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ISCHEMIC COLITIS – DIAGNOSTIC AND THERAPEUTIC CHALLENGES

ISHEMIJSKI KOLITIS-DIJAGNOSTIČKI I TERAPEUTSKI IZAZOVI

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Ključne reči
ishemijski kolitis, ishemija kolona, fulminantni kolitis, kolektomija

Abstract

Ischemic colitis (IC) is a rare condition. As ischemia is often transient and the clinical symptoms are reversible, its exact incidence is unknown. In current clinical practice, two types of IC are described according to the severity: severe IC, with transmural colonic ischemia and/or Multy Organ Failure (MOF), and mild IC, without MOF and spontaneous favorable evolution in most cases. Two clinical contexts are encountered: spontaneous IC (SIC) and postoperative IC (POIC), mainly after aortic surgery. As there are no specific clinico-biologic symptoms of IC, emergent CT-scan and colonoscopy are required for diagnosis confirmation, surgical decision and prognosis analysis. Surgical treatment of IC is not consensual but can be standardized according to organ function and the degree of ischemia: surgery treatment in case of colonic necrosis with deep ischemia and/or MOF; observation for superficial ischemia without organ dysfunction, systematic medical care. Surgery is required in 20% of cases, and consists of different types of colonic resection including colectomy without continuity restoration and prophylactic cholecystectomy. Ischemic diseases of the gastrointestinal tract are some of the commonly encountered gastrointestinal diseases which are difficult to diagnose and still more difficult to treat.

INTRODUCTION

Ischemic colitis also known as colon ischemia (IC) is a common disorder of the large bowel in older persons and is the most common form of intestinal ischemic injury. It comprises a spectrum that includes reversible colopathy (submucosal or intramural hemorrhage), transient colitis, chronic colitis, stricture, gangrene, and fulminant universal colitis. The initial presentation is usually the same among these types and does not necessarily predict the course of disease, with the exception of ischemia involving the ascending colon. This latter pattern can simultaneously involve the small intestine, usually caused by SAME (*Superior Artery Mesenteries Embolism*) or NOMI (*non-occlusive mesenteric ischemia*), can have associated shock, and carries a mortality rate of more than 50% [(1)].

See Table 1.

Table 1. *Types and approximate frequencies of colon ischemia in patients seen at a „Pirogov" hospital (referral 10 years)*

Type	Frequency (%)
Reversible colopathy and transient colitis	> 50
Transient colitis	10
Chronic ulcerating colitis	20
Stricture	10
Gangrene (necrosis)	15
Fulminant universal colitis	< 5

Incidence

The incidence of IC is underestimated because many patients suffer only mild or transient damage and do not seek medical attention. Also, IC is commonly misdiagnosed and confused with other disorders, notably inflammatory bowel syndrome (IBS).

After adjustment for age, sex, and calendar year, the incidence of IC in people with IBS was 3.4 times higher than it

was persons without IBS. IC has female gender predilection, and more than 90% of patients with IC of noniatrogenic causes are older than 60 years.

IC affecting young persons has been documented in case reports or series of a few patients and usually has been due to vasculitis, coagulation disorder, illicit use of cocaine, and a variety of iatrogenic causes including a wide variety of medications such as estrogens, serotoninergic agonists and antagonists, sumatriptan, and methamphetamine.

Pathophysiology and Causes

IC can result from alterations in the systemic circulation or from anatomic or functional changes in the mesenteric vasculature, and it is thought to result from local hypoperfusion and reperfusion injury. In most cases, no specific cause for the ischemia is identified, and such episodes are viewed as localized nonocclusive ischemia, likely a result of small vessel disease. An increasing variety of causes of IC are being defined, including hematologic disorders, thrombophilic states, and medications.

Abnormalities on angiography rarely correlate with clinical manifestations of disease, but age-related abnormalities in the splanchnic vessels, including narrowing of small vessels, tortuosity of the long colic arteries, and fibromuscular dysplasia of the superior rectal artery, can contribute to IC. The colon is particularly susceptible to ischemia, perhaps owing to its relatively low blood flow, its unique decrease in blood flow during periods of functional activity, and its sensitivity to autonomic stimulation. What triggers the episode of IC, however, is usually not known [2].

CAUSES OF COLON ISCHEMIA

Acute pancreatitis
Allergy
Amyloidosis
Heart failure or cardiac arrhythmias
Hematologic disorders and coagulopathies
Infection
Inferior mesenteric artery thrombosis
Long-distance running
Medications and toxins
Pheochromocytoma
Ruptured ectopic pregnancy
Shock
Strangulated hernia
Atheroembolism
Left atrial myoma
Trauma (blunt or penetrating)
Vasculitis and vasculopathy
Volvulus

Surgery/procedures:

Aortic aneurysmectomy
Aorto-iliac reconstruction
Barium enema
Colon bypass
Colonoscopy
Exchange transfusions
Gynecologic operations
Lumbar aortography

Pathology

Morphologic changes after IC vary with the duration and severity of the injury. The mildest injury is mucosal and submucosal hemorrhage and edema, with or without partial necrosis and ulceration of the mucosa. With more severe injury, chronic ulcerations, crypt abscesses, and pseudopolyps develop changes that can mimic inflammatory bowel disease, pseudomembranes may also be seen. Iron-laden macrophages and submucosal fibrosis are characteristic of ischemic injury. With severe ischemia, the muscularis propria is replaced by fibrous tissue, forming a stricture. The most severe form of ischemic damage causes transmural infarction [3].

Clinical Features and Diagnosis

IC usually manifests with sudden cramping, mild, left lower abdominal pain; an urgent desire to defecate; and passage of bright red or maroon blood or bloody diarrhea within 24 h. Bleeding is not sufficient to require transfusion. Mild-tomoderate abdominal tenderness is usually present over the involved segment of bowel. Patients with ischemia isolated to the right side of the colon more often present with lower abdominal pain than they do with rectal bleeding or bloody diarrhea [4-8].

A large retrospective study of patients with biopsy-proven IC shows that no region of the colon is spared from involvement. A segmental pattern of involvement is seen most commonly and the sigmoid is affected most often (22.9%), followed by the descending-to-sigmoid colon segment (11.0%), the cecum-to-hepatic flexure segment (8.0%), the descending colon alone (8.0%), and a pancolonic pattern (6.6%). Although no specific etiology was associated with any specific anatomic distribution, pancolitis and isolated right-sided colonic disease were frequently seen in patients with sepsis. In older reports, certain causes were believed to affect particular segments: local nonocclusive ischemic injuries, the watershed areas (the splenic flexure and rectosigmoid), ligation of the IMA, the sigmoid. The length of affected bowel can depend on the cause of IC: atheromatous emboli involve short segments, and nonocclusive injuries involve longer portions of colon.

If IC is suspected, a CT scan might support the clinical suspicion and also diagnose potential complications. If the CT scan shows only nonspecific findings such as a thickened segment of colon, or if the abdominal plain film appears normal, colonoscopy should be performed on the unprepared colon within 48 h of the onset of symptoms. During colonoscopy and barium enema examination, care should be taken not to overdistend the colon because high intraluminal pressure diminishes intestinal blood flow and can aggravate ischemic damage, particularly in patients with vasculitis.

Colonoscopy is preferable to barium enema because it is more sensitive in diagnosing mucosal abnormalities, and biopsy specimens may be obtained. Hemorrhagic nodules seen at colonoscopy represent bleeding into the submucosa and are equivalent to thumbprints on barium enema studies. Segmental distribution of these findings, with or without ulceration, is highly suggestive of IC, but the diagnosis of IC cannot be made conclusively on the basis of single examination unless mucosal gangrene is seen. A colonoscopic finding called the colon singlestripe sign has been described in patients with IC referring to a single line of erythema with erosion or ulceration oriented along the longitudinal axis of the colon; it had a 75% histopathologic yield in making the diagnosis of ischemic injury and signified a milder course than did a circumferential ulcer. Segmental disease, rectal sparing, and

rapid spontaneous evolution usually resulting in resolution of disease are characteristics of IC.

The initial diagnostic study should be performed within 48 h because thumbprinting disappears within days as the submucosal hemorrhages are resorbed or the overlying mucosa sloughs. Studies performed 1 week after the initial study should reflect evolution of the injury—either normalization of the colon or replacement of the thumbprints with a segmental ulcerative colitis-type pattern. Universal colonic involvement, however, favors true ulcerative colitis, whereas fistula formation suggests Crohn's disease. Occasionally, an abundant inflammatory response can produce heaping up of mucosa and submucosa that resembles a stricture or neoplasm.

At the time of symptom onset, colon blood flow typically has returned to normal; therefore, mesenteric angiography is usually not indicated. An exception to this rule is when the clinical presentation does not allow a clear distinction to be made between IC and AMI or perhaps when only the ascending colon is involved. Administration of air during flexible sigmoidoscopy or a limited colonoscopy can subsequently and immediately be used to reveal thumbprinting not otherwise visible on abdominal plain films; thumbprints stand out as relatively radiodense nodules against the radiolucency of the administered air. Nodules in the left colon or throughout the colon imply IC, whereas nodules isolated to the ascending colon suggest the possibility of otherwise silent SMA disease and the need to evaluate the mesenteric vasculature [9-11].

Clinical Course and Treatment

When IC is diagnosed and physical examination does not suggest gangrene or perforation, the patient is treated expectantly. Parenteral fluids are administered and the bowel is placed at rest. Broad-spectrum antibiotics are given to cover the fecal flora because in experimental models antibiotics reduce the extent and severity of bowel damage. An electrocardiogram, Holter monitoring, and transthoracic echocardiogram should be obtained to exclude or confirm a cardiac source of embolism. Patients with segmental nongangrenous IC undergoing such evaluation are 2.5 times more likely to have their cardiac risk factor identified compared with other patients with IC. Cardiac failure and arrhythmias are treated, and medications that can cause mesenteric vasoconstriction are withdrawn. If the colon appears distended, it is decompressed with a rectal tube. Serial imaging tests of the colon and continued monitoring of the hemoglobin level, WBC count, and electrolyte levels are indicated until the patient's condition stabilizes [12].

Increasing abdominal tenderness, guarding, rebound tenderness, rising temperature, and paralytic ileus indicate colonic infarction and demand immediate laparotomy and colon resection if appropriate. At operation, mucosal injury may be extensive despite normal-looking serosa, and of extent of resection should be guided by the distribution of disease as seen on preoperative studies rather than the appearance of the serosal surface of the colon at the operation [13].

In more than half patients with IC, the disease is reversible. Generally, the symptoms of IC resolve within 48–72 h and the colon heals in 1–2 weeks. With severe injury, it can take 1–6 months for the colon to heal, however, during this time the patient is usually asymptomatic. A retrospective study of 350 patients with biopsy-proven IC showed that those with isolated right-sided colon ischemia had a worse outcome than those with IC isolated to other segments, including a fivefold increase in the need for surgery and a twofold increase in mortality. Another retrospective study showed that patients' ages, leukocyte counts, lactate dehydrogenase levels, blood lactate levels, and absence of vascular flow to the colonic wall on abdominal Doppler ultrasonography were independent predictors of complicated IC; only absence of arterial flow was a significant predictor of complicated disease when confounding for other factors. Symptoms that persist for more than 2 weeks are also associated with a higher incidence of acute complications and irreversible disease: gangrene and perforation, segmental ulcerating colitis, or stricture [14].

Gangrene (Necrosis)

Abdominal tenderness with fever and signs of peritonitis suggests infarction and the need for emergent laparotomy.

Segmental Ulcerating Colitis

Segmental ulcerating colitis may be seen with recurrent fever and sepsis, continuing or recurrent bloody diarrhea, and persistent or chronic diarrhea with protein-losing

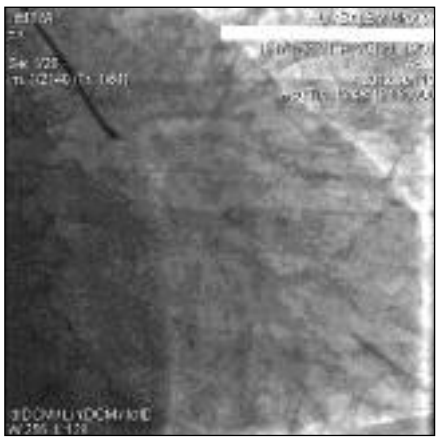

Fig. 1 *Full occlusion of AMI;*

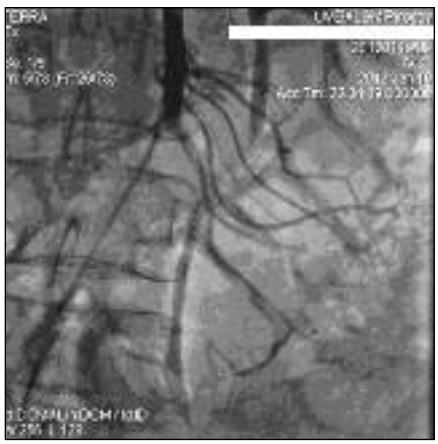

Fig. 2 *Initial partial recovery of blood flow at 45 minute*

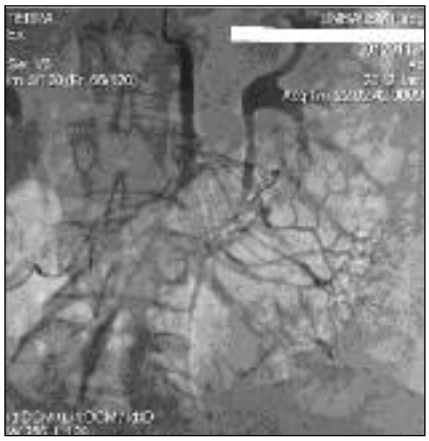

Fig. 3 *Recovered blood flow after the third hour*

colopathy. Patients who are asymptomatic or who are minimally symptomatic but have endoscopic evidence of persistent disease should undergo follow-up colonoscopy to determine whether the colitis is healing or becoming chronic, or forming a stricture. Recurrent fever, leukocytosis, and septicemia suggest unhealed segmental colitis and, if found, mandate resection of the ischemic segment of bowel. Patients with persistent diarrhea, bleeding, or protein-losing colopathy of more than 2 weeks' duration are at high risk for perforation, and resection is indicated. Patients who present with segmental ulcerating colitis are often given a misdiagnosis of inflammatory bowel disease. Response to oral steroid therapy is usually poor and may be associated with an increased incidence of perforation. Success has been achieved with fatty acid enemas and corticosteroids given per rectum. Patients whose symptoms cannot be controlled medically should have a segmental resection, which usually is curative [15].

Ischemic Stricture

Ischemic strictures that produce no symptoms can be observed. Some disappear over 12–24 months with no therapy. Of course, resection is required for those that cause obstruction. There is limited experience with endoscopic dilation of ischemic strictures, although in a few cases, this technique has been successful.

Universal Fulminant Colitis

Sudden onset of a toxic universal colitis picture with signs of peritonitis and a rapidly progressive course are typical of universal fulminant colitis, a rare variant of IC. Total abdominal colectomy with ileostomy is usually required.

CONCLUSION

Ischemic diseases of the gastrointestinal tract are some of the commonly encountered gastrointestinal diseases which are difficult to diagnose and still more difficult to treat.

Presentation of colon ischemia is even more subtle and this review article has tried to detail about the various presentation patterns of ischemic colitis and their management.

Sažetak

Ishemijski kolitis (IK) je retko oboljenje. S obzirom na to da je ishemija često prolazna i da su klinički simptomi reverzibilni, tačna učestalost nije poznata. U savremenoj kliničkoj prakasi su opisana dva tipa IK koji se razlikuju po težini: težak IK sa transmuralnom ishemijom debelog creva i/ili otkazivanjem velikog broja organa (MOF) i umeren IK bez MOF i sa spontanom povoljnom evolucijom u većini slučajeva. Svrstavaju se u dva klinička konteksta: spontani IK (SIK) i postoperativni ishemijski kolitis (POIK) koji nastaje nakon operacije aorte. S obzirom da nema specifičnih kliničko-bioloških simptoma IK, potrebni su hitan CT-skener i kolonoskopija za potvrdu dijagnoze, odluku o hirurškoj intervenciji i analizu prognoze. Ne postoji opšte prihvaćena saglasnost o hirurškom lečenju IK, ali može biti standardizovana u odnosu na funkciju debelog creva i stepen ishemije: hirurško lečenje je potrebno u slučaju postojanja nekroze debelog creva sa dubokom ishemijom i/ili MOF; u slučaju prisustva površinske ishemije bez disfunkcije organa potrebna je konzervativna terapija. Hirurško lečenje je potrebno u oko 20% slučajeva i obuhvata različite vrste resekcije debelog creva uključujući kolektomiju bez restauracije u kontinuitetu i profilaktičku holecistektomiju. Ishemijske bolesti gastrointestinalnog trakta su česte gastrointestinalne bolesti koje se teško dijagnostilkuju i još uvek se teško leče.

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