemia have a number of comorbidities that might have a negative impact on their prognosis.

In our study, the mean WBC, Hb and Blood urea of the study participants with AMI was found to be 18.85 ± 4.716 , 10.05 ± 1.538 and 26.15 ± 9.702 respectively. All the patients had elevated serum amylase and normal serum lipase. Serum creatinine was higher in 20% of the study participants on presentation. 25% had altered renal parameters and 15% had hyperhomocysteniemia. Elevated WBC and Blood urea were found among the study participants who expired and the association was found to be statistically significant between the WBC, Blood urea and the outcome of the study participants with AMI. HB was found to be lower with statistical significance among the study participants who expired. Serum creatinine and serum bilirubin were found to be independent risk factors of postoperative mortality in a study done by Otto CC et al [15]. Previous research has shown renal impairment at initial diagnosis as a prognostic factor. [20, 21]; Elevated homocysteine levels in the blood are a known risk factor for arteriosclerotic occlusive disease. [22].

In our study, 40% of the study participants with AMI had arterial thrombosis, 35% of the study participants with AMI had Venous thrombosis. Small bowel was affected in 50%, colon was affected in 30% and both small bowel and colon were affected in 20% of the study participants with AMI. Otto CC et al [15] in his study found that majority had arterial thrombosis as aetiology of AMI. Martini V et al [16] in his study found that 43% of the study participants with AMI had arterial thrombosis.

These findings are in accordance with the findings of the present study. Acute occlusions of the superior mesenteric artery due to thrombosis or embolisation are responsible for approximately 60%–70% of cases [23, 24].

In our study, 70% were managed surgically and 15% were managed medically. 90% of the study participants had risk factors mesenteric thrombosis. 70% of the study participants required ICU stay, 50% of the study participants had undergone stoma reversal after 6 to 8 weeks at the later date. 20% of them had re-admission for dehydration and dyselectrolytemia, TPN and ICU admission. 79.9% underwent bowel resection and 39.6% underwent open or endovascular revascularization in a study done by Otto CC et al [15].

Exploratory laparotomy without resection/intervention. Thrombectomy of superior mesenteric artery was done in 36% and Hemicolectomy right was done in 21% in a study done by Martini V et al [16].

The mortality rate was 15% in the present study. This is lower than the mortality rates of the other studies [15, 16]. In the scientific literature, AMI mortality rates range from 30% to 100%. [25]. because AMI is a rapidly progressive condition, early admission and diagnosis are important. One of the primary causes of the high death rate is the difficulty and delay in diagnosing prior to necrosis. The ability to identify necrosis and peritonitis in the intestines before necrosis and peritonitis occur is the most critical factor affecting survival rate. [11].

Suspicion of acute mesenteric ischemia predicts disease progression significantly. When beginning therapy, bear in mind that restoring blood flow to the viscera is a top concern. The most important prognostic indicators for acute mesenteric ischemia is the interval between the start of clinical symptoms and the beginning of definitive treatment, which helps to choose the optimum treatment technique.

Patients with acute mesenteric ischemia can only benefit from therapy and survival improvements if they receive promptly diagnosed and treated.

CONCLUSION:

AMI is a condition that mostly affects elderly people, and despite advancements in diagnosis and therapy, morbidity and fatality rates are still high. We found that increased blood urea and WBC have an increasing impact on death rate. Based on these results, we advise that these parameters be regarded as poor prognostic indicators and emphasise the significance of early surgical intervention.

Table 1: Patient demographics and characteristics

Patient demographics and characteristics		
Age (years) Mean ± SD		57.40 + 6.065
Gender, n (%)	Male	17 (85%)
	Female	3 (15%)
Co-morbidities, n (%)	Hypertension	10 (50%)
	Diabetes	8 (40%)
	IHD	6 (30%)

	Atrial fibrillation	2 (10%)
	Atheromatus plaque in aorta	4 (20%)
	Smoking	6 (30%)
Symptoms, n (%)	Acute abdominal pain	20 (100%)
	Nausea/vomiting/refusal to eat	9 (45%)
	Melena haematochezia	2 (10%)
	Hematemesis	3 (15%)
	Diarrhoea	2 (10%)
	Constipation	4 (20%)
	Respiratory distress	1 (5%)
Signs, n (%)	Altered mental status	1 (5%)
	Diffuse abdominal pain on palpation	18 (90%)
	Localized abdominal pain on palpation	3 (15%)
	Peritoneal irritation signs	4 (20%)
	Abdominal distention	8 (40%)
	Tachycardia	20 (100%)
	Hypotension	6 (30%)
	Poor peripheral perfusion	1 (5%)

Table 2: Laboratory parameters

Laboratory parameters	Mean ± SD
Hb	11.05 ± 1.53
Haematocrit	39.12 ± 4.20
Leucocyte count	5.1 + 2.06
LDH	189 + 18.23
Creatinine	0.72 + 0.34
Urea	19.75 + 6.88
Amylase	95 + 4.32
Lactate	8.97 + 3.29
Phosphate	3.67 + 0.79
CRP	0.47 + 3.29
d-dimer	0.21 + 0.07
Platelets	217.88 + 23.29

Table 3: Management and outcomes of the study

Management and outcomes of the study		
Type of AMI, n (%)	Arterial thrombosis	11 (55%)
	Arterial embolism	7 (35%)
	Venous thrombosis	2 (10%)
Bowel affected by AMI, n (%)	Colon	6 (30%)
	Small bowel	10 (50%)
	Small bowel and colon	4 (20%)
Management, n (%)	Medical management	3 (15%)
	Surgical management	14 (70%)
	Medical management + Surgical management	3 (15%)
Surgical procedures, n (%)	Duodenoduodenostomy	1 (5%)
	Exteriorized bowel	10 (50%)
	Exteriorized bowel + thrombolysis	2 (10%)
	Thrombolysis	4 (20%)
	Death	3 (15%)
Outcome, n (%)	Alive	17 (85%)
	Expired	3 (15%)
Post operative complications, n (%)	Chest infections	3 (15%)
	Wound infection	3 (15%)
	Sepsis	3 (15%)
Hospital stay (days), Mean ± SD		14.46 ± 2.73

Table 4: Outcomes and laboratory parameters

OUTCOME		WBC	HB	B. UREA
Alive	Mean	17.71	10.41	22.82
	Std. Deviation	3.738	1.326	5.503
Expired	Mean	25.33	8.00	45.00
	Std. Deviation	5.033	1.000	5.000
P value		0.006	0.008	0.000

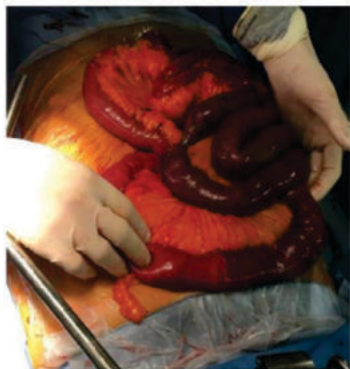


Figure 1: Gangrenous Bowel

JEJUNOSTOMY REVERSEL



Figure 2: Jejunostomy Reversal

GANGRENOUS SMALL BOWEL



Figure 3: Gangrenous Bowel

SMA THROMBECTOMY



Figure 4: Sma Thrombectomy

PNEUMOPERITONEUM WITH AIR IN THE MURAL WALL

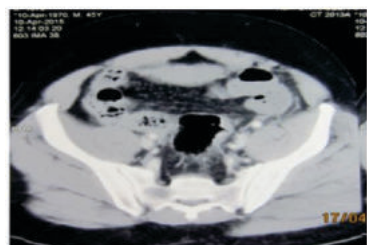


Figure 5: Embolism in the mesenteric artery superior to angioCT in sagittal section



Figure 6: Delineation of mesenteric infarction after superior mesenteric embolectomy by Fogarty probe



Figure 7: Percutaneous transluminal angioplasty superior mesenteric antegrade with stenting

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