

Evaluation of outcome in Mesenteric Ischemia

Samad Shams Vahdati,MD¹, Ozgur Tatli,MD^{2*}, Mohammad Taghizadieh,MD³, Roshan Fahimi,MD⁴, Neda Gholamzadeh,MD⁵, Mustafa Cicek,MD⁶

1. Associate professor of emergency medicine, emergency medicine research team ,Tabriz University of medical science AND Tabriz branch, Islamic Azad University, Tabriz, Iran
2. Assistant professor of emergency medicine, emergency department, Karadeniz Technical University, Trabzon, Turkey
3. Assistant professor of pathology, Department of Pathology, Medical Sciences Faculty, Tabriz branch, Islamic Azad University, Tabriz, Iran
4. Medical doctor, Road Traffic Injury Research Center, Tabriz University of medical science, Tabriz, Iran
5. Medical doctor, Medical Sciences Faculty, Tabriz branch, Islamic Azad University, Tabriz, Iran
6. Resident of emergency medicine, emergency department, Karadeniz Technical University, Trabzon, Turkey

Abstract

Background: Acute mesenteric ischemia (AMI) is an infrequent but a complicated life threatening condition. It is the leading causes of mortality with the rate of 60-100%. The purpose of our study is to investigate demographic outcomes of the patients referred to the emergency department of Imam Reza hospital with the diagnosis of AMI. **Methods and materials:** All patients with the diagnosis of AMI from March 2014 to March 2016 who were referred to emergency department of Imam Reza hospital, were studied. Demographic characteristics (age, sex, the period from symptom onset till laparotomy), risk factors and the last outcomes of patients were noted in the check lists for each patient. *P* value less than 0.05 was determined as significant. **Results:** from 111 patients, 76 cases (68.8%) were male, 35 cases (31.5%) were female. Chief complaint of all patients was stomachache. Period of arriving to the emergency room in 5 cases (4.5%) was 1-6 hours, in 3 cases (2.7%) was 6-12 hours, and in 103 cases (92.8%) has taken more than 12 hours. In 55 cases (49.5%), there was a significant relationship between clinical signs and physical examination findings, whereas in 56 cases (50.5%) there was no relation. In our study 42 cases (37.8%) were treated, whereas the morbidity and mortality rate were respectively 7 (6.3%) and 62 (55.9%). According to the results of our study the most important finding was pain which was disproportionate to physical examination findings (*P* value< 0.052). **Conclusion:** Acute mesenteric ischemia is a severe and progressive disease so early diagnosis and appropriate treatment are very important. One of the main reasons of higher mortality rate in AMI is difficulty in early diagnosis, before necrosis occurrence. Major factor that determines the survival rate is the accurate diagnosis before necrosis and peritonitis happens.

Key words: Acute mesenteric ischemia, mortality, morbidity

Corresponding author:

Ozgur Tatli

Assistant professor of emergency medicine, emergency department, Karadeniz Technical University, Trabzon, Turkey

Adress: Üniversite Mh. Farabi Hastanesi Pk:61080 Ortahisar/Trabzon

Email: dr.ozgurtatli@ktu.edu.tr Tel: +9004623771183

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Introduction

Mesenteric ischemia is a medical condition in which injury of small intestine occurs due lack of enough blood supply. Severity of the injury depends on ischemia, systemic blood pressure, blood flow, amount of autonomic stimulants in the blood and response of mesenteric vessels to them, regional hormonal factors, cell metabolites after reperfusion of ischemic intestine and duration of ischemia. Four pathologic factors are detected as the most important causes of ischemia: superior and inferior mesenteric artery embolism, thrombosis of SMA and IMA, vein thrombosis and non-occlusive mesenteric ischemia. Embolism is the most common cause of acute mesenteric ischemia. Correct diagnosis at the right time in most cases, elderly patients who have cardiac problems and some factors of higher mortality rate, is very important in managing (1). Acute mesenteric ischemia is a life threatening medical condition with mortality rate of 60-100%. It is not only an uncommon disorder but also very complicated with non-appropriate clinical condition, usually occurring in elderly people. Nowadays despite of promotion in methods of diagnosis and truly management in acute mesenteric ischemia, we face with the huge rate of morbidity and mortality. Non-specific clinical symptoms, past medical history of patients, postponement in laparotomy, old age, cardiac disease in old patients are the most usual reasons of high mortality and morbidity(2). Acute mesenteric ischemia is the etiology of almost 1% of acute abdomen hospitalization with mortality rate of 1out of 1000 patients. According to its non-specific first signs of acute mesenteric ischemia first diagnosis is difficult. As a matter of this fact that is why the mortality is evaluated from 40% up to 70%. 24 hours retardation in first diagnosis is leading to catastrophic outcomes. The most persistent sign is severe pain felt in abdomen not related to a special area, that

usually is not responding to the opiates. It is progressive. Stomach is distended after by. It is very sensitive, painful, shock and general peritonitis are not rare to happen (9). Laboratory findings include leukocytosis, elevated serum amylase, high creatine kinase (CK), low base, elevated serum level of inorganic phosphate and peritoneal fluid (10). And also rising D-dimer level which has sensitivity about 60% and specificity of 80% (11).

Vessel atherosclerosis, mesenteric vessel embolism, vessel vasospasm, mesenteric vein thrombosis are common reasons that impair intestinal blood flow (2). Duration of ischemia, occlusive rate of mesenteric artery and collateral vessel blood flow are usual causes of injury (2). Leukocytosis not only occurs in acute mesenteric ischemia, but also it is a non-specific marker in inflammations and infections. About 50% of the patients present with metabolic acidosis and 25% have elevated level of amylase. Pre renal azotemia, lactate level, rising phosphate level, and rising alkaline phosphatase is also reported (2). Radiologic imaging is not very helpful in diagnosis of acute mesenteric ischemia. Doppler sonography is a diagnostic modality which its accuracy depends on the radiologist skills. CT angiography has high specificity and sensitivity in diagnosis (2). MRI angiography could also be helpful for diagnosis. But it is limited to detecting first part of celiac artery and superior mesenteric artery. Angiography could be perform in those cases suspicious to abstraction of mesenteric artery (2). Oral and injected contrast of CT angiography is another modality of occlusive artery or vein diagnosis. CT angiography with 96% sensitivity and 94% specificity is chosen as a gold standard. If occlusive non ischemic vessel was detected CT angiography is the best choice (6).In radiology findings in plain abdominal film distention of small intestine and



colon up to splenic flexure and distended intestine filled with no gas, with air fluid level are in favor of AMI diagnosis (9). Specific findings of gas in the intestinal wall and portal vein and defective slow movement or thumb sign were seen in late stages (11). Another outcome of acute mesenteric ischemia is aortic dissection (12) leading intestine infarction, intra lumen bleeding, perforation and finally death because of sepsis. Sepsis and multi organ failure even could be happen without process of necrosis and perforation (13). Diagnosis, truly management and early surgical or non-surgical intervention is the most effective way to survive patients. Non-surgical intervention is still under research. According to other studies due to angiography and vasodilator or thrombolytics injection treatment results before peritoneal signs or hemodynamic disorders, they could be used instead of surgical intervention in many patients (1). Mesenteric artery embolism needs surgical treatment. Emergent surgery is necessary for peritonitis. thrombolysis from hepatic vein catheter is useful for vein thrombosis management that it should be done till 3 or 4 weeks after diagnosis to prevent portal vein HTN. Early diagnosis (4-6hours after starting symptoms) and surgery decreases incidence of poor prognosis (6). Early time first diagnosis is the most important factor for patient's survival. When we are suspicious for acute mesenteric ischemia and emergent angiography is not suitable, emergent laparotomy is the best choice. In patients with peritonitis signs and suspected to acute mesenteric ischemia, angiography is controversial. In patients with probable diagnosis of mesenteric artery embolism with peritonitis existence, emergent laparotomy is the standard management (2)

Multiple studies have done about etiology and outcomes of acute mesenteric ischemia. Some of them such as death leading complications of none occlusive ischemic

mesenteric artery after cardiovascular surgeries (14), hemodialysis patients (15), duodenal perfusion due to superior mesenteric artery ischemia after per cutaneous intraluminal angioplasty and stent placement (13), intestine necrosis due to mesenteric vessel recovery (16), none occlusive mesenteric ischemia due to aortic aneurysm treatment(17), splenectomy due to metastasis of lung cancer (18). According to the extensiveness of acute mesenteric ischemia, etiology and outcomes, in this study we are detecting epidemiology of acute mesenteric ischemia outcomes of the patients who were arrived to the emergency with acute mesenteric ischemia diagnosis and relationship between demographic variables and clinical outcomes of it.

Conclusion

Acute mesenteric ischemia is progressive, so that early diagnosis and suitable management is very important. One reason of high mortality rate due to acute mesenteric ischemia is difficulty in diagnosis before necrosis occurrence. The most important detecting factor of survival rate is ability to diagnose early and before necrosis and progressing to peritonitis. In our study prevalence of acute mesenteric ischemia in patients more than 60 years was about 5.76%. about sex domination epidemiology in male was high, from statistical point of view there was no significant relationship between sex and mortality rate. In our study mortality rate of patients who has been operated was 55.9%.

Methods and materials

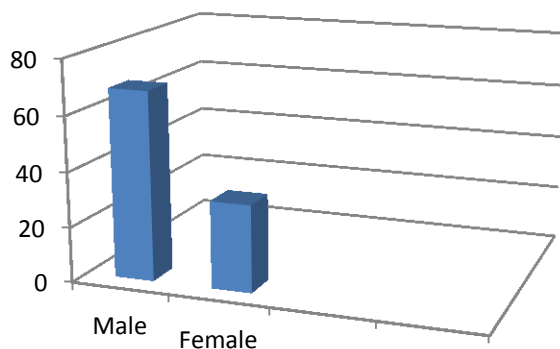
This is a descriptive cross sectional study and all patients with acute mesenteric ischemia diagnosis from March 2014 to March 2016 have been investigated. Demographic characteristics (age, sex, duration between starting symptoms up to laparotomy intervention), risk factors and outcomes were noted in the check list for each patient. In retrospective studies patients with



incomplete records were not investigated. All data consist of age, sex, discharging, referring to the other hospital centers, death, discharging with patient or their parents' consent were noted in the check list. Analytical studies have been done using statistic system SPSS; (version 15, SPSS Inc., Chicago, IL, USA). Descriptive statistical methods were used for statistical analysis. To present quantitative data, mean \pm standard deviation (SD) was used, and frequency and percentage were used to demonstrate qualitative data.

Results

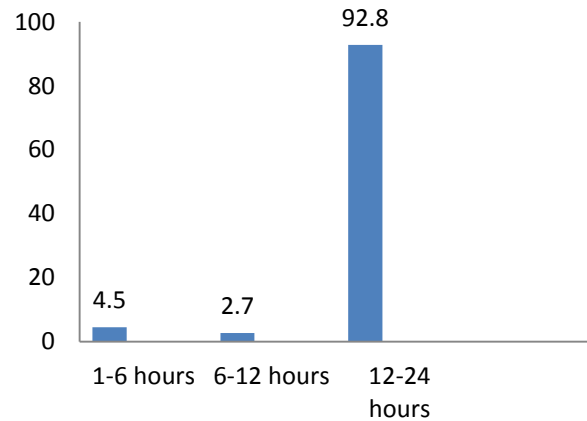
In our study 76 cases (68.5%) were male and 35 cases (31.5%) were female. Period of arriving to the emergency in 5 cases(4.5%) was 1-6hours, in 3cases (2.7%) between 6-12hours, in 24 cases (21.6%) was 12-24hours, in 72 cases (64.9%) was less than a week, in 7 cases (6.3%) it had taken more than one week.



Pain localization in 5 cases (4.5%) was in RUQ, in 8 cases (7.2%) in epigastric region, in 1 of them (0.9%) in LUQ, in 15 cases (13.5%) in umbilical area, in 3 cases (2.7%) in RLQ, in 1 (0.9%) of them in hypogastric area, in 1 of them (0.9%) in LLQ, in 77 cases (69.4%) was felt generalized in abdomen.

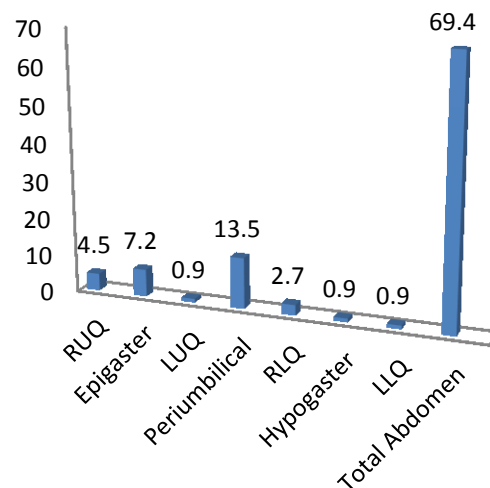
In 55 cases there was a relationship between symptoms and physical examination. In 56 cases (50.5%) there wasn't any. In 77 cases (69.4%) CT scan has got positive results

whereas in 34 cases (30.6%) results of CT were negative. In our study 15 cases (13.5%) were operated, 8 cases (7.2%) and 88 cases (79.3%) were respectively admitted in the ICU and ward.



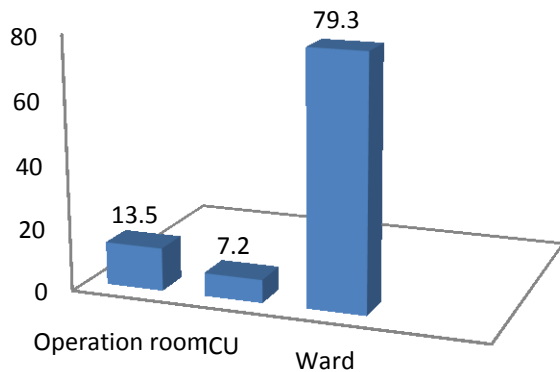
In our study 42 patients (37.8%) were treated whereas morbidity rate was 7 cases (6.3%) and mortality rate was 62 cases (55.9%).

In 3 cases (2.7%) there was no pathological point in radiography findings, in 21 cases (18.9%) gas was seen, in 55 cases (49.5%) air-fluid level was seen, in 20 cases (18%) free gas under diaphragm was detected and in 21 cases (10.8%) both air-fluid level and free gas under diaphragm were detected.

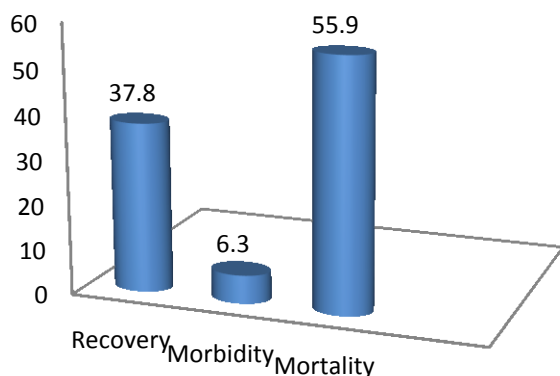


The risk factors of the patients of our study in 66 cases were HTN, in 55 cases intra abdominal operation, in 48 cases smoking

cigarette, in 33 cases cardiovascular disease, in 24 cases hyperlipidemia, in 19 cases diabetes, in 8 cases CVA, in 6 cases hemodialysis, in 5 cases operation in thorax, in 5 cases surgery on joints. There was no significant relationship between risk factors and mortality (P value >0.052).

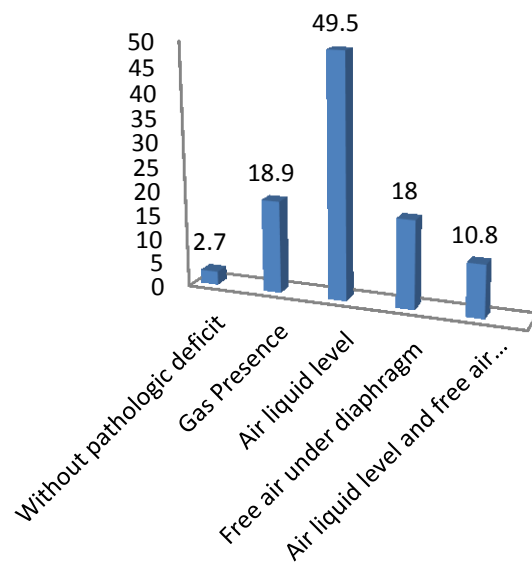


Acute mesenteric ischemia is 1 out of 1000 admitted patients in the hospital. Due to its low prevalence this diagnosis and its risk factors causing high mortality rate, are not many, similar to other diagnosis. Mortality rate of acute mesenteric ischemia is variable between 30%-100% (2).



Emergency specialist can do all of emergency procedures easily(19) and in most

of the patients the first impression and last impression in emergency department is a same with last diagnosis in wards but in a few cases it can be had mismatch (20). Mortality rate in Gans *et al* study in first 30 days after discharge is 3.8%, in re-admitted in 30 days after discharging is 14.1%. 47.4% of patients were operated. Mortality rate 30 days after discharging was about 7.3% and in re-admitting was about 21.3% (3).



Acute mesenteric ischemia is a sever progressive medical condition, so that early diagnosis and truly management is very important. One of the reasons of high mortality rate of acute mesenteric ischemia is difficulty in diagnosis and before necrosis. The most important factor of detecting survival rate is ability to diagnose before necrosis and its progressing to peritonitis (2).

In most of emergency department , emergency specialist use ultrasonography as a bed side diagnostic tools specially in trauma patients, but ultra-sonography can show us free fluid in other patients who suspicious to have abdominal problem (21, 22).

For pain control we can use opioids, opioids can decrease pain without any change in peritoneal reaction findings (23).

In Aliosmanoglu *et al* study 47 patients (49.5%) were operated in first 24 hours that 5 of them (10.6%) were died. 48 patients (50.5%) after 24 hours were diagnosed and operated which 35 cases of this group (72.9%) was the rate of mortality. There was a significant difference in these groups. Finally, they have got to this important that latency and retardation in diagnosis comes with poor prognosis (2). In our study period of arriving to emergency department in 5 cases (4.5%) was 1-6 hours, in 3 cases (2.7%) was 6-12 hours, in 24 cases (21.6%) between 12-24 hours, in 72 cases (64.9%) less than a week, and in 7 of them (6.3%) lasted more than one week. We were not able to find significant relationship between poor prognosis and postponement. The only imaging modality and also standard method useful for acute mesenteric ischemia diagnosis is angiography, others are used to rule out differential diagnosis. Angiography has two restrictive factors: A) mesenteric vessels angiography is not done in most clinical centers. B) Clinical condition of most patients is not suitable for angiography (2). Bradburg *et al* recommended that operation must have done for all patients with the first diagnosis of acute mesenteric ischemia (2). In Aliosmanoglu *et al* study 39 patients (41.1%) went to the operation room after physical examination and peritoneal lavage. For 56 cases (58.9%) plain abdominal film was done to rule out differential diagnosis (2). In Mozaffar *et al* study in a simple abdomen radiography of a patients (3.1%) distended loop was seen. In another patients generalized haziness and air-fluid level, and in 3 cases (9.4%), generalized haziness, distended loop and air-fluid level was detected and in 10 cases (62.5%) radiography was not requested (1). In abdomen radiography which was done in 13 patients no special clue was detected. In 50% of the patients with peritonitis symptoms there was no significant relationship with the death (1). In our study in 3 cases (2.7%) in plain abdominal film no

pathological clue was found. In 21 cases (18.9%) air was seen, in 55 cases (49.5%) air-fluid level, in 20 cases (18%) free air under diaphragm and in 12 cases (10.8%) both air – fluid level and free gas under diaphragm was detected. Similar results to Mozaffar *et al* study there was not significant relationship between plain abdominal film and morbidity. According to Mozaffar *et al* study in 15.6% of patients intensity of pain and tenderness, guarding, rebound tenderness comparison, were consonant whereas in 27 cases (84.3%) were not (1). In our study in 55 cases (49.5%) there was a relationship between symptoms and physical examination, whereas in 56 cases (50.5%) there wasn't any. In Mozaffar *et al* study unlike other studies 67% of the patients were male. Past medical histories of the patients of his study was consisted of Diabetes Melitus in 5 cases (15.6%), HTN in 5 cases (15.6%), mitral valve prolapse in 2 cases (6.2%), cardiomyopathy in 2 cases (6.2%) and scleroderma in 1 (3.1%). 17 patients (53.1%) didn't have any systemic diseases (1). Heart disease was the most common systemic disease and atrial fibrillation was the most common heart disease (1). Atherosclerosis, vasculitis, peritonitis, and sclerodermatitis are reported as the other etiologies (1). Risk factors of the patients were reported. HTN in 66 cases, intra-abdominal surgery in 53 cases, HLP in 24 cases, smoking cigarette in 48 cases, heart disease in 33 cases, DM in 19 cases, CVA in 8 cases, hemodialysis in 6 cases, thoracic surgery in 5 cases and joint surgery in 5 cases. In Ghaffouri and *et al* study, shows that there is a direct relation between serum lactate and mesenteric ischemia in patients with high suspicious to has mesenteric ischemia (24)

According to the studies of Mozaffar *et al* no significant relationship was found between final diagnosis and mortality (1). Results based on various studies shows that acute mesenteric ischemia is rising at the age of 65 years. In our



study the most common age of acute mesenteric ischemia is at the age of 75 years, similar to many other studies results.

Conclusion

Acute mesenteric ischemia is progressive, so that early diagnosis and suitable management is very important. One reason of high mortality rate due to acute mesenteric ischemia is difficulty in diagnosis before necrosis occurrence. The most important detecting factor of survival rate is ability to diagnose early and before necrosis and progressing to peritonitis. In our study prevalence of acute mesenteric ischemia in patients more than 60 years was about 5.76%. about sex domination epidemiology in male was high, from statistical point of view there was no significant

relationship between sex and mortality rate. In our study mortality rate of patients who has been operated was 55.9%.

Authors contribution

SSV designed the study. NG Data collection. MC performed the analysis and final evaluation. OT critically revised the article and study conduct. RF drafted the first copy of article. MT lab test data collection and pathology data collection.

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Conflict of Interest

Authors have no conflict of interest.

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