Case Report

Secondary polycythemia causing renal artery thrombosis and presenting with acute abdominal pain – A case report

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ABSTRACT

We present the case of a 52-year-old gentleman presented with acute abdominal pain. He has a personal history of 20 pack year smoking and his hematocrit was 62.8%. With subsequent investigations, a diagnosis of renal artery thrombosis due to smoker's polycythemia was made. The patient symptomatically improved with hematocrit reduction after the phlebotomy. Renal artery thrombosis due to smoker's polycythemia is a rare entity and needs a high index of suspicion for prompt diagnosis and treatment. This case report reviews the causes of polycythemia, it's differentials, pathophysiology, and management.

Key words: Acute abdominal pain, Renal artery thrombosis, Secondary polycythemia, Smokers

Polycythemia otherwise known as erythrocytosis refers to increased production of red cells. Hemoglobin and hematocrit above 16.5 g/dL and 18.5 g/dL in females (48%) and males (52%), respectively, will make a diagnosis of polycythemia [1]. Blood hyperviscosity coupled with plasma volume contraction places the patient at risk for thrombosis. Turbulent flow causes shearing force and endothelial injury on the wall of the blood vessels, and hyperviscosity leads to stasis, which causes platelet activation and aggregation and leads to the formation of a thrombus [2].

Renal infarction (RI) is a rare condition which often resembles such as renal stones, pyelonephritis, leading to confusion in its early diagnosis. The primary clinical manifestation is lower back pain or colicky renal pain. When this pain occurs suddenly, it is typically initially attributed to other causes. As a symptom so common, its diagnosis and management can be challenging for clinical specialists [3].

CASE REPORT

A 52-year-old hypertensive male presented to the emergency department complaining of acute abdominal pain. The pain was severe in intensity, diffuse, colicky type, radiating to the back, had no aggravating or relieving factors, and was not associated with any other symptoms. He has a past medical history of hypertension for which he was not taking consistent treatment. He had a 20-pack-year smoking history and does not consume alcohol or illicit drugs.

His blood pressure was 200/100 mmHg on admission, and other vital signs were within normal limits. Physical examination of the abdomen showed tenderness in the umbilical, right iliac fossa, and right lumbar regions. There was guarding or rigidity present and bowel sounds were present.

His blood investigations showed hemoglobin 21.4 g/dL and hematocrit of 62.8%, and other blood investigations including renal and liver functions were within normal limits. Urine analysis showed 2+ proteinuria and microscopic hematuria. Ultrasonography of the abdomen showed left kidney enlargement with mild loss echogenicity suggesting pyelonephritis. After ruling out surgical causes of the abdomen with history and thorough examination, a differential of renal artery thrombosis was made. Contrast-enhanced computed tomography abdomen showed right RI with filling defect on contrast with compensatory left kidney hypertrophy. There was eccentric partial thrombosis with approximately 30% luminal occlusion in the abdominal aorta at the origin of the right renal artery and complete thrombosis of the right renal artery up to the level of branching of the segmental artery with faint contrast flow in the right segmental arteries (Fig. 1).

Therapeutic phlebotomy was performed and the patient was initiated on aspirin. He became symptomatically better after two sessions of phlebotomy. His serum erythropoietin levels were normal and genetic testing for JAK2 mutation was negative.

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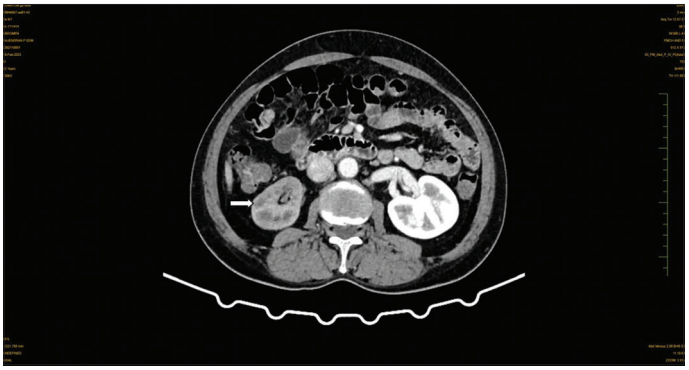

Figure 1: Contrast-enhanced computed tomography of abdomen was performed which showed right kidney with diffuse hypo enhancement with compensatory hypertrophy of left kidney and no obvious contrast excretion into the collecting system of the right kidney in the delayed phase representing reduced renal function

DISCUSSION

Polycythemia is classified as spurious or true polycythemia based on plasma volume contraction and increase in true red cell mass, respectively. True polycythemia is further classified based on serum erythropoietin levels [4]. Tobacco smoking causes secondary polycythemia. It also has a higher incidence in males [5]. Although the prevalence of secondary erythrocytosis is difficult to estimate, it is higher than that of polycythemia vera [6]. However, a smoker's polycythemia is a combination of both volume contraction and increased red cell mass due to chronic carbon monoxide exposure. Carbon monoxide exposure causes contraction of plasma volume, the mechanism of which is still uncertain. Chronic carbon monoxide exposure causes a left shift of the oxyhemoglobin curve leading to hypoxemia which serves as a trigger for erythropoietin synthesis [7]. Most cases of renal artery thrombosis are due to thromboemboli which usually originate in the heart or aorta.

In situ thrombosis of the renal artery is uncommon. The most common causes of *in situ* thrombosis are blunt abdominal trauma and atherosclerotic lesion of the renal artery, polycythemia vera, pregnancy, hypercoagulability, renal transplantation, intra-aortic balloon placement, renal angiography, oral contraceptives, cocaine injection, nephrotic syndrome, systemic lupus erythematosus, renovascular hypertension, infective endocarditis, Ehlers–Danlos syndrome, and renal surgery [8].

In these patients, phlebotomy is therapeutic with goals to maintain hematocrit values of 42% to 46%. The management includes volume resuscitation, low-dose aspirin, and phlebotomy in the majority of cases [2]. Our patient responded well to phlebotomy, was discharged symptom-free, and was advised to quit smoking.

RI is the major complication that may result from an untreated renal artery thrombosis. Hypertension is sometimes refractory to medical management. RI could lead to significant renal impairment that, in some cases, may be irreversible. RI shows acute kidney injury on initial presentation, and a quarter subsequently developed chronic kidney disease [9]. Delayed treatment due to misdiagnosis usually results in irreversible damage to the kidney resulting in a nephrectomy. Emergency physicians and other physicians need to consider this diagnosis in unexplained flank pain, especially in patients with risk factors for this disease [10].

CONCLUSION

Although renal artery thrombosis is a rare differential diagnosis for acute abdominal pain. In this case report, we attempt to highlight the importanceof having an open mind while considering differential diagnoses for acute abdominal pain. Correct diagnosis and treatment are important for preventing serious complications like renal infarction.

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