Mesenteric vascular occlusion (ischemia)

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Mesenteric vascular Ischemia

uncommon vascular emergency
diagnosis is often difficult,

and

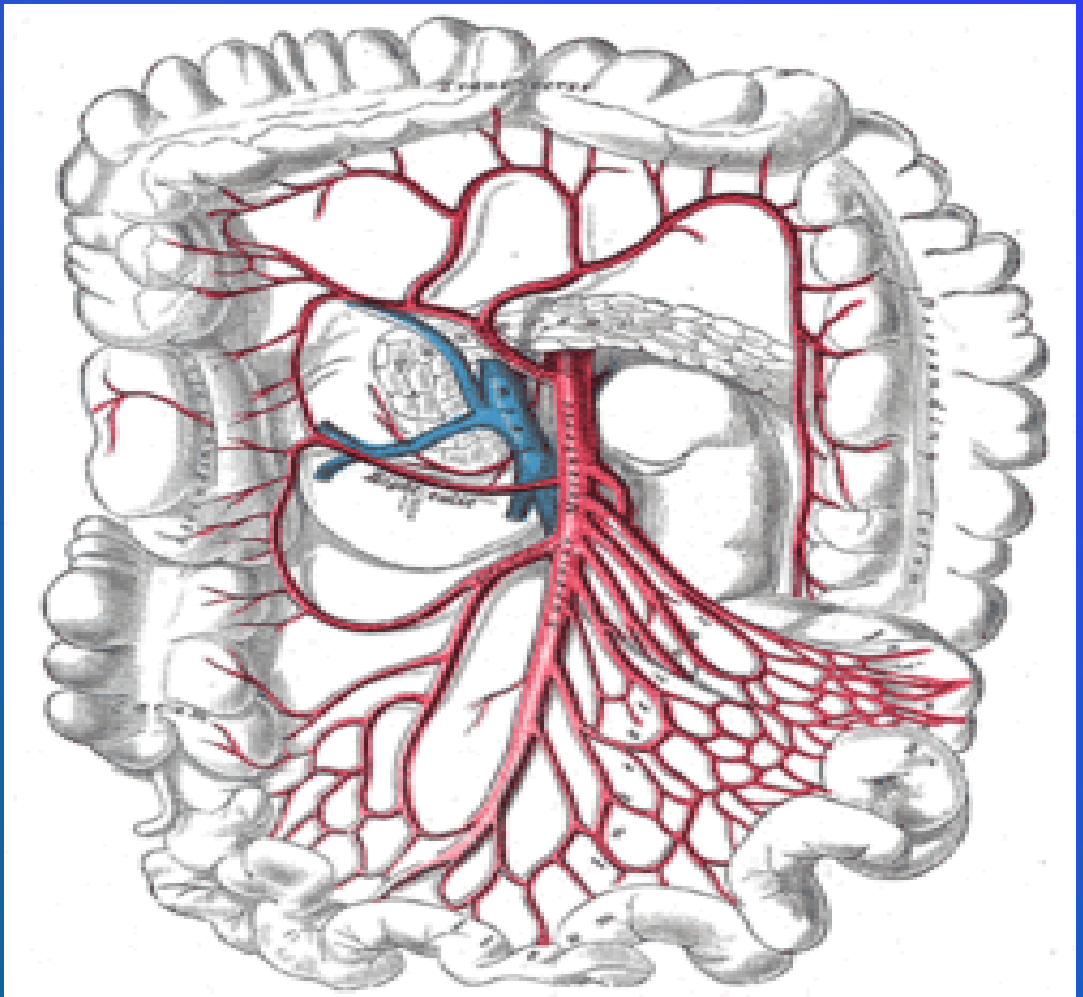
delay in diagnosis results in a grave outcome.

Mesenteric ischemia due to disruption in blood flow to the small intestine or the right colon.

- **More often In elderly,.**

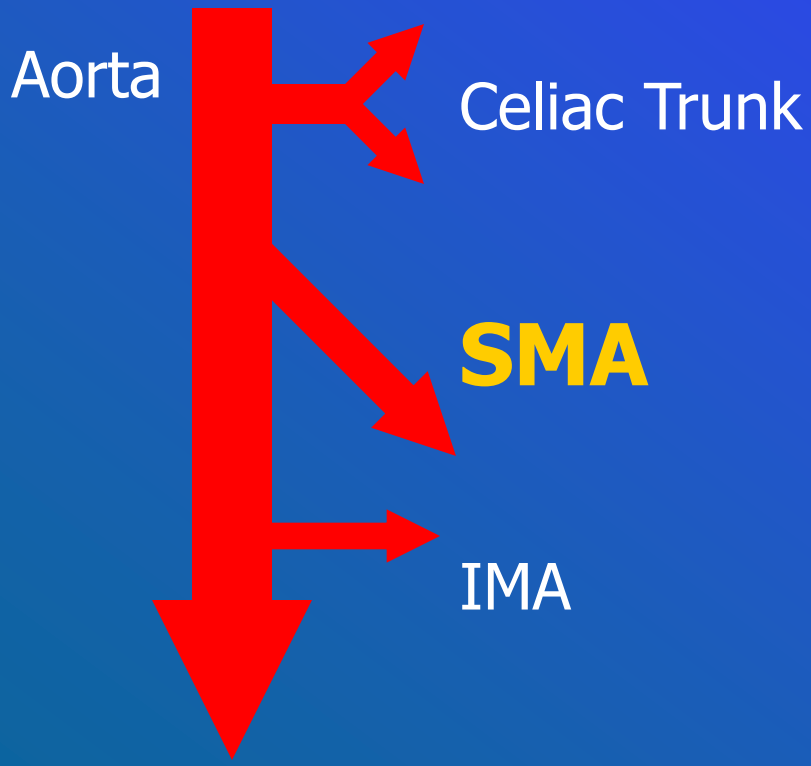
intestinal viability is 100% when symptoms are < 12 hours, before diagnosis.

SMA, branch of abdominal aorta, supplies the intestine from the lower part of the duodenum + two-thirds of the transverse colon, as well as the pancreas.



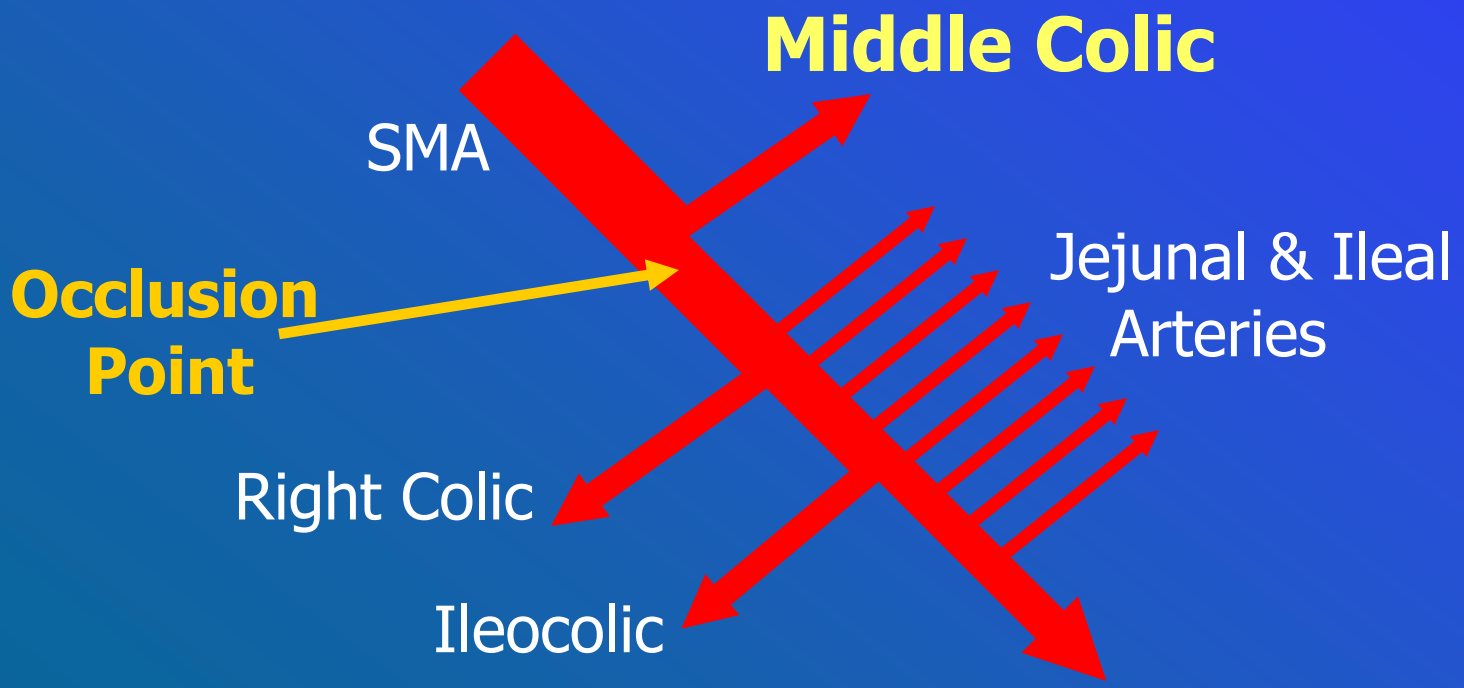
(SMA)

Large caliber + 45 degree angle makes it most commonly occluded



(SMA)

- **Site of Embolic occlusion**



There are acute and chronic forms of mesenteric vascular ischemia.

Acute Mesenteric Ischemia (AMI) Etiology

- SMA Occlusion
  - Embolism: MI, A fib, Endocarditis (65%)
  - Thrombosis: Atherosclerosis(25%)
- Non-occlusive Mesenteric Ischemia(6%)
  - Atherosclerosis + shock
- Mesenteric Venous Thrombosis (MVT) (4%)
  - Primary clotting disorder

in chronic mesenteric ischemia
M. arteries can develop collaterals

This explains
the lack of significant ischemia
despite the high incidence of
atherosclerotic aorta

collaterals are insufficient in case of
acute embolic insult occurs .

- **Suspect the diagnosis**

in elderly + abdominal pain related to meals

- **Patients at risk include the following:**
  - **Congestive heart failure (CHF)**
  - **Cardiac arrhythmias (AF)**
  - **Recent MI**
  - **Atherosclerosis**
  - **Hypo-volemia, Shock**
  - **Hyper-coagulable state (MVT)**

- Mortality rates vary from 60-90% according to the approach

- A survival rate of 90% if angiography was obtained early.

Clinical presentation

Classic Presentation:

- **Rapid onset of severe, peri-umbilical pain**

  (Pain out of proportion to findings on physical examination).
- **Nausea and vomiting**
- **Urgent bowel evacuation**

IN THE PRESENCE OF

Risk factors for acute mesenteric ischemia

Clinical variations

- Pain refractory to analgesics
- Gradual onset, (sudden with embolus)
- Often related to meals (intestinal angina).
- may be absent in 20% of cases.
- Nausea and vomiting are frequent, and
- Diarrhea in (50%)

- (SMA) embolism triad:

GI emptying, abdominal pain,
and underlying cardiac disease

- Abdominal distention, ileus, frank peritonitis, and shock may be present (advanced ischemia).

- Gross or occult blood in 50% of cases.

- ((Do not wait for definite physical signs))

this would be equal to

waiting

for the ischemic bowel to infarct

Mesenteric Venous Thrombosis:

- Fever
- Abdominal distension
- Hem-occult positive stool

Lab. Findings

- Nonspecific & unreliable.
- Metabolic acidosis: in 50% of cases.
- Lactic acidosis
- leukocytosis > 15,000/mm3.
- Hemo-concentration
- Elevated LDH, amylase, AST, & CPK
- Elevated K and Phos. (late signs)

Imaging Studies:

- Plain abdominal radiographs:

normal or nonspecific.

A physician may see

pneumatosis, or portal venous gas

- Selective angiography:

the study of choice:

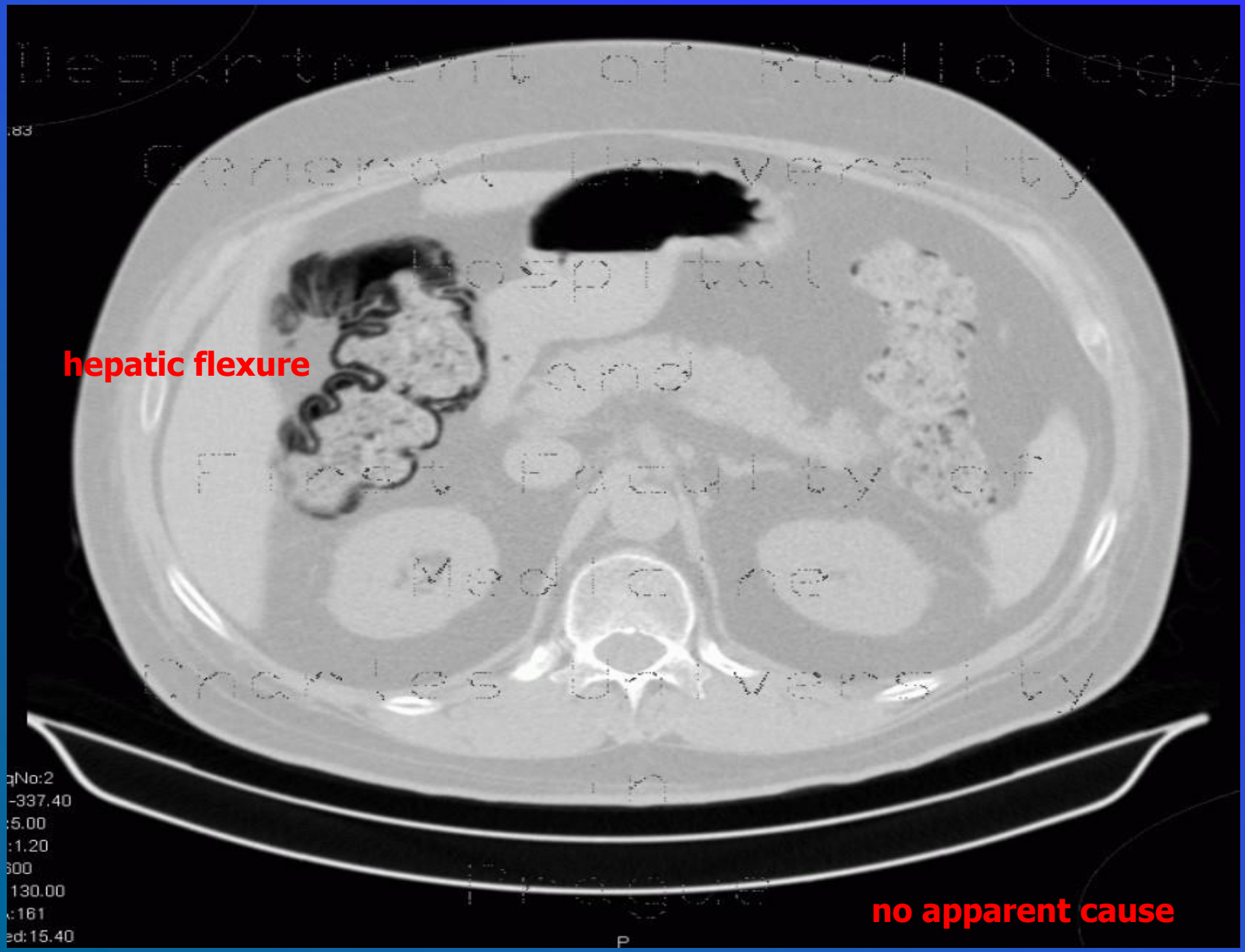
- CT scanning
- MRI

Plain abdominal films

Diffuse dilation of small bowel with Some air in Left colon and Rectum.

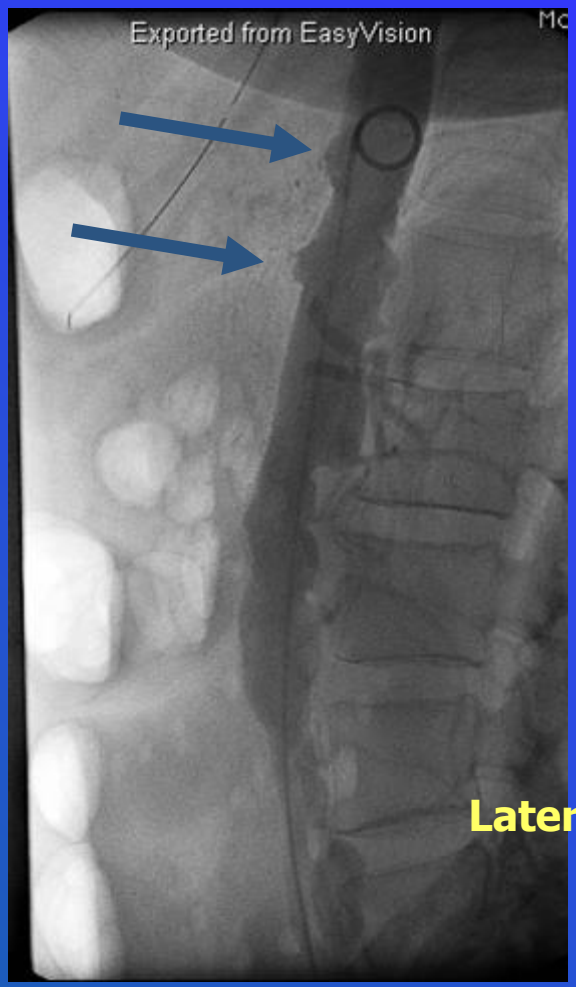
NO free air

Pneumatosis intestinalis CT


hepatic flexure
no apparent cause

Occlusion of SMA at origin (black arrowhead)

Mesenteric Angiogram

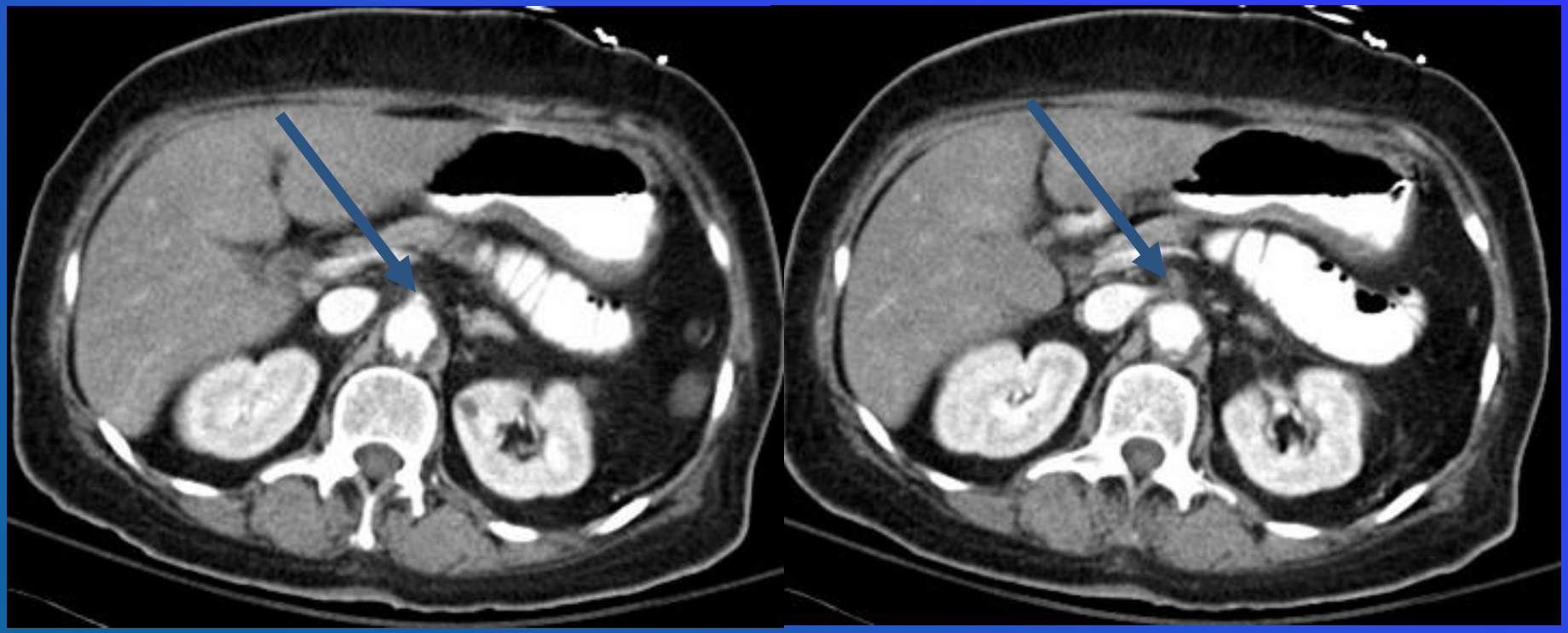


Lateral view

complete lack of contrast in mesenteric vessels in AP view (left).

The occluded origins of celiac axis and SMA Lateral view (right).

CT Angiogram



complete occlusion and lack of IV contrast in SMA from its origin (Arrows).

DIFFERENTIALS

Appendicitis,
Cholangitis
Cholecystitis and Biliary Colic
Lactic Acidosis
Myocardial Infarction
Bowel Obstruction,
Pancreatitis

Ischemia → Infarction

Marked by:

peritoneal signs, fever

Management

Consider the following

- Admit to the hospital/ICU
- Aggressive resuscitation
  - Start IV with isotonic crystalloid solution (NS or LR)
- Insert Foley catheter
  - Monitor response to resuscitation
- Administer broad spectrum antibiotics
  - Likely intra-abdominal septic process
- Parenteral narcotic analgesics

- Anticoagulation
- Infusion of a vasodilator

Gastric decompression:

NGT is useful diagnostically, to evaluate the presence of blood,

&

therapeutically, to relieve distention 2ry to ileus

Consultations:

- **vascular surgeon**

If not available,
consult a general surgeon.

- **Interventional radiology**

for further diagnostic testing.

MEDICATIONS

- **Limit drug therapy:**
  until angiography is performed.
- **Mesenteric venous thrombosis requires anticoagulation.**
  - **If no peritoneal signs, and no collaterals on the angiography, administer intra-arterial papaverine infusion, with repeated angiography.**
  - **If the patient has peritoneal signs, administer continuous papaverine infusion and laparotomy**

Transfer:

- Transfer: if imaging studies or therapeutic interventions are not available.
- Otherwise, do not transfer.

- however, resuscitation prior to transfer.

Complications:

- Sepsis/septic shock
- Multiple system organ failure
- Death

Prognosis:

- With an aggressive diagnostic and therapeutic approach, mortality can be reduced.
- act on clinical suspicion and don't wait a hard evidence.
- The risk of angiography is minor compared to the risk of a delayed diagnosis.

Decision-making in the management of mesenteric ischemia.

Classical signs of mesenteric ischemia

Abdominal pain out of proportion to finding
CT scan evidence of arterial occlusion

- **Direct to OR**

Decision-making in the management of mesenteric ischemia.

Insidious onset, vague symptoms

Mesenteric venous thrombosis

Non-occlusive mesenteric ischemia

→

Anticoagulation, resuscitation, bowel rest, serial exam., ttt. of original low-flow state or inflammatory processes, exploratory laparotomy for failure to improve

intra-operative management of mesenteric ischemia.

SMA embolism

→ **Embolectomy of SMA, check for bowel viability, resect bowelas needed, .., re-operation, anticoagulation**

Mesenteric arterial thrombosis

→ **Aorto- mesenteric bypass as needed, check for bowel viability, resect bowel as needed,.., re-operation, anticoagulation**

Necrotic bowel from mesenteric ischemia.

SUMMARY

Chronic intestinal ischemia

- Atherosclerosis, rarely median arcuate ligament compression
- Abdominal angina & weight loss,? Bruit
- Lateral view aortography ,CT angiography
- Endarterectomy or dacron graft bypass
- Division of median arcuate ligament.

- **AMI** = vascular emergency
- **overall mortality** 60-90%
- **4** main clinical processes

  & the same common endpoint, bowel necrosis, abdominal sepsis, and death.
- Rich collateral: celiac , SMA, & IMA.
- **Acute** occlusion causes acute intestinal ischemia and necrosis.

Non-occlusive ischemia

- **Low cardiac output >>splanchnic vc**
- **No vascular block**
- ***Reperfusion injury*:**

  return of blood flow>> release of oxygen radicals >> damage of cell membrane.

Diagnosis - high degree of suspicion.

"pain out of proportion to physical exam"

Treatment - requires aggressive resuscitation and hemodynamic monitoring. Urgent surgery

Ischemic Colitis?

- Presentation: less & more focal pain (usually left-sided) Splenic flexture ++,
- More bloody diarrhea,
- (>90% are over 60 years old).
- Etiology :

  ?small vessel disease +/- hypoperfusion
- Usually self limited except when stricture or gangrene develops
- Colonoscopy is initial evaluation of choice
- IV fluid antibiotic, Surgery (rarely required).

References

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- Oldenburg et al. Arch Intern Med 164:1054 2004
- Scott JR et al. AJR 113:2 "Acute Mesenteric Infarction" 1971
- UptoDate Online: Article on "Acute Mesenteric Ischemia"
- UptoDate Online: Article on "Ischemic colitis"


THANK YOU

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The four processes:

1) **Acute arterial embolus** :mostly SMA embolus AF, or valvular disorders.
2) **Acute arterial thrombosis** atherosclerotic plaque at origin of vessel acutely thrombosis
3) **Chronic mesenteric ischemia** - atherosclerosis (intestinal angina)
4) **Acute venous occlusion** – (thrombosis)

A First Big Distinction…

- Mesenteric Ischemia – ischemia of the **small bowel**, usually 2/2 an acute cause involving the SMA or SMV.
- Ischemic colitis – ischemia of the **colon**, rarely with a known acute precipitating cause.

Other studies

CT angiogram / MR angiogram

- sensitivity 75%, specificity 100% for emboli
- additionally can detect thickened, distended bowel loops
- more sensitive for Mesenteric Venous Thrombosis

Acknowledgment

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