

Acute Occlusive Intestinal Ischaemia: Factors Affecting Mortality in Sohag Locality: A Retrospective Study

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ABSTRACT:

Background: Acute mesenteric ischaemia is one of the most serious abdominal conditions known to humans. The mortality rate is high and ranges from 60 to 100 % because of the diagnostic delay and confusion with other causes of acute abdominal pain.

Aim of the work: To study the factors that influence mortality and long term outcome of patients with occlusive mesenteric ischaemia.

Patients and Methods: A comparative retrospective analysis was performed on patients with final diagnosis of acute mesenteric vascular occlusion between January 2000 and January 2006 at Emergency Department, Sohag University Hospital. Based on clinical and surgical findings, patients were divided into 2 categories: occlusive arterial ischaemia and occlusive venous ischaemia. Patient demographics, clinical characteristics, risk factors, surgical procedures and survival rates were analyzed.

Results: Thirty – two patients with acute mesenteric vascular occlusion, who did laparotomy, were identified during the study period. The etiologies were arterial embolism in 53 % (17/32) patients, arterial thrombosis in 25 % (8/32) and venous thrombosis in 22 % (7/32). The mean age of our patients was 58.7 years which is approximately 10 years younger than previously reported in other studies. Twenty – two percent of these patients had mesenteric venous thrombosis, a rate higher than expected. Arterial thrombo-embolic events affected patients over wide age range whereas patients with venous thrombosis were predominantly men younger than 50 years. Patients with arterial embolism invariably had a significant history of cardiac disease. Abdominal pain was nearly a uniform finding. However, in these patients with arterial causes of intestinal ischaemia, the pain was more pronounced than in patients with venous occlusion. Oliguria was seen in 72 % & 28.5 % in acute arterial and venous occlusion respectively and it was significantly related to mortality. Leucocytic count was markedly elevated in occlusive arterial ischaemia ($23.3 \pm 1.8 \text{ WBC} \times 10^3/\text{ml}$) and moderately elevated in venous thrombosis ($15.6 \pm 2.7 \text{ WBC} \times 10^3 \text{ ml}$). Acidosis, elevated blood urea nitrogen and creatinine were observed in both categories. Bowel resection was performed in 28 patients (87.5 %) whereas bowel resection and revascularization was performed in 4 patients (12.5 %). The mortality rates within 30 days after surgery were 60 % & 14.2 % in arterial and venous occlusion respectively ($P = 0.03$). Among patients with occlusive arterial ischaemia, patients who died differed from survivors only with respect to the time of presentation & intervention (37.4 % in early intervention versus 70 % in delayed intervention, $P = 0.02$). Short bowel syndrome was reported in 3 patients with arterial occlusion versus one patient with venous thrombosis. The survival rates at one year were 32 % and 85.8 % for arterial and venous occlusion respectively ($P = 0.01$).

Conclusion: Acute mesenteric ischaemia is a challenging clinical problem with diverse causes, which often results in delayed diagnosis and treatment. A strong clinical suspicion and an aggressive approach should be adopted in dealing with this condition. The final advice of the study is to pay intensive attention to resuscitation of the patients, correction of metabolic and haemodynamic derangements and performing laparotomy as soon as these derangements were corrected.

INTRODUCTION:

Acute mesenteric ischaemia represents one of the most dramatic intra-abdominal catastrophes encountered by physicians with a mortality rate of 60 % to 100 %⁽¹⁻³⁾. The severity of injury depends on etiology of ischaemia, systemic blood pressure, collateral circulation flow, response of mesenteric vessels to autonomic stimulation, amount of circulatory metabolites after reperfusion of the ischaemic bowel, and duration of ischaemia^(4,5). Practically, acute mesenteric ischaemia is divided into 4 different primary clinical entities: acute mesenteric arterial embolus, acute mesenteric arterial thrombus, non occlusive mesenteric ischaemia and mesenteric venous thrombosis⁽⁶⁻⁸⁾. Most studies support the concept that embolus is the most common cause of acute mesenteric ischaemia^(9,1 and 3).

The source of the emboli is usually the heart and is most frequently related to atrial fibrillation and myocardial infarction⁽¹⁰⁾. Thrombotic acute mesenteric ischaemia is a late complication of preexisting visceral atherosclerosis and tends to occur at the origin of superior mesenteric artery causing early wide spread infarction⁽¹¹⁾.

Mesenteric vein thrombosis may occur in association with portal hypertension, abdominal neoplasm, inflammatory bowel disease, use of oestrogen containing compounds and hypercoagulability status⁽¹²⁾. In contrast to mesenteric infarction due to arterial occlusion, infarction due to venous thrombosis is subacute in its presentation and usually involves limited, well-demarcated segment of bowel⁽¹³⁾.

Conditions that cause non occlusive mesenteric ischaemia include low-flow states (e.g. pancreatitis,

sepsis, hypovolemia), mechanical causes (e.g. strangulated hernia, adhesive bands, intussusception), trauma, aortic dissection and colon ischaemia after abdominal aortic aneurysm repair⁽¹⁰⁾.

The commonest pitfall in management of acute mesenteric vascular occlusion is lack of early diagnosis until the disease is far advanced⁽²⁾. Appropriate diagnosis depends on a high clinical suspicion particularly in patient who has a history of cardiovascular disease^(14,15). Early diagnosis and early intervention to ameliorate vascular obstruction are critical patient's salvage^(3,8). Appropriate resuscitation of the patients and diagnostic studies and early surgical or non surgical intervention are the most effective approaches to save the patient⁽¹⁶⁾. Non surgical interventions are still investigatory^(9,2). However, recent studies have shown that angiography and vasodilators or thrombolytic agent injection before appearance of peritoneal signs or haemodynamic derangements have had suitable results and may replace surgical intervention in a large number of these patients^(17,18). At this time, appropriate surgical intervention, embolectomy, thrombectomy, vascular bypass, resection of frankly gangrenous bowel and second look laparotomy are the standard treatment of this fatal disease⁽¹⁹⁻²¹⁾.

AIM OF THE WORK:

In this study we decide to review cases of mesenteric ischaemia during 6 years in Sohag University Hospital and analyze their clinical findings, results of para-clinical studies and results of treatment in these patients.

PATIENTS AND METHODS:

The charts of all patients with final diagnosis of acute occlusive mesenteric ischaemia who were admitted between January 2000 and January 2006, at Emergency Department, Sohag University Hospital, were analyzed with respect to demographic information, risk factors, time interval between onset of symptoms and diagnosis, vital signs at presentation, laboratory studies, diagnostic studies and hospital length of stay (LOS), operative findings and surgical outcome. Based on the clinical and surgical findings, patients were identified as having mesenteric arterial ischaemia (embolism and thrombosis), mesenteric venous thrombosis or non-occlusive intestinal ischaemia.

Intraoperative diagnosis of the etiology was based on presence of pulse at the origin of mesenteric arteries, location of damaged bowel and mesenteric veins evaluation.

RESULTS:

Thirty-four patients with occlusive mesenteric ischaemia were identified during the study period. Thirty-two patients underwent laparotomy whereas two patients died before operation in whom the diagnosis was based on clinical findings and intra-abdominal fluid aspiration analysis. They were excluded from the study reducing the number into 32 cases.

According to the cause of ischaemia, 25 patients (78 %) had arterial occlusion (embolism & thrombosis) and 7 (22 %) had venous occlusion. The mean age was 57.8 years (range 31-80 years). The male/female ratio was 1.5 (19/13).

Patients with occlusive arterial ischaemia:

In patients with occlusive arterial ischaemia, the cause was emboli in 17 patients (53 %, 17/32) and thrombosis in 8 patients (25 %, 8/32). In both categories, patients were on average age of 62.3 ± 2.7 years old (range 41-80 years); and one fifth (5/25) were 50 years of age or younger. The male/female ratio was 1.3 (14/11). The most common symptom was sudden onset of acute abdominal pain which was observed in all patients (100 %) and was associated with nausea in 24 patients (92 %), vomiting in 19 (75 %), obstipation in 12 (48 %), bloody diarrhea in 6 (24 %) and haematemesis in 2 (8 %).

Presence of pulse at the origin of mesenteric arteries makes the diagnosis to be emboli and absence of it results in the diagnosis of thrombosis. Thrombosis of the main mesenteric veins means venous thrombosis. Segmental involvement and presence of underlying disease suggests non-occlusive mesenteric ischaemia.

All patients with non-occlusive intestinal ischaemia were excluded from the study.

Statistical analysis:

Patients' age, vital signs, LOS, laboratory results and death were analyzed by using two-way analysis of variance to determine whether differences existed among diagnostic groups. Differences in patient gender and coexistent clinical condition were evaluated between groups by using Chi-square analysis. $P < 0.05$ was considered significant. SAS software program was used for the statistical analysis.

The average time between onset of symptoms and presentation for definitive intervention was 2.2 ± 0.6 days, although 8 patients (32 %) came to treatment within 12 hours after the onset of symptoms.

Risk factors:

Associated medial conditions were shown in table (1). Nineteen patients (76 %) had cardiac underlying disease with inadequate controlled chronic atrial fibrillation in 15, pre-existing features of chronic mesenteric ischaemia were recorded in 3 patients (12 %), one of them had scleroderma (Photograph 1,2). With respect to risk factors; hypertension was observed in 14 patients (56 %), smoking in 10 (40 %), chronic obstructive pulmonary disease in 7 (28 %), diabetes mellitus in 5 (20 %), peptic ulcer disease in 5 (20 %) and hepatomegaly in one (4 %) (Table 2).

Clinical features & diagnostic tests:

At presentation 64 % (16/25) demonstrated peritonitis and 32 % (8/25) exhibited hypotension. The mean arterial blood pressure of this series was 92 ± 4 . The mean pulse and respiratory rates were 108 ± 6 per minute and 22 ± 2 per minute respectively. Urinary output was less than 30 cc per hour in 18 patients (72 %) and more than 30 cc per hour in 7 (28 %). ECG showed AF rhythm in 15 patients (60 %), myocardial infarction in 4 (16 %), sinus rhythm in 6 (24 %).

Laboratory studies reveal marked leucocytosis (average $23.2 \pm 1.8 \times 10^3/\text{ml}$), markedly elevated blood urea nitrogen (average 36.4 ± 4.0 mg/dl), mildly elevated creatinine (average 2.1 ± 0.4 mg/dl) and an elevated serum lactate level (average 5.3 ± 1.3 mg/dl) (Table 3).

On plain X-ray, there was distended loop in one patient (4 %), diffuse haziness in one (4 %), diffuse haziness and air fluid in 7 (28 %), diffuse haziness and distended loop and air fluid in 3 (12 %). X ray did not performed in 13 patients (52 %). Abdominal ultrasonography was performed in all patients. There was dilated fluid-filled loops of bowel in 5 patients (20 %), thickened bowel wall in 4 (16 %) and free peritoneal fluid in between dilated bowel loops in 16 (64 %). Diagnostic peritoneal lavage was performed in 9 patients (36 %) in which a serosanguineous fluid was recovered. Other diagnostic modalities such as duplex sonography, computed tomography, magnetic resonance imaging and angiography were not performed in this series.

Operative findings and surgical procedures:

Intra-operative findings consisted of:-

Jejunum was gangrenous in 11 patients (44 %), normal in 10 (40 %) and suspicious in 4 (16 %). The ileum was gangrenous in 20 patients (80 %) and normal in 5 (20 %). Caecum was gangrenous in 11 patients (44 %), normal in 13 (52 %) and suspicious in one (4 %). Ascending colon was gangrenous in 14 patients (56 %), normal in 9 (36 %) and suspicious in 2 (8 %). Transverse colon was gangrenous in 12 patients (48 %), normal in 10 (40 %) and suspicious in 3 (12 %). Descending colon was gangrenous in 5 patients (20 %), normal in 19 (76 %) and suspicious in one (4 %).

Bowel resection was performed in 21 patients (84 %), whereas 4 patients (16 %) underwent limited bowel resection and revascularization of the occluded vessel by