

# Klippel-Trenaunay Syndrome of the Rectosigmoid Colon Presenting as Severe Anemia

Eula Plana Tetangco, MD, Hafiz Muhammad Sharjeel Arshad, MD, and Rogelio Silva, MD

University of Illinois at Chicago, Advocate Christ Medical Center, Oak Lawn, IL

## ABSTRACT

A 23-year-old female with Klippel-Trenaunay syndrome presented with abdominal pain and severe anemia. Colonoscopy revealed diffuse venous congestion extending circumferentially from the midsigmoid to the rectum, with multiple large varicosities. This case emphasizes that Klippel-Trenaunay syndrome may have visceral manifestations beyond the classic presentation, which can be a significant source of morbidity and mortality.

## INTRODUCTION

In 1900, French physicians Klippel and Trenaunay were the first to recognize that the findings of a cutaneous nevus (a cutaneous capillary malformation), varicose veins, and hypertrophy of bone and soft tissue were part of a single entity.<sup>1,2</sup> Previous reports by Adams in 1858 and by Trelat and Monod in 1869 stated that these occurrences were unrelated.<sup>3</sup> The International Society for the Study of Vascular Anomalies defines Klippel-Trenaunay syndrome (KTS) as capillary malformation, venous malformation (varicose veins) with or without lymphatic malformation, and limb overgrowth.<sup>4</sup> The diagnosis of this rare congenital malformation is established when 2 of these 3 features are present.<sup>1</sup> Capillary malformation can be located anywhere on the body, although facial involvement is quite rare. Venous malformation and lymphatic malformation are seen mainly on the extremities and the adjacent pelvis or shoulder.<sup>3</sup> Visceral involvement is uncommon but can be a significant source of morbidity and mortality.<sup>5</sup> Organs that may become involved are the bladder, rectum, gastrointestinal tract, penis, uterus, vulva, vagina, liver, kidneys, lung, and spine.<sup>3</sup> Pelvic involvement is seen in 18% of cases, presenting with hematuria or rectal bleeding.<sup>5</sup> The distal colon and rectum are involved in 1-12.5% of cases.<sup>6</sup> They are not found on the face or the brain. Limb hypertrophy comes in the form of bone elongation, circumferential soft-tissue hypertrophy, or both. It often exhibits as leg-length discrepancy, but any extremity may be affected. Both unilateral and crossed involvement may occur.<sup>1,3</sup>

## CASE REPORT

A 23-year-old female with KTS was evaluated for abdominal pain and anemia. She had been diagnosed with the syndrome in childhood and had a telangiectatic venous system and asymmetry in the growth of the right lower extremity, which required above-the-knee amputation as well toe amputations on the left foot. She also had a history of craniosynostosis, which required surgical correction of the prematurely closed sutures. She denied experiencing fever, melena, hematochezia, and hematuria. She had presented 3 years prior for anemia attributed to menorrhagia, which had since resolved. On admission, she was tachycardic with a pulse rate of 119 beats per minute, normotensive with a blood pressure of 112/75 mm Hg, and had a normal respiratory rate and temperature. Physical exam revealed a soft, slightly distended abdomen with mild right lower quadrant tenderness. She had pale conjunctivae and warm, dry skin. Laboratory evaluation showed severe microcytic anemia with hemoglobin 5.7 g/dL, mean corpuscular volume 60.3 fL, unremarkable hepatic chemistries, and platelet count 189,000/mL with no evidence of coagulopathy.

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Correspondence: Eula Plana Tetangco, Advocate Christ Medical Center, 4440 W 95th St, NO 131, Oak Lawn, IL 60453 (tetangco@uic.edu).



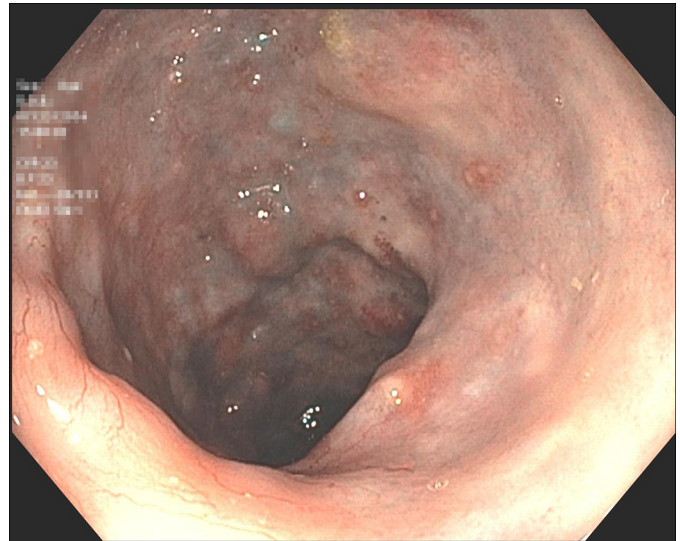
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**Figure 1.** Abdominal and pelvic computed tomography showed eccentric mural thickening of the rectosigmoid colon with calcifications representing possible phleboliths (arrow a) and perirectal inflammation (arrow b). Multiple soft tissue abnormalities were seen, likely related to KTS. Asymmetric fatty atrophy of the right psoas muscle was noted (arrow c), with infiltration of the adjacent soft tissues and right transversus abdominus muscle.

Abdominal and pelvic computed tomography demonstrated thickening of the rectosigmoid colon with possible phleboliths and perirectal inflammation (Figure 1). Multiple observed soft tissue abnormalities were likely related to KTS. Asymmetric fatty atrophy of the right psoas muscle was seen, with infiltration of the adjacent soft tissues and right transversus abdominus muscle. She was treated conservatively with a transfusion of 2-U packed red blood cells and iron replacement. Hemoglobin responded appropriately, climbing to 7.2 g/dL. Upper endoscopy showed minor antral gastritis. Colonoscopy revealed unremarkable colon until the midsigmoid area. At approximately 50 cm, there was a very distinct line of abnormality where normal mucosa met the abnormal area (Figure 2). This area demonstrated diffuse venous congestion and venous malformation extending circumferentially from 40-50 cm all the way to the rectum. There were multiple large varicosities seen throughout the rectum and sigmoid as well as purplish discoloration of the entire mucosa and prominent internal hemorrhoids (Figure 3). Due to the size and appearance of the varicosities, biopsies were not taken for fear of uncontrollable bleeding from the vascular malformations.

After colonoscopy, the patient developed hematochezia and required a unit of packed red blood cells for a drop in hemoglobin to 6.8 g/dL. There was an appropriate response, with hemoglobin rising to 8.2 g/dL and resolution of hematochezia. Given the extent of the disease from the distal sigmoid to the rectum, together with the absence of menorrhagia and other bleeding manifestations such as hematuria, the gastrointestinal vascular malformations were the most likely source

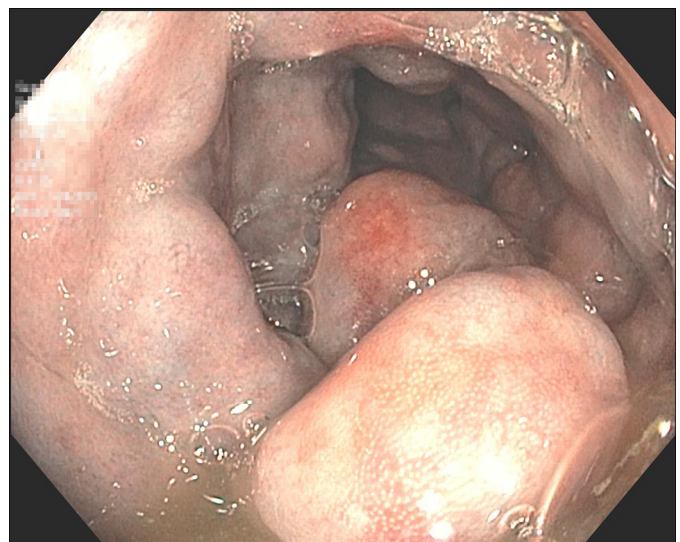


**Figure 2.** Colonoscopy revealed diffuse venous congestion and malformation extending circumferentially from the midsigmoid to the rectum. At approximately 50 cm, there was a distinct line of abnormality where normal mucosa met the abnormal area.

of the patient's anemia. She was then advised to seek tertiary evaluation for possible rectosigmoid resection.

## DISCUSSION

Most cases of KTS are sporadic, becoming evident at birth or in childhood.<sup>1</sup> The etiology remains uncertain. Reciprocal and balanced chromosomal translocations have been described, but most patients have a normal karyotype.<sup>3</sup> It has been hypothesized that a lethal gene that survives through mosaicism or somatic mutations causes aberrant angiogenesis



**Figure 3.** Multiple large varicosities and purple discoloration of the entire mucosa were seen throughout the rectum (pictured here) and sigmoid.

that results in KTS.<sup>5</sup> Another theory proposes that KTS is a result of embryologic or fetal injury, such as injury to the sympathetic ganglia or intermediolateral tract with subsequent dilatation of microscopic vascular channels, mesodermal defects that result in arteriovenous communications, or venous malformations obstructing normal venous flow and causing venous hypertension. Although several genes have been linked to the formation of vascular structures, none have been directly linked to KTS. A polygenic cause for KTS has been proposed, where combinations of mutated genes involved in vascular formation and growth are inherited in a dominant pattern without causing symptoms until a time when secondary mutations cause a functional loss of the gene and result in KTS.<sup>5</sup>

Cutaneous capillary malformations and limb hypertrophy are prominent external manifestations of KTS. Visceral manifestations are less common but can lead to life-threatening complications from blood loss and anemia.<sup>7</sup> Gastrointestinal involvement often goes unrecognized in asymptomatic patients such as ours. Bleeding is uncommon, presenting in 6 of 588 cases in the largest KTS study to date. When it does occur, it is a potentially fatal emergency. Hematochezia is a result of an overloaded venous system in the affected limb draining into the internal iliac vein, together with the rectal pudendal, vesicular, and genital veins. When the volume of flow is so great that drainage is no longer effective, rectal bleeding occurs.<sup>6</sup>

Treatment of gastrointestinal bleeding has proven to be challenging. Endoscopic therapies have a limited role due to the extensive nature of the disease. A conservative approach with iron replacement may be used for nonsignificant bleeding. This comes with the risk of recurrent bleeding and blood transfusions. In cases of life-threatening bleeding and transfusion dependency, as seen in our patient, surgical resection has been effective.<sup>1,6,7</sup> In distal colonic disease, proctocolectomy and abdominoperineal resection with transient or permanent colostomy have been performed. Localizing and defining the range of malformation intraoperatively is particularly problematic, because visual inspection, transillumination, and palpation cannot guarantee total identification and resection of the lesion.<sup>6</sup> Visceral angiography aids in defining the extent of disease prior to surgery.<sup>8</sup> The vascularity of the

lesions makes surgical repair an arduous task. Selective angiography with embolization and clipping has been utilized emergently as a bridge to surgery and to reduce risk of intraoperative bleeding.<sup>8,9</sup> Proximal embolization reduces the perfusion pressure to the malformation but does not eliminate it. Distal embolic agents are not recommended because of associated risk of intestinal ischemia.<sup>6</sup> Our patient was lost to follow-up, and we were unable to determine whether she continued to improve and proceeded with surgery.

## DISCLOSURES

Author contributions: EP Tetangco wrote the manuscript and is the article guarantor. HMS Arshad and R. Silva reviewed and edited the manuscript.

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Informed consent could not be obtained due to hardship of finding the patient. All identifying information has been removed to protect patient privacy.

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