Case Report

Isolated ileocolic artery occlusion presented with segmental bowel infarction: a case report

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Abstract

Acute mesenteric ischemia is a serious acute abdominal condition requiring early diagnosis and intervention to improve the outcome. Although transmural acute bowel infarction represents about 1% of all cases of acute abdomen, it has a higher annual mortality rate than colon cancer. It tends to affect the colon in segmental fashion, mostly the splenic flexure and rectosigmoid portions of the colon. Isolated ischemia of the right side of the colon is rarely reported, especially in association with shock. Diagnosis of acute colonics ischemia is challenging as it may easily be confused with other non ischemic conditions both clinically and radiologically. Surgical resection is still the main curative approach. We present a case of segmental terminal ileum, cecum and part of ascending colon infarction due to isolated IleoColic artery thrombosis.

Case presentation

A 57-year-old Indian male laborer was admitted to the hospital from the Emergency Department complaining of central abdominal pain. The pain had started on the previous day with severe colicky pain starting around the umbilicus. This pain was non-radiating, was not related to meals. It was associated with anorexia, nausea, one attack of vomiting [coffee ground vomitus], and two attacks of non bloody diarrhea with no mucus. There was no history of urinary symptoms, fever or weight loss. The patient was hypertensive on beta blockers, had no history of surgeries or allergy, and had no special habits. Physical examination revealed no evidence of arrhythmia or heart failure. Physical examination was significant only for marked generalized abdominal distension, tenderness, rebound tenderness, abdominal guarding and rigidity. There were no bowel sounds, no ascites or organomegaly. Rectal examination revealed an empty rectum with mild dark blood in the rectum. Blood workups showed some abnormal limits; white blood cell count of 13.5 thousand/ml, sodium 129 mmol/L, potassium 5 mmol/L and bilirubin 50 umol/L. Urine examinations was positive for ketones, glucose and red blood cells. Chest x-ray revealed no air under the diaphragm or signs of intestinal obstruction. Angio CT of the Abdomen revealed complete thrombosis of the distal IleoColic artery with secondary nonenhancement of the wall of the distal ileum, cecum and part of ascending colon secondary to arterial occlusion (thrombosis). [Figure 1, and Figure 2]. A bolus of intravenous heparin sodium was given to avoid any further thrombus propagation. The patient consented and was prepared for an urgent exploratory laparotomy which revealed gangrene affecting 5 cm of the distal ileum and cecum and about 6 cm of the ascending colon. Careful examination found...
both small and large intestine intact. A right hemicolec-
tomy was performed with Ileo-transverse anastomosis.
Histopathology examination revealed black discoloration
of the distal 5 cm of terminal ileum, Cecum and the prox-
imal 6 cm of the ascending colon with no visible perfora-
tions. Microscopic examination revealed submucosal and
transmural necrosis of the same segments of terminal
ileum, cecum and proximal ascending colon. Appendix
showed small organizing thrombus in the submucosal
vessels and both resection margins were viable. Post oper-
avative Lab work up revealed prolonged prothrombin
time (13.2 seconds), increased lactic acid level (3.6 mmol/L),
increased D Dimer automated (417 ng/ml), positive C-
Reactive protein (96 mg/L), Antithrombin III function
deficiency (61%), normal protein C clotting and protein S
clotting, normal activated protein C resistance test, nor-
mal carcinoembryonic antigen (CEA), CA 19-9, homocysteine,
and prostate specific antigen (PSA) normal fibrinogen level, negative antcardioliopin Ig M, ANA, ANCA ethanol. Abdominal Angio CT was done on the sec-
ond post operative day and was normal. Patient was dis-
charged home after 8 days.

Discussion
Acute mesenteric ischemia represents one of the most
threatening abdominal conditions in elderly patients [1].
It has high mortality rate (50%-90%, depending on the
cause of the event and the degree and extent of ischemic
bowel wall damage despite medical advances [2]. Most
cases of acute intestinal ischemia result either from
thrombosis of a preexisting stenotic lesion or from embol-
ization [3] (most frequently to the SMA). Cardiac emboli
are the most common variety, though tumor emboli [4],
and atheroemboli are seen as well. Atheroemboli gener-
ally result from iatrogenically induced cholesterol embol-
ization caused by aortic catheterization. Acute mesenteric
artery thrombosis accounts for 25% to 30% of all ischemic events[4]. Segmental ischemia of the right side
of the colon is uncommon and reported particularly in
case of shock [5]. Acute occlusions of the superior
mesenteric artery due to thrombosis or embolization are
responsible for approximately 60%-70% of cases of acute
bowel ischemia, Acute occlusions of the mesenteric arter-
ies may be related to numerous other conditions, how-
ever, including atherosclerosis, thromboembolism from
the aorta, mesenteric arterial thrombosis, aortic or
mesenteric arterial dissection, spontaneous or postope-
rateive cholesterol embolization, aortic surgery, stent place-
ment, or therapeutic embolization of mesenteric vessels
to treat gastrointestinal hemorrhage [6]. Isolated infarc-
tion of cecum was reported in two patients who were both
diabetic and hypertensive [5]. In contrast to the dual
blood supply serving the ileum, appendix and ascending
colon, the cecum is supplied by end arteries which may
render it more susceptible to ischemia [5]. Also poor col-

Figure 1
Abdominal Angio CT coronal reconstructed image
revealed; no enhancement of the distal IleoColic
artery in arterial phase denoting complete thrombo-
sis. Note also; decreased degree of venous enhancement in
the IleoColic vein as an effect of arterial thrombosis. (1) Ileo-
Colic vein. (2) IleoColic artery.

Figure 2
Abdominal Angio CT coronal reconstructed image
revealed; marked discrepancy of the bowel wall
enhancement between the distal ileum and right
colon, and the proximal ileal loops and left colon,
denoting arterial ischemia.
lateral vessel flow may put the cecum at risk for embolic infarction commonly by atheromatous emboli [7]. In subject patient there is associated Antithrombin III function deficiency (61%), hypofibrinogemia and increased D Dimer which indicate hypercoagulable state. CT scan is a fast, widely available noninvasive modality that holds great promise for use in the diagnosis of AMI. CT

Diagnostic criteria of AMI include pneumatosis intestina-

lis, venous gas, superior mesenteric artery occlusion, celiac

and inferior mesenteric artery arterio-occlusion with dis-
tal superior mesenteric artery disease, or arterial embo-

lism or, alternatively, bowel wall thickening combined

with any one finding of focal lack of bowel wall enhance-

ment, solid organ infarction, or venous thrombosis. By

combining these criteria, a sensitivity of 96% and a speci-

ficity of 94% can be achieved [8]. Other CT findings sug-
gestive of bowel ischemia include thumbprinting, intramural hemorrhage, focal or diffuse bowel dilatation, mesenteric arterial thrombus, engorged mesentery, portal or mesenteric venous gas and pneumoperitoneum [9]. Unfortunately, common CT findings in bowel ischemia are not specific, and specific findings are rather uncom-

mon [10]. CT findings of isolated cecal infarction may be

mistaken for typhilitis; ischemia of the terminal ileum or

segmental bowel ischemia, Crohn disease; ischemic pan-
colitis and infectious or ulcerative colitis. However, the

most common cause of CT misinterpretation of non

ischemic conditions for bowel ischemia is the presence of

pneumatosis or portal venous gas [11]. Contrast-

enhanced ultrasonography is a promising tool for the

assessment of bowel ischemia in patients with radi-

ographic evidence of small-bowel dilatation. By taking

the noninvasive nature of the test into account, this method

has potential for application in daily practice as a diagno-

stic method for bowel ischemia [12]. Operative interven-
tion remains the mainstay of management of almost all

patients who present with AMI. Surgery is indicated in all

patients with peritonitis after rapid resuscitation. At

laparotomy the surgeon should establish the diagnosis,

consider appropriate revascularisation and resect the

already damaged bowel. The decision for relook laparot-

omy should be made at the initial surgery itself and is

independent of the clinical status of the patient between

the two procedures [13]. The goals in the surgical treat-

ment of acute mesenteric ischemia are (i) to restore nor-

mal pulsatile flow to the SMA and (ii) to resect any

nonviable intestine. In general, revascularization precedes
resektion. The therapeutic approach varies, depending on
the specific underlying cause. For embolic disease of the
SMA, the standard treatment is surgical embolectomy
using the balloon catheter thromboembolectomy, with or
without patch angioplasty of the superior mesenteric
artery [14]. Management of Superior Mesenteric Artery
Thrombosis is performed by thrombectomy, if possible,
or (usually) by a bypass. Options include an aortovisceral

graft (with a polyester fluoroethylene prosthesis or the

saphenus vein) either antegrade from the supraceliac or
retrograde from the infraceliac aorta or iliomesenteric bypass grafting originating from the right or left iliac artery [15]. In most cases, a single-vessel, retrograde bypass graft is best since it requires the least time to com-
plete and causes less hemodynamic disturbance through
cross-clamping of the iliac artery [16]. Percutaneous Tran-
scatheter Thromboaspiration is another treatment modal-
ty of Superior Mesenteric Artery Thrombosis;An 8F
guiding catheter (Cordis, Roden, the Netherlands) placed
into the ostium of superior mesenteric artery from a per-
cutaneous transfemoral approach, and embolectomy per-
formed coaxially with 7F and 6F aspiration catheters using
a 60-mL locking syringe for aspiration [17]. After success-
ful restoration of mesenteric arterial flow, laparoscopic
examination of the viability of the abdominal organs was
performed. Intensive anticoagulation was maintained.
Thrombolysis of the SMA thrombosis through intra-
arterial infusion of urokinase or streptokinase may result in
revascularization of the small intestine. Angiographic
demonstration of the arterial blood flow with venous
return in the small mesenteric vessels also is the superior
monitorization method for the intestinal viability. There-
fore, patency should be checked 30 minutes after intra-
arterial infusion of thrombolytic agent with an opaque
injection associated with power Doppler ultrasound scan.
If repeated angiography shows occlusion, laparotomy
should be performed urgently. Surgical resection of
necrotic bowel and anticoagulant therapy to control pro-
gressive vascular thrombosis should be carried out with-
out delay. Time-consuming radiological and laboratory
investigations should be avoided [18].

Some investigators have promoted endovascular treat-
ment as a first-line therapy for mesenteric occlusive dis-

ease [19]. Simonetti and associates have reported on
seven patients who presented with acute occlusive
mesenteric ischemia [20]. However, only five cases were
amenable to angioplasty, fibrinolysis, or both. Of those
five patients, four showed clinical improvement without
need for operation. Other groups have reported even
more limited success in the endovascular management of
patients with acute mesenteric ischemia [21,22]. Endo-
vascular treatment of patients with acute mesenteric ischemia
also may expose the patient to the risk of ongoing
ischemic damage during the wait for the thrombolytic
therapy to have an effect. Furthermore, acute bowel
ischemia may result in mucosal slough, leaving a large raw
surface area, so that infusion of thrombolytic agents
directly into the superior mesenteric artery vessel could
result in significant gastrointestinal hemorrhage. Finally,
the status of the bowel integrity cannot be addressed
through angiographic techniques, and early recognition
and resection of ischemic bowel that may progress to per-

oration are essential to avoid potentially disastrous clini-
laparoscopic second-look operation is one of the safest interventions, which proves the technique is really "minimally invasive." It not only prevents unnecessary laparotomies but also saves poor-risk patients from additional surgical trauma. It has become the routine procedure of choice for every patient who is operated on with the diagnosis of mesenteric ischemia [25].

Conclusion
Acute arterial mesenteric ischemia is a serious condition if not recognized and treated early. There is often a delay in diagnosis and treatment of this disease because of its diverse causes and non specific radiological studies. We recommend that whenever mesenteric ischemia is suspected Angio CT should be ordered because the routine CT examinations may miss focal arterial mesenteric ischemia. Decreasing the time to diagnosis remains the only reliable means to decrease the morbidity and mortality associated with this disease.

Abbreviations
AMI: acute mesenteric ischemia; ANA: antinuclear antibody; ANCA: anti-neutrophilic cytoplasmic antibodies; CA 19-9: cancer antigen 19-9; CEA: carcinoembryonic antigen; CT: computed tomography; PSA: prostate specific antigen; SIRS: systemic inflammatory response syndrome.

Consent
Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review from the journal's Editor-in-Chief.

Competing interests
The authors declare that they have no competing interests.

Authors' contributions
HH, MFA, AEO did the surgery. HH, EMB wrote the article. All authors read and approved the final version of the manuscript.

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