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Case Report

Superior mesenteric venous thrombosis in a 47 years old male with protein S deficiency: A case report

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ABSTRACT

Introduction: Mesenteric venous thrombosis is due to blood clot in veins that drain blood from the intestine. It may lead to mesenteric ischemia. Protein S deficiency is one of the causes of superior mesenteric vein thrombosis.
Case presentation: A 47 years old male patient presented with pain in the abdomen. Contrast CECT shows filling defect in the superior mesenteric venous thrombosis. Coagulometer showed lower protein S activity than that of normal.
Clinical discussion: Proper diagnosis is needed for early detection so that proper intervention can be made on time. Anticoagulation and vitamin K antagonists are given.
Conclusions: Though rare, protein S deficiency should be considered a possible cause of mesenteric venous thrombosis.

1. Introduction

Mesenteric venous thrombosis occurs as a result of local blood coagulation which impairs the venous return of bowel [1]. It is one of the causes of mesenteric ischemia which accounts for 5–15% of cases [2]. Mesenteric venous thrombosis could be primary or idiopathic or may be due to various risk factors like prothrombotic states, surgery, inflammatory bowel disease, pancreatitis, malignancy etc [1,2]. The various prothrombin states which might lead to thrombosis are protein C and S deficiency, factor V leiden deficiency, antithrombin deficiency, prothrombin gene sequence variation, polycythemia, increased prothrombin protein etc [2–4] Protein C and S are vitamin K dependent glycoprotein that are produced in the liver [5]. As they are important for anticoagulation, deficiency of these proteins leads to thrombosis. The prevalence of familial protein S deficiency was found to be 0.03–0.13% [6]. Among them 50% of patients who have heterozygous protein S deficiency will develop venous thromboembolism [7]. If recognition, intervention, management of venous thrombosis is not done in time, it could lead to complications like peritoneal signs, hemodynamic instability, transmural infarction, bowel gangrene and eventually death [1, 8].In this case report we describe the presence of mesenteric venous thrombosis in a 47 years old man with a hereditary protein s deficiency. This case report has been reported in line with the SCARE 2020 guideline [9].

2. Case presentation

A 47 years old male known case of Diabetes Mellitus under medication presented with abdominal pain in the umbilical region for 4 days. Pain was acute in onset, burning in character, non-radiating, decreasing severity since Day 1, intermittent, relieved by analgesics with no aggravating factors, visual analog scale 5 out of 10. He also had complaints of a 4 days history of acute abdominal distension which is generalized and progressive in nature. He had prior history of passing bluish stool, yellowish urine and fever 10 days back. He had no history of trauma, nausea and vomiting, hematemesis. He also had no history of chest pain, shortness of breathlessness, palpitation, loss of consciousness, burning micturition. He had no any significant medical history in the past. However, he confirmed the death of his father in early 40 due to thrombotic disorder, However, the cause of thrombotic disorder was not

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known at that time due to limited resources. He did not recall the type of thrombotic disorder.

On examination the patient was found to be average built. His blood pressure, pulse rate, respiratory rate, $Sp0_2$ were 134\92 mmHg, 124 bpm, 24 per minute and 94% respectively. On inspection, the abdomen was distended and globular. On palpation there was tenderness at the umbilical region, left lumbar and left hypochondrium. There was shifting dullness on percussion also.

Routine investigations revealed neutrophilia with increased activated partial prothrombin time, increased random blood glucose level, uremia, direct hyperbilirubinemia as shown in Table 1. There was a positive occult blood test for stool. His serum sodium, potassium levels were normal. Serum amylase, urine analysis, and serological examination were unremarkable.

Ultrasonography of abdomen and pelvis showed no any significant findings. Thus, with diagnostic uncertainty, CECT abdomen and pelvis was done by giving oral and I\V contrast medium which shows filling defect in the superior mesenteric vein throughout its course up to portal vein confluence extending from approximately 18 mm into the main portal vein. SMV is dilated. Increase attenuation of the associated mesentery is noted. (Fig. 1). Dilated and edematous jejunum and proximal third of the ileum, maximum diameter of approx. 4.0 cm. Intramural pneumatosis intestinalis is seen for approximately length of 30cm predominantly in jejunum (Fig. 2). Reduced enhancement is noted in the involved segment of small bowel on post contrast study. Multiple tiny foci of air attenuations are seen along the involved mesentery and in the intrahepatic portal vein (Fig. 3). Mild free fluid is seen in the peritoneal

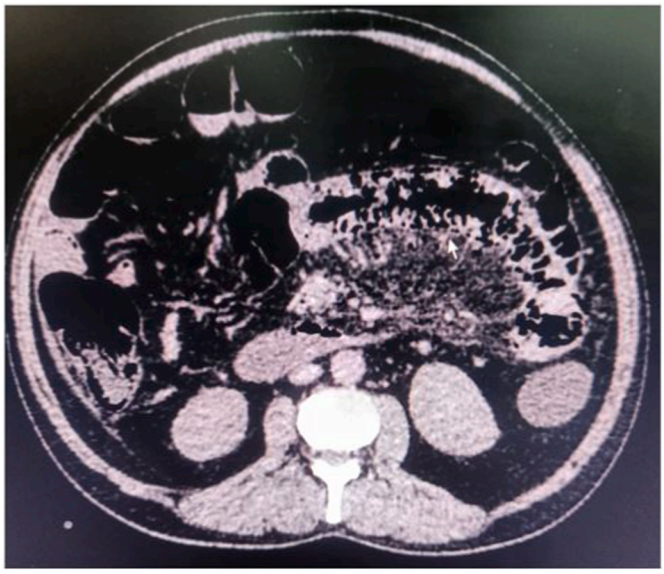

Fig. 2. Dilated and edematous jejunum and proximal third of the ileum, with pneumatosis intestinalis is seen predominantly in jejunum.

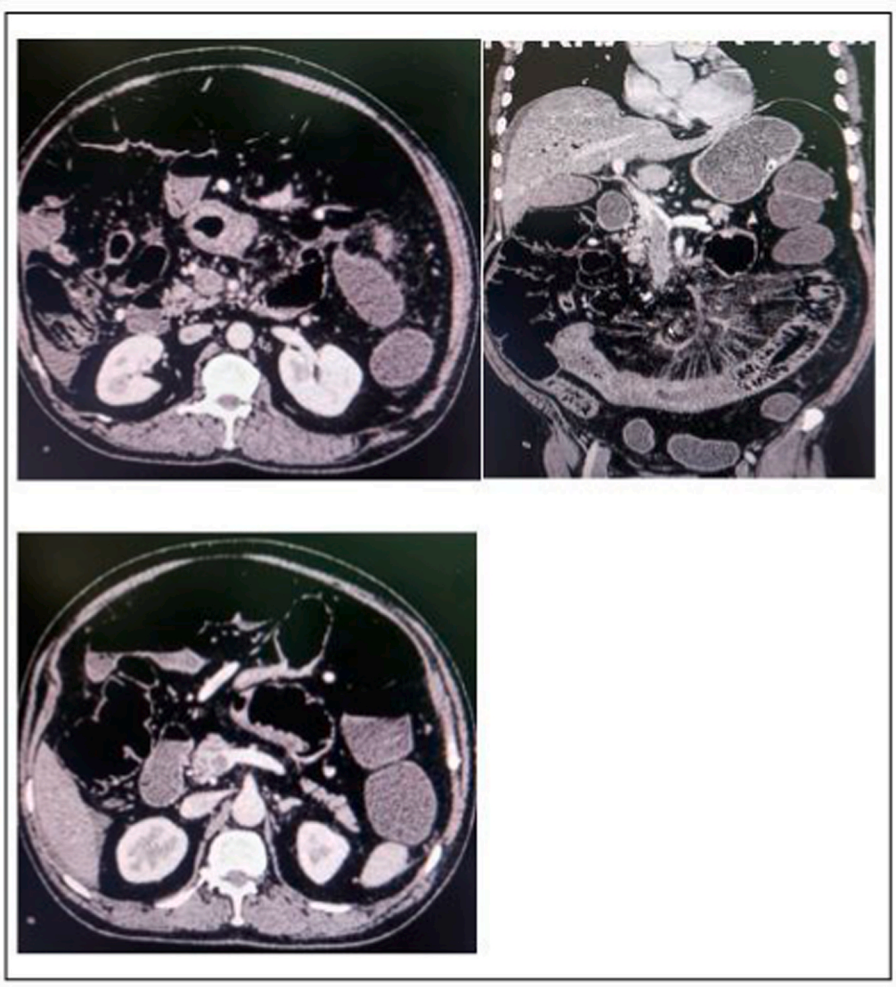

Fig. 1. Increase attenuation of the associated mesentery with dilation of Superior mesenteric vein is noted.

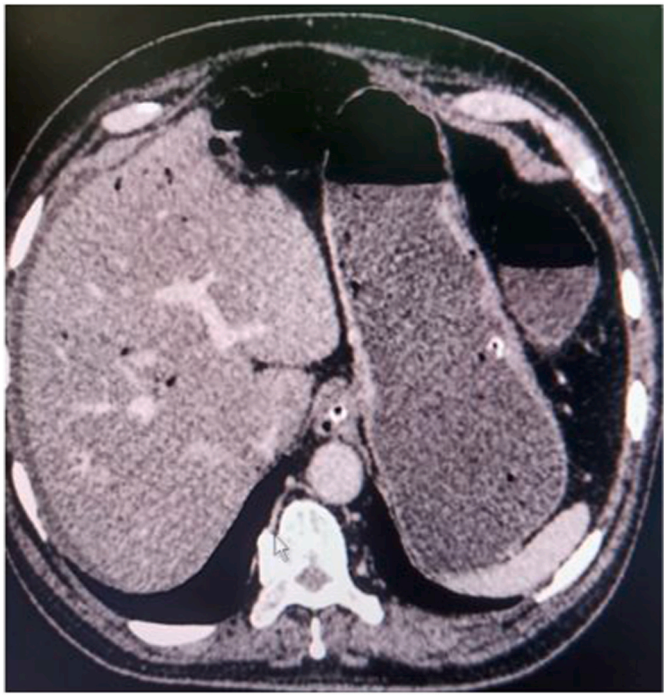

Fig. 3. Multiple tiny foci of air attenuations are seen along the involved mesentery and in the intrahepatic portal vein.

cavity. With the diagnosis of Superior mesenteric thrombosis, our patient was admitted into the surgical intensive care unit for further management.

Owing to the diagnosis of Superior mesenteric venous thrombosis, investigations to find out possible prothrombotic disease were started. Fully automated coagulometer results showed plasma protein S activity of 57% (ref. 77–143%), protein C activity 95% (ref. 70–130%) whereas a chromogenic assay showed plasma antithrombin III activity of 87% (Ref. 77–143). Additionally, the search for cardiolipin antibodies was negative. A final diagnosis of Superior Mesenteric Vein Thrombosis due to Protein S deficiency was made.

We managed this patient with injection of low molecular weight heparin in continuous infusion, clexane and oral warfarin. The patient was kept on total parenteral nutrition. Along with empirical parenteral antibiotics, and other supportive management were given. The therapeutic target of activated partial thromboplastin time (aPTT) was kept on 30–35 seconds which was achieved after 3 days and INR was maintained at 2–3. We monitored vitals of patients regularly and routine investigations were done on a regular basis. The symptoms of patients gradually improved. We discharged the patient after 10 days of admission with advice of oral direct thrombin inhibitor Dabigatran 110 mg for 2 months to maintain INR around 2. The patient was advised to have a normal diet along with no strenuous activity. The patient was properly instructed to follow up medicine and surgery OPD with PT/INR report after 1 month.

3. Investigations

See Table 1.

Table 1
Routine investigation.

Test name	Results	Ref. Value
Hemoglobin	15.9	M:13–17 gm/dl F: 12–15 gm/dl
Platelet	150000	150000- 400000 cells/cumm
TLC:	10600	4000- 11000 cells/cumm
DLC		
Neutrophils	85	40–80%
Lymphocytes	10	20–40%
Monocyte	04	2–10%
Eosinophil	01	1–6%
Basophils	–	<1–2%
Coagulation Assay		
PT/INR- 16.8 Control: 13.0 sec 1.2		
Glucose(random)	248	<140mg/dl
Urea	76	13–43 mg/dl
Creatinine	1.1	M: 0.9–1.3 mg/dl F: 0.6–1.1 mg/dl
Sodium	133	136–145meq/l
Potassium	4.4	3.5–5.1 meq/l
Amylase	22	Upto 90 u/l
T. Bilirubin	2.3	0.3–1.2 mg/dl
D. Bilirubin	1.3	<0.2 mg/dl
Alkaline Phosphate	78	Upto 46 U/l
SGPT	16	Upto 46 U/l

4. Discussion

Mesenteric venous thrombosis is one of the causes of mesenteric ischemia caused by impairment of venous return of the bowel due to local blood coagulation [1,2]. The incidence of superior mesenteric venous thrombosis causing mesenteric ischemia is 6–9% [8]. Protein S deficiency is a rare genetic disorder which is responsible for 2.6% of mesenteric venous thrombosis [10].

Patients usually present with abdominal pain, fever, diarrhea and vomiting which are non-specific symptoms and may be wrongly diagnosed as endotoxin shock, hypoperfusion, direct trauma, disseminated intravascular coagulopathy, volvulus, adhesion, intussusception etc [11,12] Our patient is also presented with abdominal pain in the emergency ward. Thus, proper diagnosis is needed in an absolute time, so that proper intervention and treatment can be done in time.

Many diagnosis modality have been used like abdominal x-ray, doppler sonography among which contrast enhanced computed tomography (CECT) is best. In our study, ultrasonography detected only mild fatty liver but not mesenteric thrombosis which were later diagnosed by contrast enhanced CT scan. Thus, in a poor setting hospital with only X-Ray and ultrasound, thrombosis may miss out and it may be wrongly diagnosed as other diseases which will give poor prognosis.

Protein S is Vitamin K dependent plasma glycoprotein which is non-covalently bound to C4-binding protein where free protein S functions a cofactor that enhances the activity of activated protein C in the proteolytic degradation of activated factors V and VIII [13]. A deficiency of protein S leads to inability to control coagulation resulting in the excessive formation of blood clots [14]. Congenital protein S deficiency is an autosomal dominant trait in PROS1 gene [8,14].

In a recent systematic review by Acosta et al. [15] suggested that treatment of mesenteric venous thrombosis depends on the stage of disease i.e non-operative approach in a patients diagnosed early without peritonitis and whereas surgical method of explorative laparotomy in which resection of necrosed bowel following bowel anastomosis is done [16]. But our patient with abdominal pain and distension visited the emergency ward at an early phase where we performed routine examination, ultrasonography and later followed by CECT scan. This leads to the diagnosis of mesenteric venous thrombosis with associated mesenteric and small bowel loops ischemia. Thus immediate starting of anticoagulant drugs leads to the gradual improvement of a patient.

Supportive treatment includes pain control, fluid management, electrolyte replacement, prophylactic antibiotics and bowel rest. Singal et al. in his article suggested that anticoagulation with low molecular weight heparin should be given to improve the condition [8]. We have switched to direct oral anticoagulants or vitamin K antagonists i.e warfarin after the symptoms of a patient have subsided which is also

explained in one of the studies [16]. One of the studies shows more than 80% resulted in recanalization, if anticoagulation therapy given earlier [8] while another study shows 61% recanalization rates in the superior mesenteric vein thrombosis [17]. The recurrent mesenteric venous thrombosis is highly fatal [18]. Thus, anticoagulant therapy along with aPTT and PT/INR monitoring is given for 6 months in identifiable transient risk factors and lifetime medication for underlying thrombophilia or unidentified mesenteric venous thrombosis [2,19].

5. Conclusion

We present a case of a patient suffering from superior mesenteric vein thrombosis due to protein S deficiency. This is a rare condition presenting with nonspecific symptoms like pain in the abdomen and GI disturbances. The diagnosis may be difficult so all the possible causes should be ruled out. Examination of blood serology, along with abdominal ultrasonography, contrast CECT is required. Though very few cases are reported it is essential to consider protein S and C deficiency as a possible cause of mesenteric venous thrombosis. Timely treatment is necessary to improve the quality of life of these patients.

Author agreement statement

We the undersigned declare that this manuscript is original, has not been published before and is not currently being considered for publication elsewhere.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We understand that the Corresponding Author is the sole contact for the Editorial process. He/she is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs.

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Author contributions

Author 1: Led data collection, contributed to writing the case information and discussion.

Author 2: The resident radiologist, who helped in the diagnosis and supervised throughout the process of manuscript writing.

Author 3: The resident physician, who help in finding the case edited the rough draft into the final manuscript.

Author 4: Revised it critically for important intellectual content, contributed to review and editing.

Author 5: Contributed to the process of original draft preparation and introduction.

Author 6: Contributed to conceptualization, methodology, and discussion and preserved the pictures.

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 by the editor-in-chief of this journal on request.

Ethical approval

This is a case report, therefore, it did not require ethical approval from ethics committee.

Trial registry number

Not applicable.

Guarantor

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Declaration of competing interest

The authors report no conflicts of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2022.103719.

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