

# Bowel ischaemia

## Types of bowel ischaemia

Bowel ischaemia has been classified into three main types:

- Acute mesenteric ischaemia.
- Chronic mesenteric ischaemia.
- Ischaemic colitis (colonic ischaemia).

## Acute mesenteric ischaemia

This is an umbrella term covering a number of conditions, including acute mesenteric arterial embolus and thrombus, mesenteric venous thrombus and non-occlusive mesenteric ischaemia (NOMI).

They all have the features of impaired blood transfusion to the intestine, bacterial translocation (the passage of intestinal bacteria to normally sterile tissue) and systemic inflammatory response.

### How common is acute mesenteric ischaemia? (epidemiology)

This is chiefly a disease of people aged over 50, although younger people with risk factors for mesenteric venous thrombosis (MVT) – eg, [atrial fibrillation](#) (AF) – can be affected. The overall incidence is low – around 0.09–0.2% of all hospital admissions – but is a common indication for emergency intestinal resection.<sup>[1]</sup>

### Predisposing factors

- Conditions causing arterial emboli – eg, mural thrombus following myocardial infarction, auricular thrombus associated with [mitral stenosis](#) and AF, septic emboli from [valvular endocarditis](#), fragments of proximal aortic thrombus, arterial catheterisation dislodging bits of plaque.

- Conditions causing arterial thrombosis – atherosclerosis (most common), [aortic aneurysm](#) or [dissection](#), arteritis, decreased cardiac output (eg, from [myocardial infarction](#) or [chronic heart failure](#)), dehydration.
- NOMI – hypotension, vasopressive drugs, ergotamines, cocaine, digitalis.
- MVT can be caused by:
  - Hypercoagulability disorders (eg, protein C and S deficiency).
  - Tumour causing venous compression or hypercoagulability.
  - Infection – usually intra-abdominal such as [appendicitis](#), [diverticulitis](#), or abscess, venous congestion from [cirrhosis](#) (portal hypertension).
  - Venous trauma from accidents or surgery, especially portocaval surgery, [pancreatitis](#), decompression sickness.

### **Acute mesenteric ischaemia symptoms**

The presentation of the various types is similar, with moderate-to-severe colicky or constant and poorly localised pain.

A striking feature is that the physical findings are out of proportion to the degree of pain and, in the early stages, there may be minimal or no tenderness and no signs of peritonitis.

In the later stages typical symptoms of peritonism develop, with rebound guarding and tenderness. A mass is sometimes palpable. Examination may reveal associated causes (eg, AF).

### **Investigations**

A high level of suspicion and early diagnosis with CT angiography are the key to lower mortality rates.

- There are no specific laboratory tests. A raised white cell count and/or lactate may suggest ischaemia, but are nonspecific.
- Plain abdominal X-rays are of little utility.

- A CT scan may show gas in various ectopic places such as bowel wall (pneumatosis intestinalis) or portal vein, bowel wall and/or mesenteric oedema, thumbprinting, streaking of mesentery and solid organ infarction.
  - CT angiography is the gold standard and shows arterial blockage due to emboli or thrombus.<sup>[1]</sup> Multidetector computerised tomography (MDCT) with intravenous contrast enhancement is the specific investigation of choice.
  - Intraoperative fluorescein administration may be required to highlight those areas of bowel that need resection.
- 

## Differential diagnosis

- Other causes of an [acute abdomen](#).
- [Abdominal aortic aneurysm](#).
- [Biliary disease](#).
- Chronic mesenteric ischaemia.
- [Diverticulitis](#).
- [Ectopic pregnancy](#).
- [Helicobacter pylori](#) infection.
- Multisystem organ failure of [sepsis](#).
- [Myocardial infarction](#).
- [Pneumonia](#).
- [Pneumothorax](#).
- Acute intermittent [porphyria](#).
- [Testicular torsion](#).

## Acute mesenteric ischaemia treatment<sup>[1]</sup>

### Medical care

- Initial resuscitation with intravenous fluids and oxygen should be carried out.

- Nasogastric tube should be sited.
- Intravenous broad-spectrum antibiotics are recommended.
- Unless contra-indicated, intravenous unfractionated heparin is also recommended.

### **Surgical care**

- Prompt laparotomy should be done for patients with overt peritonitis.
- The goals of surgery include re-establishment of the blood supply to the ischaemic bowel; resection of all non-viable regions and preservation of all viable bowel.

Endovascular revascularisation procedures may have a role with partial arterial occlusion.

### **Prognosis**

Even in the best hands, the outcome is poor. If the diagnosis is missed, the mortality rate is 90%. With treatment, the mortality rate is still 50–90%.<sup>[2]</sup> Survivors of extensive bowel surgery face considerable disability.

## **Chronic mesenteric ischaemia**

This is a chronic atherosclerotic disease of the vessels supplying the intestine. It is also known as intestinal angina. Usually all three major mesenteric arteries are involved.

### **How common is chronic mesenteric ischaemia? (Epidemiology)**

Chronic mesenteric ischaemia has a very low incidence, accounting for less than 1 in 1,000 hospital admissions for abdominal pain.<sup>[3]</sup>

Patients are typically female and between 50 and 70 years of age. They usually have other coexisting manifestations of atherosclerotic disease.

### **Predisposing factors**

This is generally caused by factors predisposing to atherosclerosis – eg, smoking, hypertension, diabetes mellitus and hyperlipidaemia.<sup>[4]</sup>

### **Chronic mesenteric ischaemia symptoms**

The presentation of the various types is similar, with moderate-to-severe colicky or constant and poorly localised pain.

The history is typically one of weight loss, postprandial pain ('intestinal angina') and a fear of eating.<sup>[4]</sup>

There is usually a history of cardiovascular disease such as myocardial infarction or cerebral vascular disease. Other nonspecific symptoms may include nausea, vomiting, or bowel irregularity.

Examination may show vague abdominal tenderness disproportionate to the severity of the pain, an abdominal bruit and signs of generalised cardiovascular disease.

### **Differential diagnosis**

- Acute mesenteric ischaemia.
- Other causes of an [acute abdomen](#).
- Causes of [dyspepsia](#).
- [Diverticulitis](#).
- [Gastric cancer](#).
- [Chronic pancreatitis](#).
- Chronic [pyelonephritis](#).

### **Investigations<sup>[5]</sup>**

- Tests should be carried out to exclude a gastrointestinal malignancy and other potential differentials; depending on the situation, this might include an OGD, colonoscopy, and abdominal CT scan.
- A CT angiogram is the preferred definitive imaging test for chronic mesenteric ischaemia. It has largely replaced catheter-based angiography, although this may occasionally still be needed if unusual anatomy obscures diagnostic views from CT angiography.
- Mesenteric duplex ultrasonography is another non-invasive method of demonstrating arterial blood flow but is more affected by extraneous factors such as obesity or respiratory movements.

## Chronic mesenteric ischaemia treatment<sup>[3]</sup>

Asymptomatic patients are usually managed conservatively, with smoking cessation and antiplatelet therapy. These patients have a five-year mortality of 40%, with the majority of deaths attributed to myocardial infarction or cardiovascular death.

Symptomatic chronic mesenteric ischaemia (CMI) is an indication for either open or endovascular revascularisation, as patients with untreated symptomatic CMI carry a five-year mortality rate that approaches 100%.

Nutrition is important in pre-operative assessment, as patients are often malnourished at the time of diagnosis; **total parenteral nutrition** may be necessary both pre- and postoperatively. The optimal revascularisation approach depends heavily on the anatomy and pre-operative condition of the patient. Renal failure is a common postoperative complication.

## Prognosis

For most patients the quality of life is poor. The constant fear of abdominal pain that may occur when eating food leads to significant weight loss. The malnourished state often leads to other metabolic and endocrine problems, such as **osteoporosis** and easy bruising.

## Ischaemic colitis

This is caused by a compromise of the blood circulation supplying the colon. Marginal branches of the middle colic (superior mesenteric territory) and left colic (inferior mesenteric territory) arteries supply the transverse and descending segments of the colon and, with an arterial and lymphatic watershed existing near to the splenic flexure, supported by an additional vascular arcade, this part of the colon is at risk.

Also, blood flow may be impaired by colonic distension with ischaemic colitis occurring within the segment of intestine immediately proximal to an obstruction (stercoral ulceration) or pseudo-obstruction. Ischaemic colitis may also be caused by venous occlusion.

## How common is ischaemic colitis? (Epidemiology)

The incidence of ischaemic colitis rose from 6.1 cases/100 000 person-years in 1976-80 to 22.9/100 000 in 2005-09.<sup>[6]</sup> Many mild cases may go unreported.

Because the most common cause is atheroma of the mesenteric vessels it is mainly a disease of the elderly and is rare before the age of 60.

The average age for diagnosis is 70. The incidence is likely to increase with the increasing age of the population. The condition is, however, by no means unknown in younger age groups, due to non-cardiovascular causes such as cocaine abuse.

## **Predisposing factors**

- Thrombosis:
  - Inferior mesenteric artery thrombosis.
- Emboli:
  - Mesenteric arterial emboli.
  - [Cholesterol emboli](#).
- Decreased cardiac output or [arrhythmias](#).
- Shock (sepsis, haemorrhage, hypovolaemia).
- Trauma.
- Strangulated [hernia](#) or [volvulus](#).

- Drugs:
  - Digoxin.
  - Oestrogens.
  - Antihypertensive drugs.
  - Cocaine and methamphetamine.
  - Vasopressin.
  - Phenylephrine.
  - Pseudoephedrine.
  - Immunosuppressive agents.
  - Psychotropic agents.
- Surgery:
  - Cardiac bypass.
  - Aortic dissection and repair.
  - Aortoiliac reconstruction.
  - Colectomy with inferior mesenteric artery ligation.
  - Gynaecological operations.
- Vasculitis:
  - Systemic lupus erythematosus.
  - Polyarteritis nodosa (hepatitis B, hepatitis C).
  - Thromboangiitis obliterans.
  - Rheumatoid vasculitis.
  - Sickle cell disease.



- Disorders of coagulation:
  - Protein C deficiency.
  - Protein S deficiency.
  - Paroxysmal nocturnal haemoglobinuria.
  - Activated protein C resistance.
  - Antithrombin III deficiency.
- Long-distance running.
- Colonoscopy or barium enema.
- Idiopathic.

### Ischaemic colitis symptoms

The condition may be difficult to diagnose, with nonspecific symptoms of an 'acute abdomen', such as acute-onset abdominal pain.

The pain is most frequently located in the left iliac fossa. Nausea and vomiting often occur and, in the later stages, loose motion containing dark blood. Marked tenderness may be found in the left iliac fossa but the presence of peritonitis suggests full thickness ischaemia, perforation, or alternative diagnosis.

The acute onset of the symptoms is a useful distinguishing factor between ischaemic colitis and inflammatory or infective colitis, where abdominal pain often has a more insidious onset.

Symptoms of ischaemic colitis manifest in a matter of hours and, unlike infective or inflammatory colitis, continue to worsen with systemic instability.

The diagnosis may be one of exclusion and should always be borne in mind in patients presenting with abdominal pain of indeterminate cause. In younger patients it is often associated with taking the contraceptive pill, cocaine or methamphetamine abuse, the use of pseudoephedrine, sickle cell disease and inherited coagulopathies.<sup>[7]</sup> <sup>[8]</sup>

### Investigations<sup>[9]</sup>

- Ischaemic colitis is usually diagnosed via an abdominal CT, ideally with intravenous contrast.
- Formal CT angiography should be performed if isolated right colon ischaemia is found (as it may be a precursor of acute mesenteric ischaemia), or otherwise if acute mesenteric ischaemia is suspected.
- Colonoscopy may show blue, swollen mucosa not showing contact bleeding and sparing the rectum.
- Ultrasound of the bowel can also sometimes demonstrate ischaemic colitis, but is operator-dependent.

## Differential diagnosis

- [Dysentery](#).
  - Acute [diverticular disease](#) of the colon.
  - Acute [inflammatory bowel disease](#).
  - Perforation of a hollow viscus or [pancreatitis](#) causing left-sided peritonitis.
- 

## Ischaemic colitis treatment<sup>[10]</sup>

### Medical care

- The ischaemia may be transient and resolve once the cause of the hypoperfusion has been alleviated. Bowel rest and supportive care are often helpful.
- Broad-spectrum antibiotics are recommended.

### Surgical care

- If symptoms do not improve in 24-48 hours, repeat colonoscopy or imaging of the mesenteric vasculature with CT angiography is necessary to re-evaluate the severity and degree of the disease.
- Increasing abdominal tenderness with guarding and rebound tenderness, fever, uncontrollable bleeding, and paralytic ileus indicate possible infarction of the colon (severe disease) and require urgent laparotomy and removal of the necrotic part of the colon.

## Prognosis

This depends on the location and extent of the disease, coexistent diseases, and whether or not the patient's condition requires emergency surgery. The severity of the IC and the overall mortality is higher in right-sided disease, but the overall mortality is about 22%.<sup>[10]</sup>

**Disclaimer:** This article is for information only and should not be used for the diagnosis or treatment of medical conditions. Egton Medical Information Systems Limited has used all reasonable care in compiling the information but makes no warranty as to its accuracy. Consult a doctor or other healthcare professional for diagnosis and treatment of medical conditions. For details see our [conditions](#).

<b>Last updated by:</b> Dr Doug McKechnie, MRCP 25/01/2024	
<b>Peer reviewed by:</b> Dr Toni Hazell 25/01/2024	<b>Next review date:</b> 23/01/2029

View this article online at: [patient.info/doctor/bowel-ischaemia](http://patient.info/doctor/bowel-ischaemia)

Discuss Bowel ischaemia and find more trusted resources at [Patient](#).



To find out more visit [www.patientaccess.com](http://www.patientaccess.com)  
or download the app



Follow us

