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CRACKING THE CASE: POSTERIOR NUTCRACKER SYNDROME UNVEILED

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Abstract

Background:

Renal veins are formed by the union of 2 to 3 renal parenchymal veins in the renal sinus. It traverses anterior to the renal artery and drains into the inferior vena cava. The left renal vein is longer than the right renal vein, left renal vein measures 6-7 cm, while the right renal vein measures 3-4 cm. They both have similar caliber, approximately ~1.2 cm. Normally the left renal vein courses anteriorly to the abdominal aorta. When there is a variant course of left renal vein traversing posteriorly to the abdominal aorta and compressing between the aorta and the vertebral body, it is termed as Posterior Nutcracker syndrome (NCS),which is a much rarer entity[1].Another variant is the compression of left renal vein, most commonly between the superior mesenteric artery and the aorta, this is known as Anterior Nutcracker Syndrome. Posterior nutcracker syndrome can clinically manifest with diffuse abdominal pain, intermittent hematuria, gonadal or spermatic reflux resulting in varicocele. Ultrasound is the first line imaging, but contrast enhanced computed tomography provides a more accurate diagnosis.

Case Presentation:

We report the case of a 50-year-old male who presented with diffuse abdominal pain. Contrast-enhanced computed tomography (CECT) of the abdomen revealed a retro aortic left renal vein compressed between the aorta and vertebral body with resultant venous dilatation of left renal vein and varix formation, consistent with posterior nutcracker syndrome. Note was made of associated ileo caecal inflammatory wall thickening.

Conclusion:

Posterior nutcracker syndrome is a rare entity (2.06% incidence in MSCT study of over 6,000 patients) [2] that may mimic other abdominal pathologies. CECT plays a crucial role in its diagnosis[3].

Keywords: *Posterior nutcracker syndrome; Retro aortic left renal vein; CECT; Case report*

Introduction

Nutcracker syndrome (NCS) is a rare vascular compression disorder caused when there is a variant course causing extrinsic compression of the left renal vein, resulting in renal venous hypertension[4]. The anterior type occurs due to entrapment between the superior mesenteric artery and the aorta,

which is much more common, whereas the posterior type results from compression of a retro aortic left renal vein between the aorta and vertebral body[1]. The posterior type is extremely rare and often underdiagnosed due to nonspecific clinical symptoms such as hematuria, flank pain, and varicocele[00].

Imaging modalities including Doppler ultrasonography, Contrast enhanced computed tomography, Magnetic resonance angiography, and retrograde venography play an essential role in establishing the diagnosis[3]. We present a case of posterior nutcracker syndrome in a middle-aged male diagnosed on CECT abdomen

Case History

A 50-year-old male, Mr. Abdul Sattar, presented with complaints of intermittent dull aching diffuse abdominal pain with more prominent left flank pain for the past six months. He also complaint of recent onset of abdominal discomfort and weight loss. There was negative history of trauma, surgery, or significant comorbidities. Clinical examination revealed mild tenderness in the left lumbar region without any palpable mass. Routine hematological and biochemical investigations were within normal limits. The patient was further requisitioned for a contrast-enhanced computed tomography (CECT) scan of the whole abdomen for further evaluation.

Imaging Findings

CECT Whole Abdomen Report:

There is evidence of retro aortic left renal vein with its impingement between aorta & vertebra. There is resultant dilatation of left renal vein (~12.4mm in diameter). There is a dilated tortuous vascular channel in retroperitoneum on left side - likely venous which appears to be communicating with left renal vein & IVC (measuring ~14.6 x 18 x 41.4mm) (AP x TR x CC) - likely varix.

Note was made of multiple enhancing sub-centimetric retroperitoneal & right iliac fossa region lymph nodes are seen.

There is presence of circumferential wall thickening of caecum, ileocecal junction & terminal ileum base of appendix (wall thickness measures 13.3mm) causing severe luminal narrowing. Moderate surrounding fat stranding seen. Rest of the appendix appears normal in diameter with normal wall thickness.

Other abdominal organs including liver, gall bladder, spleen, pancreas, kidneys, adrenal glands, urinary bladder, and prostate appeared normal

Impression:

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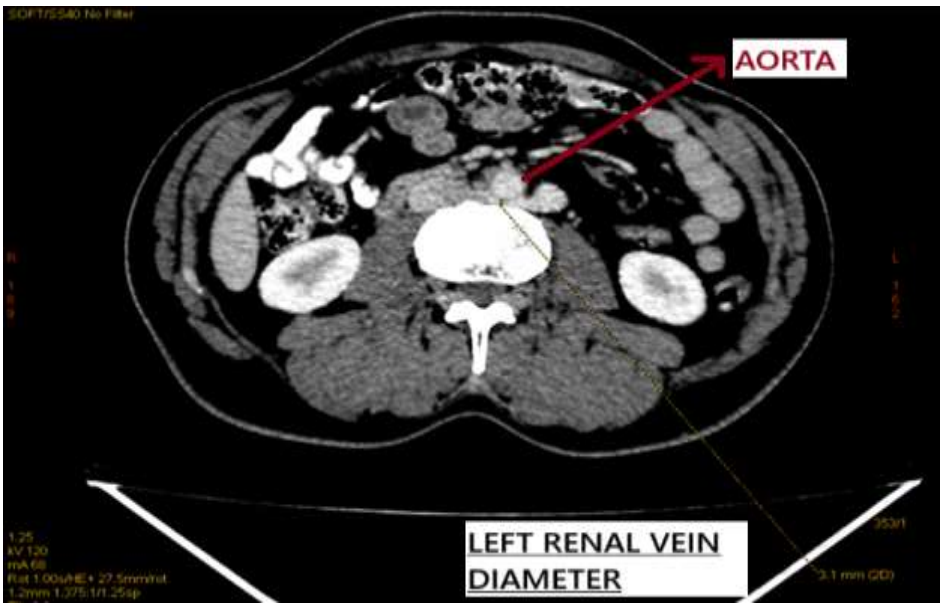
Findings suggest retro aortic left renal vein with its impingement between aorta and vertebra resulting in dilatation of left renal vein diameter (~12.4 mm in diameter). Dilated tortuous vascular channel in retroperitoneum on left side – likely venous communicating with left renal vein & IVC – likely varix. Appearance likely represents posterior nutcracker syndrome.

There is evidence of circumferential wall thickening of caecum, ileo caecal junction & terminal ileum base of appendix causing severe luminal narrowing with moderate surrounding fat stranding. Rest of the appendix appears normal in diameter with normal wall thickness. Appearance likely represents active infective/inflammatory etiology. Possibility of tubercular etiology needs consideration.

Multiple enhancing sub-centimetric retroperitoneal and right iliac fossa region lymph nodes.



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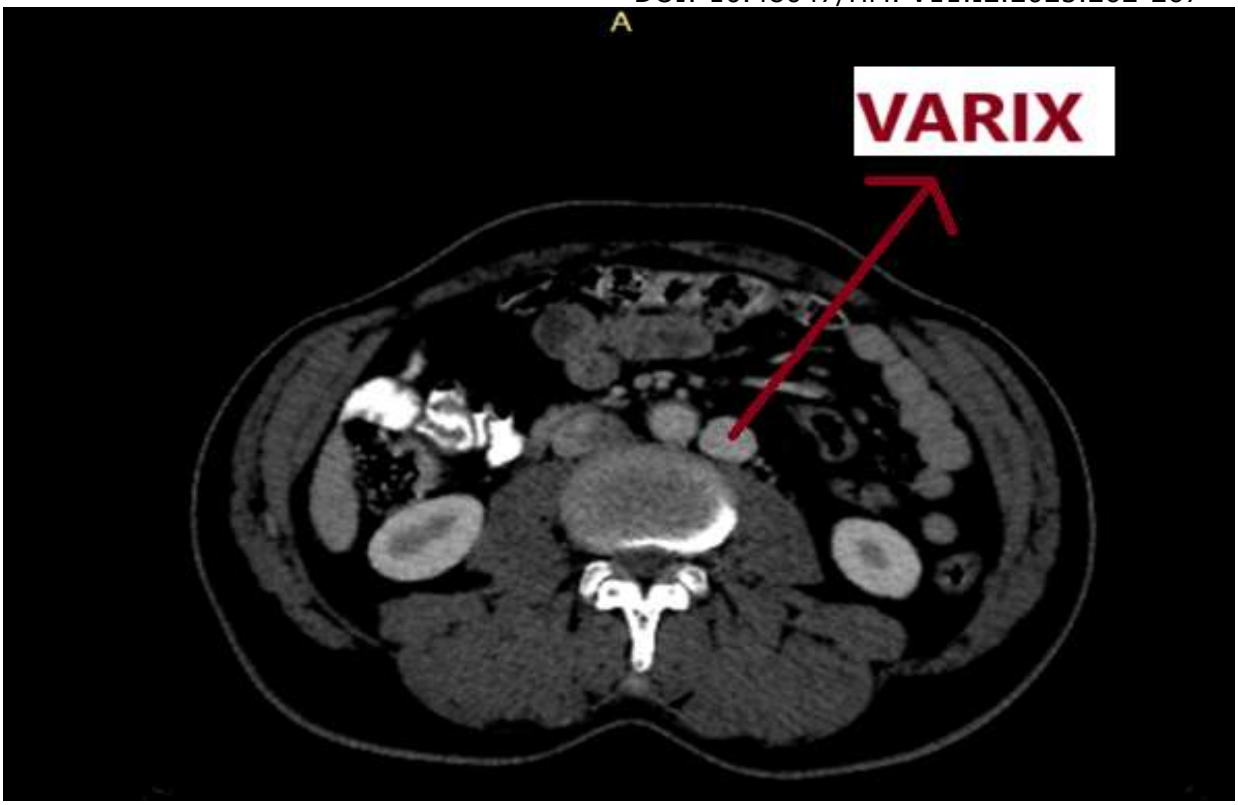

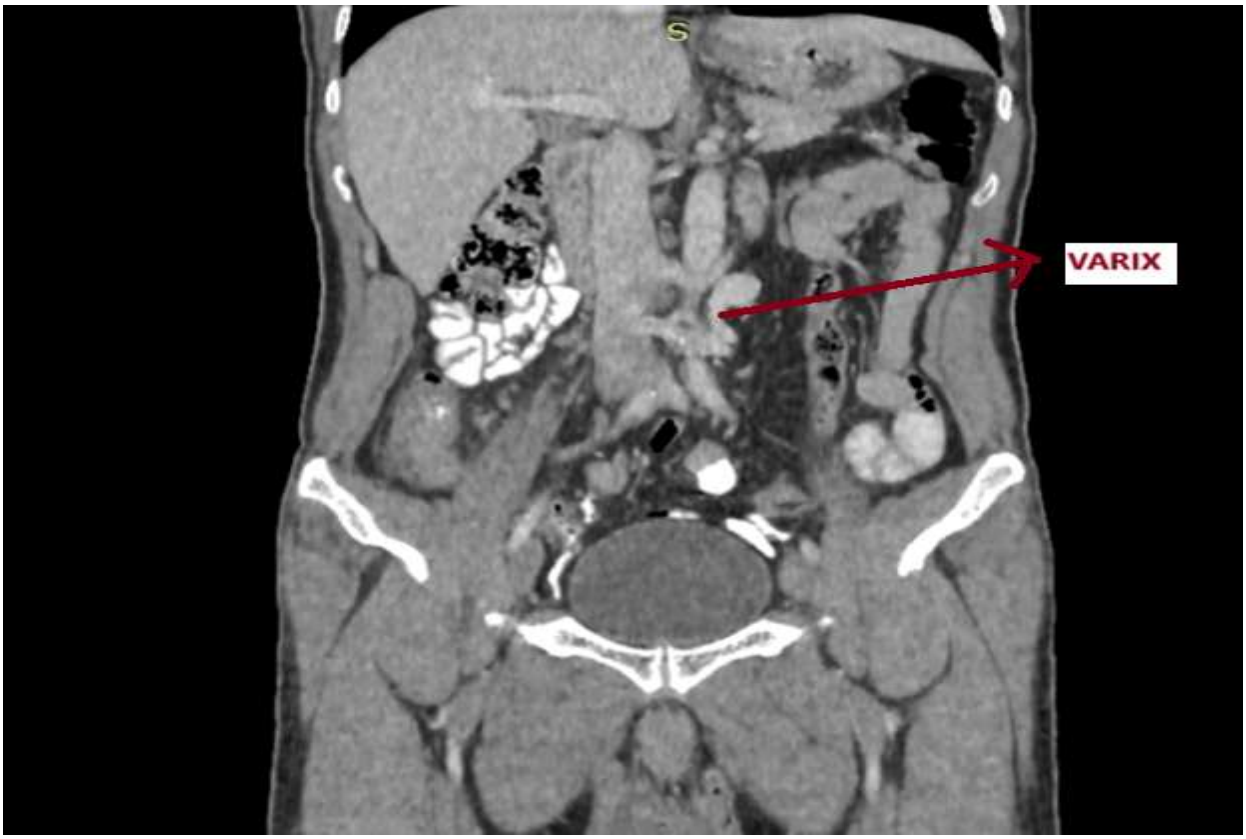

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Discussion

Nutcracker syndrome (NCS) belongs to a group of very rare vascular disorders known as vascular compression syndromes. NCS can be diagnosed by corelating imaging findings to the clinical symptoms. Many other conditions can mimic the symptomatology of NCS, making computed tomography an accurate diagnostic tool for the condition. NCS results from compression of the left renal vein, leading to impaired venous drainage and can be congenital or acquired. There are two types: anterior (ANCS) and posterior nutcracker syndrome (PNCS). The posterior type occurs due to entrapment of a retro aortic left renal vein between the abdominal aorta and vertebrae, resulting in venous hypertension. This can manifest clinically with hematuria, flank pain, proteinuria, and varicocele. Imaging modalities such as Doppler ultrasonography, CECT, MR angiography, and retrograde venography can confirm the diagnosis.

Our case demonstrated posterior NCS along with a dilated collateral venous channel (varix), which is a compensatory pathway for venous return. This highlights the role of CT imaging in diagnosing both the compressive anatomy and secondary collateral changes. The co-existence of inflammatory bowel pathology in this patient underscores the importance of thorough abdominal evaluation.

Management depends on symptom severity, ranging from conservative observation in mild cases to surgical interventions such as stenting, transposition, or bypass in severe cases.

Conclusion

Posterior nutcracker syndrome is a rare vascular compression disorder that requires a high index of suspicion for diagnosis. Cross-sectional imaging, particularly CECT, plays a pivotal role in identifying the compressive anatomy and associated venous changes. Awareness and proper imaging protocol of this rare entity can prevent misdiagnosis and guide appropriate management.

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