Case Number 9
Superior Mesenteric Venous Thrombosis

Ramona Camilleri
Reviewed by: Mr. Ernest Ellul

Case summary:

Demographic details:
Mr. G.B., male, Birkirkara.
Referred from: GP.

Mr. G.B., a 69-year-old gentleman, was admitted with severe periumbilical pain radiating to the left lower quadrant. A diagnostic CT scan revealed superior mesenteric vein thrombosis as the underlying cause for the pain. In view of the fact that there were no contraindications to thrombolysis, it was possible to manage this patient with medical treatment using recombinant tissue plasminogen activator (rt-PA; Alteplase). The patient's condition improved and he was deemed fit for discharge on long-term warfarin ten days after admission.

The aetiology of thrombus formation in this gentleman is not as yet known. Further investigations will need to be carried out in order to find the underlying cause.

Presenting complaint:

Gentleman presented with a three week history of episodic worsening lower abdominal pain, associated with nausea and one episode of vomiting.

History of presenting complaint:

The pain was severe in nature, worse in the periumbilical area and in the left lower quadrant. It was associated with nausea and one episode of vomiting. It was not relieved by rest, paracetamol or by opening bowels.

The patient complained of reduced appetite and reduced frequency of bowel opening. Patient last opened his bowels on the morning of admission. He denies any blood with stools, malaena, haematemesis or coffee-ground vomitus.

There was no associated weight loss, fever, chills, rigors or lower urinary tract symptoms.

Past medical and surgical history:

Past medical history:

Chronic obstructive pulmonary disease
Hypertension
Hypercholesterolemia
Depression

Past surgical history:

Stabilization of T12 and L1 fracture (2009)
Movement under anaesthesia and external fixation of fractured tibia and fibula (2009)

Drug history:

Drug	Dosage	Frequency	Type	Reason
Ipratropium	2 puffs	BD	Anticholinergic	Shortness of breath
Budesonide	2 puffs	BD	Inhaled corticosteroid	Shortness of breath
Quetiapine	50mg	Nocte	Atypical antipsychotic	Depression
Lorazepam	2mg	Nocte	Short-acting benzodiazepine	Depression
Paroxetine	20mg	Daily	SSRI antidepressant	Depression
Simvastatin	40mg	Nocte	Statin	Hypercholesterolaemia

The patient suffers from no known drug allergies.

Family history:

Father died of a myocardial infarction at 50 years of age.
Mother had hypercholesterolaemia.

Social history:

Mr. G.B. smokes four cigars daily and does not drink alcohol. He lives with his wife and has good social support. He is fully mobile and copes well with activities of daily living. He is currently a pensioner and used to work as a teacher.

Systemic inquiry:

Systemic enquiry revealed episodic headaches but was otherwise unremarkable.

Discussion of results of general and specific examinations:

General examination:
Patient was alert, not distressed and afebrile. Glasgow Coma scale 15/15.

Respiratory examination:
Respiratory rate: 26 breaths/min
Oxygen saturations: 100% on air.
Chest was clear and there was good air entry bilaterally

Cardiovascular examination:
Capillary refill time: <2seconds
Pulse: 100bpm
Blood pressure: 185/95mmHg
Heart sounds: HS1+ S2+0

Abdominal examination:
Soft abdomen, no distension, tender in epigastrium and left lower quadrant. No rebound tenderness and

no guarding. Percussion tenderness present on left side of the abdomen. No masses were palpable.

Direct rectal examination: brown stools, enlarged prostate, no blood or malaena present.

Differential diagnosis:

- Superior mesenteric vein thrombosis
- Superior mesenteric artery occlusion
- Abdominal malignancy
- Diverticulitis
- Inflammatory bowel disease
- Pancreatitis
- Submucosal haemorrhage or haematoma

Diagnostic procedures:

Laboratory exams:

Test: Bloods: Complete blood count.
Justification for test: Infection, anaemia, thrombocytopaenia.
Result: White cell count raised, raised neutrophils.
Conclusion: Leukocytosis present. No anaemia or thrombocytopaenia.

Test: Bloods: Urea and electrolytes, creatinine.
Justification for test: Renal function, electrolyte balance.
Result: Potassium raised (5.92).
Conclusion: Hyperkalaemia present.

Test: Bloods: Amylase.
Justification for test: Query pancreatitis.
Result: Normal.
Conclusion: Pancreatitis unlikely.

Test: Bloods: Arterial blood gases.
Justification for test: Acid-base status, query sepsis.
Result: pH 7.65, pCO2 15.6, Base Excess -6.1, HCO3: 13.6, Lactate 1.9.
Conclusion: Compensated respiratory alkalosis, no sepsis.

Test: APTT, INR.
Justification for test: Baseline, query need for thrombolysis.
Result: INR: 1.13, APTTr: 0.90.
Conclusion: No contra indication to thrombolysis.

Instrumental exams:

Test: Chest X-ray.
Justification for test: Active lung lesions, hypertension, air under diaphragm.
Result: No active lung lesion was noted. No cardiomegaly present and no perforation suspected.
Conclusion: Normal chest X-ray.

Test: Abdominal X-ray.
Justification for test: Acute abdomen, bowel perforation, impacted faeces, bowel obstruction.
Result: No air or fluid levels were noted. Metallic fixation of the vertebral bodies was seen.
Conclusion: No signs of bowel perforation, obstruction or impacted faeces.

Test: CT scan (Figure 1).
Justification for test: To find aetiology of pain, exclude malignancy.
Result: Superior mesenteric vein thrombosis extending to the portal confluence with correspondent jejunum and proximal ileum. Mesenteric panniculitis. Small ascites. Diverticular disease of the large bowel.
Conclusion: Superior mesenteric vein thrombosis diagnosed.

Figure 1: CT scan showing thrombosis of superior mesenteric vein.

Management and therapy:

1. Patient was reviewed and admitted to intensive therapy unit (in view of his condition).
2. He was kept nil by mouth.
3. Nasogastric tube was inserted and stomach contents aspirated.
4. Urinary catheter was inserted with urinometer – input and output charting was monitored hourly.
5. Fluids were administered – 1L normal saline alternating with 5% dextrose I L 6 hourly.
6. Parameters were monitored hourly (including: pulse, blood pressure, temperature, oxygen saturations).
7. Medications were started as shown below.

Drugs:

Drug	Dosage	Frequency	Type	Reason
Cefuroxime	750mg IV	TDS	Antibiotic	Empirical
Metronidazole	500mg IV	TDS	Antibiotic	Empirical
Omeprazole	40mg IV	Daily	Protein pump inhibitor	Reduces risk of bleeding
Paracetamol	1g IV	QDS	Analgesic	Pain relief
Pethidine	75mg IM	TDS/PRN	Analgesic	Pain relief

Prochlorperazine (Stemetil)	12.5mg IM	TD/PRN	Dopamine antagonist	Anti-emetic
Alteplase	See below	See below	Tissue plasminogen activator	To dissolve thrombus in SMV

Thrombolysis: In view of the fact that there was probably prolonged onset and there were no contraindications to thrombolysis, it was decided to thrombolyse the patient using alteplase 0.9mg/kg. Patient weighed 82kg and therefore a total of 73mg alteplase was administered as follows:
-10mg as IV bolus
-50mg over 1 hour
-15mg over the next hour
Following thrombolysis, an unfractionated heparin infusion 6000U IV 6-hourly was started. APTT was checked after 6 hours of starting heparin and an APTTr of 2.5 - 3 was aimed for.

Diagnosis:

Superior mesenteric vein thrombosis is a relatively uncommon condition which carries significantly high morbidity and mortality rates. It causes 5-15% of cases of acute mesenteric ischaemia and its prognostic outcome depends on early diagnosis and adequate treatment. A high level of clinical suspicion is therefore required to ensure prompt and effective treatment administration.

Relevant Anatomy (Figure 2):

The superior mesenteric vein is formed by the jejunal, ileal, ileocolic, right colic and middle colic veins. The inferior mesenteric vein joins the splenic vein which in turn join the superior mesenteric vein to form the portal vein. The superior mesenteric vein drains the small intestine, caecum, ascending colon and transverse colon.

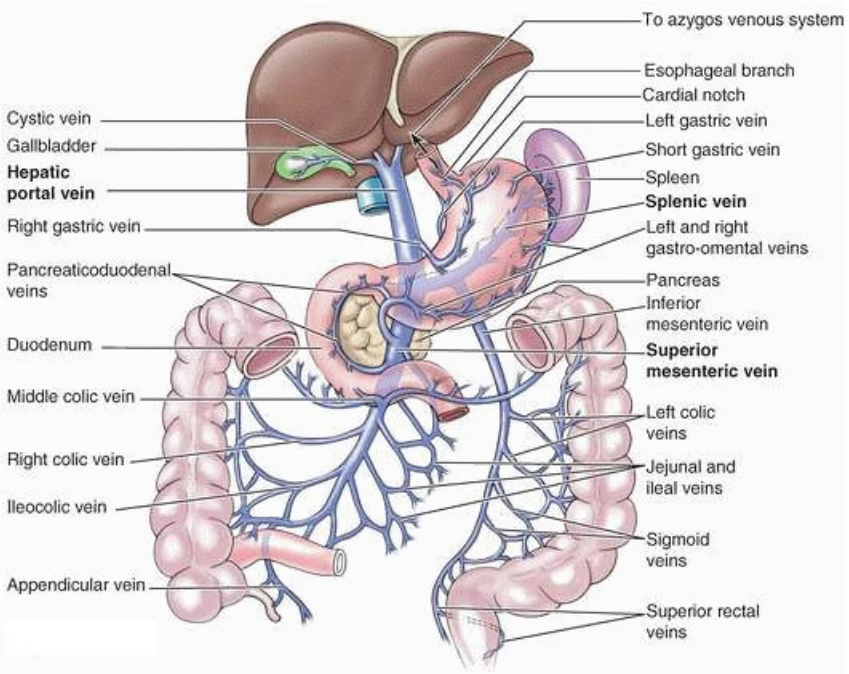

Figure 2: Anatomy of superior mesenteric vein.

Aetiology:

- Patients at increased risk of thrombus formation include those having:
- Hypercoaguable states – polycythaemia vera, protein C deficiency, protein S deficiency, anti-

thrombin III deficiency.
- Visceral infection and inflammation – diverticulitis, pancreatitis, perforated viscus.
- Malignancy (by direct invasion and by hypercoaguable state).
- Abdominal trauma.
- Post-abdominal surgery – including, but not limited to, post-splenectomy, Roux-en-Y gastric bypass, colectomy.
- Portal hypertension.
- Drugs – oral contraceptive pill.

The most common cause is intra-abdominal sepsis and up to 20% of cases are idiopathic (Medscape, 2012).

Pathophysiology:

The underlying pathophysiology of acute mesenteric ischaemia is due to an increased fluid volume in the bowel wall and lumen which results in systemic hypovolaemia and haemoconcentration. Thrombus formation in the superior mesenteric vein occludes the outflow of blood. This together with resulting bowel wall oedema, impede inflow of arterial blood leading to bowel ischaemia.

Presentation:

Patient typically complains of generalised severe periumbilical pain which gradually worsens over a few days and is associated with fever, nausea and vomiting. On examination, the abdomen is usually distended and tender.

Relevant Investigations:

Haematological investigations mainly help to exclude other possible causes. They may reveal leucocytosis and haemoconcentration. Other useful haematological investigations which would aid in diagnosing the cause, include protein C and S deficiencies, anti-thrombin III antibodies, abnormalities in lupus anticoagulant, cardiolipin antibody, platelet aggregation studies.

Imaging should include:

-Abdominal X-ray - may reveal dilated loops of bowel, air under diaphragm
-CT scan or angiography – diagnostic
-ECG – especially in this case in view of hyperkalaemia

Treatment:

It is crucial to determine the underlying cause of the patient's hypercoaguable state and treat it appropriately.

Supportive:

1. Ensure patent airway, breathing present, circulation stable
2. NG decompression by nasogastric tube insertion and suction
3. Fluid resuscitation
4. Bowel rest
5. Fluid input-output charting

Pharmacological:

- Lytic therapy: Thrombolysis using recombinant tissue plasminogen activator (rt-PA) administered according to local protocols.
- Anticoagulation: Heparin administered initially until the desired APTT range was achieved. Once an APTT of 2.5-3 was achieved, the patient was converted to warfarin.

Surgical:

- Thrombectomy with thrombolysis
- Intravenous catheterisation with thrombolytic infusion
- Excision of infarcted non-viable bowel

Indications for surgery include:

- Peritonitis
- Bowel infarction
- Haemodynamic instability
- Inadqeuate response to medical treatment

Prognosis:

This is highly dependent on the time taken to diagnose this condition and treat it appropriately. It is associated with 30% mortality rate and 25% recurrence rate in patients not given anticoagulant therapy. Anticoagulant therapy combined with surgery is associated with the lowest recurrence rate (3-5%). Superior mesenteric vein thrombosis is associated with the best prognosis from all aetiologies of mesenteric ischaemia.

Final treatment and follow ups:

The patient's parameters and progression of general condition were monitored. He was discharged from the intensive therapy unit two days after admission to hospital and was admitted to a surgical ward.

His APTTr was monitored and the dose of heparin was increased or decreased by 500U accordingly. Once the target APTTr range (2.5-3) was achieved, the patient was started on warfarin. He was started on 10mg warfarin for two days and on the second day his International Normalised Ratio (INR) was taken. On the third day since warfarin was started, his warfarin dose was reduced to 5mg (as per protocol). Heparin was stopped once his INR was more than 2. Antibiotics were also stopped.

Mr. G.B's condition got progressively better. He opened his bowels, was started on light feeds and was mobilised. He was deemed fit for discharge ten days after admission, on 5mg warfarin. He was informed that he will need lifelong warfarin and was informed regarding the associated side-effects and interactions. He will be followed up at the ACCX clinic daily for two weeks and then accordingly.

A repeat CT chest thorax and abdomen was performed in order to exclude any underlying pathology responsible for the thrombosis. The CT showed clear lungs with scattered bronchiectasiae, no lymph node enlargement, no organ pathology or free fluid. Thrombosis of the superior mesenteric vein was seen to have completely resolved.

The patient will be followed up at surgical outpatients clinic in three months and was referred for a haematological consultation for coagulation studies.

Fact Box 9:

Title: Superior Mesenteric Vein Thrombosis

Incidence: 10-15% of cases of mesenteric ischaemia.

Risk Factors: Hypercoaguable states, abdominal sepsis and inflammation, malignancy, trauma and post-abdominal surgery.

Presentation: Insidious onset, abdominal pain, abdominal distension and tenderness.

Diagnostic Investigation: CT scan, MRI

Treatment: Resuscitation,
Pharmacological – thrombolysis, anticoagulation
Surgical – thombectomy with infusion of thrombolysis, excision of non-viable bowel

Prognosis: High mortality attributed to long delay in diagnosis. If treated promptly and adequately, mortality is significantly reduced and recurrence is reduced to 3-5%.

References:

1. Kaplan JL., et al. Treatment of superior mesenteric and portal vein thrombosis with direct thrombolytic infusion via and operatively placed mesenteric catheter. Am Surg, 2004; 70(7):600-4
2. Carr, N. and Jamison, M. H. (Superior mesenteric venous thrombosis. Br J Surg, 1981; 68: 343–344.
3. Bradbury M.S. et al. Mesenteric venous thrombosis: diagnosis and non-invasive imaging. Radiographics. 2002; 2:527-541
4. Kumar S., et al. Mesenteric venous thrombosis. N Engl Med. 2001; 6:1683-1688
5. http://www.ncbi.nlm.nih.gov/pubmed/15279182 as viewed on 15/03/2014
6. http://emedicine.medscape.com/article/193921-overview as viewed on 15/03/2014
7. http://emedicine.medscape.com/article/193921-treatment as viewed on 15/03/2014
8. http://www.ajronline.org/doi/abs/10.2214/ajr.143.1.83 as viewed on 15/03/2014

Photograph References:

1. http://medicoreview.blogspot.com/2012/05/blood-supply-of-gi.html as viewed on 20/03/2014
2. http://www.cmaj.ca/content/183/6/693/F1.expansion.html as viewed on 20/03/2014