

## NUTCRACKER SYNDROME: A CASE REPORT

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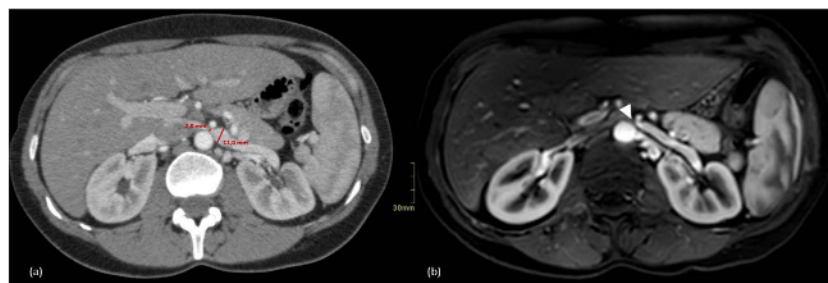
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A 35-year-old woman felt left flank and left lower quadrant abdominal pain daily for the past six months, besides nausea, macroscopic hematuria, and shortness of breath. These symptoms progressively worsened until activities such as eating or working were significantly impaired. She investigated these symptoms in various medical institutions during this period, but no diagnosis was made.

Computed tomography (CT) scan and magnetic resonance imaging (MRI) showed a compression of the left renal vein between the superior mesenteric artery and the aorta ( $8^\circ$  aortomesenteric angle; Figure 1), causing an important narrowing of this vein, with dilatation above the compression point (Figure 2). Other possible causes for the symptoms were investigated and ruled out, allowing for the diagnosis of Nutcracker syndrome.



**Figure 1:** Significantly reduced aortomesenteric angle (red lines), measuring  $8^\circ$  (normal angle  $> 41^\circ$ ) in the sagittal plane.



**Figure 2:** A: Axial contrast-enhanced abdominal CT scan shows a significant compression of the left renal vein by the aorta and the superior mesenteric artery, with dilatation above the compression point and a 5.0 ratio between anteroposterior diameters of the prestenotic and stenotic points (normal ratio  $< 4.9$ ); B: Axial contrast-enhanced abdominal MRI showing the same finding (white arrowhead).

Nutcracker syndrome is a rare condition of uncertain prevalence that can affect all age groups, from children to older adults, but mainly diagnosed in middle-aged women<sup>1</sup>. It is related to the compression of the left renal vein by surrounding anatomic structures, such as the superior mesenteric artery and the aorta<sup>2</sup> in most cases, especially when the angle between these arteries is below 41° in the sagittal plane (sensitivity of 100% and specificity of 55.6%)<sup>3</sup>. A ratio higher than 4.9 between the anteroposterior diameter of the left renal vein proximally to the stenosis and at the stenotic point (aortomesenteric region) has a sensitivity of 66.7% and a specificity of 100% for nutcracker syndrome<sup>3</sup>. This compression creates an obstacle to venous blood flow and dilates the renal vein proximally to the compressing point.

The presence of clinical signs and symptoms due to this phenomenon defines the syndrome and includes: microscopic or macroscopic hematuria, pelvic venous insufficiency, left flank pain, varicocele, proteinuria, and even platypnea<sup>4</sup>. Hematuria is the most prevalent symptom and is attributed to the increase of venous pressure that leads to the rupture of small varices within the renal collecting system<sup>5</sup>.

When very symptomatic, as in this case, a possible treatment for the syndrome may be endovascular stenting of the left renal vein to increase venous diameter and reduce the compression by the surrounding structures. This procedure was chosen for the patient, allowing for adequate venous decompression (Figure 3) and complete remission of symptoms, with a significant improvement in quality of life.



**Figure 3:** Axial contrast-enhanced abdominal CT scan after stenting of the left renal vein, showing a significant increase in the venous diameter.

## REFERENCES

1. Shin JI, Lee JS, Kim MJ. The prevalence, physical characteristics and diagnosis of nutcracker syndrome. *Eur J Vasc Endovasc Surg.* 2006;32(3):335-6.
2. Kurklinsky AK, Rooke TW. Nutcracker phenomenon and nutcracker syndrome. *Mayo Clin Proc.* 2010;85(6):552-9.
3. Fong JKK, Poh ACC, Tan AGS, Taneja R. Imaging findings and clinical features of abdominal vascular compression syndromes. *AJR Am J Roentgenol.* 2014;203(1):29-36.
4. Dever DP, Ginsburg ME, Millet DJ, Feinstein MJ, Cockett ATK. Nutcracker phenomenon. *Urology.* 1986;27(6):540-2.
5. Stewart BH, Reiman G. Left renal venous hypertension "nutcracker" syndrome: managed by direct renocaval reimplantation. *Urology.* 1982;20(4):365-9.

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