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Original Article

Mesenteric ischemia: Results of surgical treatment and a review of literature

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Abstract
Background: Acute Mesenteric Ischemia (AMI) is one of the causes of acute abdomen which occurs because of significant decrement in bowel perfusion. Mortality rates of 60 to 100 percent have been reported in different studies in relation to this fatal disease(1, 5, ,11, 16,18,28). In this study, we review clinical features, laboratory findings, abdominal x rays, ECGs, intraoperative findings and results of treatment in 32 patients who were admitted in Shohada-E-Tajrish hospital with final diagnosis of AMI from March 1996 to March 2002.
Methods: 32 patients with final diagnosis of AMI who were admitted in Shohada-E-Tajrish hospital were included in this retrospective study by means of review of their files and medical records.
Results: The disease was more common in men than women, with a 2:1 male: female ratio. The mean age of patients was 60 years. Abdominal pain was the most common symptom of patients followed by nausea, vomiting, obstipation, hematemesis, and melena. On physical exam tachycardia was prevalent. Oliguria was seen in approximately 70% of patients and it was related to mortality. 10% of patients were in shock status related to mortality. 30% of patients had peritoneal signs, but it was not related to mortality. In laboratory tests, leukocytosis was present in 95% of patients, and in 50% of cases it was more than 20000/mm³. Acidosis was seen in 80% of patients and overall mortality rate was 75%.
Conclusion: The final advice of the study is to pay intensive attention to resuscitation of the patients, correction of metabolic and homodynamic derangements, and performing laparotomy as soon as these derangements were corrected. In some patients it is necessary to perform second look operation to evaluation of the viability of the intestine.
Key words: Mesenteric ischemia, second look, colectomy

Introduction

Acute mesenteric ischemia is one of the most fatal diseases with a mortality rate of 60-100%[1,2,4,5,11,16,18,28.] The severity of injury depends on etiology of ischemia, systemic blood pressure, collateral circulation flow, response of mesenteric vessels to autonomic stimulators, amounts of circulatory autonomic stimulators, regional hormonal factors, presence of cellular metabolites after reperfusion of the ischemic bowel, and duration of ischemia[2,7,11,12,17,23,24,25,26] Four pathologic factors have been described as the cause of acute mesenteric ischemia including: superior or inferior mesenteric artery emboli, thrombosis of these vessels, venous thrombosis, and non occlusive mesenteric ischemia[5,9,12,21] Emboli is the most common cause of AMI[1,14,15,25] Appropriate diagnosis of this disease depends on a high clinical suspicion particularly in elderly an patient who has history of cardiovascular disease[14,7,21,22] Early diagnosis and early intervention to ameliorate vascular obstruction are critical in patient's salvage[1,4,9,22,27] . Appropriate resuscitation of the patient and diagnostic studies and early surgical or non surgical intervention is the most effective approach to save the patient[1,3,9,28] . Non surgical interventions are still investigatory[,3,15] . However, recent studies have shown that angiography and vasodilator or thrombolytic agent injection before appearance of peritoneal signs or hemodynamic derangements, is beneficial and may replace surgical intervention in a large number of this patients[1,3,13,15,16,21]. At this time, appropriate surgical intervention, embolectomy, thrombectomy, vascular bypass, and resection of frankly gangrene bowel and second look is the standard treatment of this fatal disease [6,10,22,27]. In this study we decided to review our experience in the management of mesenteric

ischemia over a 6 year period in Shohada-E-Tajrish Hospital Iran .

Patients and Methods

32 patients with final diagnosis of acute mesenteric ischemia who were admitted in Shohada-E-Tajrish hospital from March 1996 to March 2002 were included in this study. Two patients died before operation and the diagnosis was based on clinical findings and analysis of fluid aspiration from the abdomen. All others had an intraoperative diagnosis of mesenteric ischemia. Biodata clinical findings, laboratory results,operative technique, intraoperative findings and etiology , and postoperative progression were recorded and classified and evaluated in relation to mortality. Intra operative diagnosis of etiology was based on presence of pulse at the origin of mesenteric arteries, location of injured bowel, and evaluation of mesenteric veins. Presence of pulse at the origin of mesenteric arteries signified the presence of an emboli and absence pulse suggested the diagnosis was thrombosis, segmental intestinal involvement and presence of underlying disease suggests non occlusive disease and at last, thrombosis of main veins means venous thrombosis.

Results

There were 32 patients; 21 men and 11 women were included in this study. The mean age of patients was 60.8±16.9 years. All 32 patients had abdominal pain which was sudden onset in 12 patients (37.5%) and recurrent and chronic in 20 patients (62.5%). 31 (96.9%) patients had nausea, 28(87.5%) patients were vomiting. Nineteen(59.3%) patients were constipated 5(15.6%) patients had hematemesis,and 5(15.6%) patients had hematochesia. 13 (40.6%) patients had cardiac disease,4 (12.5%) patients had atherosclerosis , 5 (15.6%) patients had vasculitis , 1(3.1%) patient each had peritonitis,and abdominal aortic aneurysm .Systemic diseases encountered in patients consisted of diabetes mellitus in 5(15.6%) patients, hypertension in 5(15.6%) patients, Cardiomyopathy in 2(6.2%) patients and scleroderma in 1(3%) patient. 17(53.1%) were previously healthy with no prior systemic disease .

On physical examination 17(53.1%) patients were conscious, 11(34.4%) patients were lethargic, and 4(12.5%) patients had restless.Core body temperature (sublingual) was normal in 26(81.2%) patients. There was slight elevation to $37.8^{o\ c}$ in 6 (18.7%).10(31.2%) patients presented in shock and 16(50%) patients had symptoms of peritonitis.Mean systolic blood pressure on admission and mean diastolic blood pressure were 113.8±26.1 and 67.3±15.2 mm Hg. Mean pulse rate was 106.8±19 per minute and respiratory rate was 25.6±6.1 per minute. In abdominal exam, 32(100%) patients had tenderness, 18(56.2%) patients had guarding, and 10(31.2% patients had rebound tender ness. 31(96.9%) patients had abdominal distention. Bowel sounds were decreased in 28(87.5%), patients, increased in 2(6.3%) patients and normal in 2(6.3%) patients .

Central venous catheters were inserted for all of patients and CVP was normal in 20 (62.5%), patients increased in 9 (28.1%) patients and decreased in 3 patients (9.4%). Urinary output was less than 30cc per hour in 23 patients (71.9%) and more than 30cc per hour in 9(28.1%) patients. There was AF rhythm on electocardiography in 12(37.7%), patients and sinus tachycardia in 11 (34.4%) patients and normal sinus rhythm in 8(25%) There was myocardial Infarction in 1 (3.1%)patient .White blood cell count was greater than 20000/mm 3 in 16(50%), patients 10000 to 20000 in 13(40.6%) patients and less than 10000 in 3(9.4%)patients. On laboratory investigations, blood sugar was high in 20(62.5%) patients and normal in other 12 patients. Hemoglobin was normal in 22(68.7%), and low in 10(31.2%). Creatinine was high in 21(65.6%) patients and normal in 11 (34.4%). PaO2 was low in 2(68.8%) 2 patients and normal in 10 (31.2%) patients. There was acidosis with a low bicarbonate level in 25(78.1%), patients normal in 5(15.6%) patients and high in 2 (6.3%) patients. Potassium was high in 7(21.9%) patients, normal in 17(53.1%) patients and low in 8 (25) % patients . On plain abdominal x-rays, there were distended intestinal loops in 1(3.1%) patient, diffuse haziness in one patient , diffuse haziness and air-fluid level in 7 patients , diffuse haziness and distended loops and air-fluid levels in 3(9. %4) patients, There were no x-rays reports in 20(62.5%)patients. The interval between onset of pain and operation was greater than 10 hours in 25 (78.1%) patients and lower than 10 hours in 25 (15.6%) patients. 2 patients died before operation. Peritoneal fluid was aspirated looked dark in 28 patients (87.5%) and clear in 4 (12.5%)patients. Intra operative findings consisted of: gangrene Jejunum in 13 patients (43.3%), normal in 12(40%) patients and suspicious in 5 patients (16.7%). There was gangrene Ileum in 24 patient (80%) and normal in 6 patients (20%). There was gangrene cecum in 13 patients (43.3%), normal in 15 patients (50%) and suspicious in 2 patients (6.7%). Gangrene ascending colon in 17 patients (56.7%), normal in 11 patients (36.7%) and suspicious in 2 patients (6.7%). Gangrene Transverse colon in 15 patients (50%), normal in 12 patients (40%) and suspicious in 3 patients (10%). Gangrene descending colon in 7 patients (23.3%), normal in 22 patients (73.3%) and suspicious in 1 patient (3.3%).Intra operative diagnosis of patients was emboli in19 patients (63.3%1), thrombosis in 9 patients (30%), non occlusive in 1 patient (3.3%), and venous thrombosis in 1 patient (3.3%). The mucosa of the transected bowel was well perfused in 16 patient (53.3%), poorly perfused in 12 patients (40%) and suspicious in 2 patients (6.7%) .

Discussion

The mean age of patients was 60.8 ± 19.6 years which is approximately 10 years younger comparing to other studies[2711,19.] Women[11,19.] are more commonly affected though sixty seven percent of our patients were male. Tachycardia was a common mode of presentation among our patients and there was

leukocytosis evidence of overwhelming in ongoing inflammatory reaction. Renal function was compromised as evidenced by acidosis , hypo/hyperkalemia and raised creatinine . Mesenteric ischemia was complicated by atrial fibrillation , , vasculitis , peritonitis , sclerodermia, vomiting hematemesis, constipation, and melena. There was associated comorbdities noted in some patients notably cardiac disease, atherosclerosis and diabetes mellitus . The commonest presenting sign was abdominal pain, nausea, vomiting and hematemesis. Resuscitation was meant to be improve urinary output as most patients whose output were compromised had a poor outcome. Thirty four percent of patients presenting in Shock did not recover and all 84% of patient who were not in shock or were resuscitated all survived. Plain abdominal x rays did not provide specifc information to support diagnosis in 13 patients but in 50% of patients there were features suggestive of peritonitis .There were no imaging characteristics useful in the prediction of mortality. It is usually not easy to identify clinically the patient AMI due to an embolus different from the patient with thrombosis. Several studies indicate that AMI following emboli do worse than those caused by thrombi[17,21]. Patients who had a second look operation were more likely to survive compared to those who never had it.. SMA embolectomy was performed on two patients, one died on the table and the other one was discharged after 1 week. Over all mortality rate for all operations in the long run was 75%.

Conclusion

The patient with AMI is a surgical emergency due to derangement in electrolytes with severe inflammatory reaction. The initial effort is to resuscitate efficiently and take a good clinical history and exam thoroughly . Intervention should be urgent with the aim of resection of gangrene loops of gut ,embolectomy and vascular bypass as necessary .Accurate postoperative monitoring of the patient is critical and oral feeding should be started as soon as possible. In this situation TPN may be helpful in managing the patient. If short bowel syndrome or other complications of bowel resection occur, continuing the TPN until bowel adaptation is recommended.

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