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# Late Middle Age Woman with Nutcraker Syndrome with Abdominal Pain: A Case Report

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**ABSTRACT:**
Nutcracker syndrome (NCS) is caused by a compression of left renal vein between aorta and superior mesenteric artery. Typically, it presents with symptoms like abdominal pain, hematuria, and varicocele, but hypertension is rarely noted. This is a rare condition and often under-diagnosed, more prevalent in females and if not treated, can lead to severe problems. There are no clear guidelines regarding management. We present a case of a 45-year-old woman experiencing intense pain in the lower abdomen, with no signs of hematuria, who was diagnosed with nutcracker syndrome after undergoing a computed tomography scan

**KEYWORDS:** Abdominal pain, Contrast enhanced, Computed tomography, Left renal vein, Middle aged woman, Nutcracker syndrome.

## INTRODUCTION:

Nutcracker syndrome (NCS) arises when the left renal vein (LRV) is compressed, typically between the aorta (AO) and the superior mesenteric artery (SMA), disrupting blood flow to the inferior vena cava. While anatomical variations can exist, they don't always lead to symptoms, complicating prevalence estimates. NCS which is also called "renal vein entrapment syndrome" [1] can affect anyone but is more frequently observed in women. Common symptoms include left flank pain, hematuria, left-sided varicocele, and orthostatic proteinuria. Diagnosis is based on clinical evaluation and imaging methods like Doppler ultrasound and CT. Management typically involves conservative observation or surgical options, including endovascular techniques such as balloon angioplasty.We present a case of nutcracker syndrome which was diagnosed during imaging in late middle aged woman with pain abdomen under evaluation.

## CASE REPORT:

A 45-year-old late middle aged female patient, previously in good health, walked into surgery department (SD) with severe pain in the lower abdomen which started on the previous day with

worsening of symptoms including nausea and vomiting, with more noticeable diffuse pain in the left flank. There is no history of hematuria or gynecologic complaints. There is no history of any kidney disease, diabetes or hematuria in the family.

After admission, the patient had undergone per abdominal examination including an abdominal X-ray & sonography both of which were unremarkable. Then she was advised contrast enhanced computed tomography (CECT) of abdomen.

CECT of abdomen demonstrated dilatation of the left ovarian vein (0.96 cm in max diameter**)** (Fig-1A). There is also compression of the left renal vein between the superior mesenteric artery and aorta (Fig-1B) with reduced aorto mesenteric distance (approx. -0.91 cm) (Fig-2A) and reduced aorto mesenteric angle (approx.35.9 degree) (Fig-2B). Precompressed left renal vein (p) diameter is approx. 0.8 cm & compressed vein (c) measures approx. 0.16 cm. with increased compressive ratio (CR) of more than 2.25. (CR = P/C of 5).

Based on the abdominal CECT findings patient was diagnosed with nutcracker syndrome.

**REPRESENTATIVE IMAGES OF THIS CASE:**

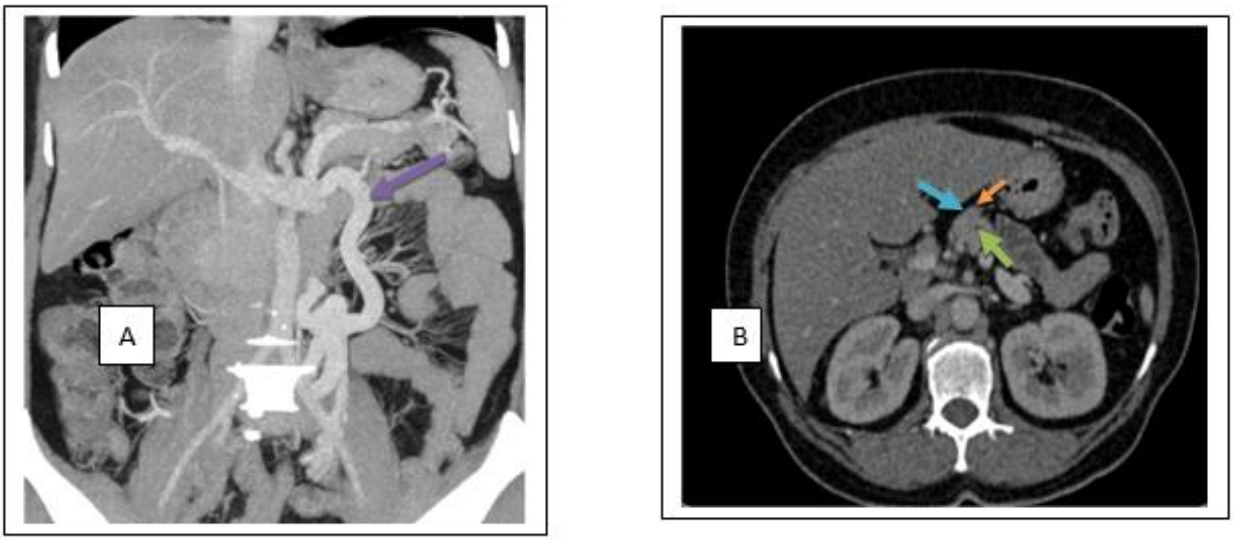


**Figure 1- A & B: A. Coronal contrast enhanced tomography imaging shows dilated left ovarian & pelvic veins (purple arrow). B. Axial contrast enhanced tomography imaging shows left renal vein (orange arrow) compressed when it crosses between abdominal aorta (green arrow) and superior mesenteric artery (sky-blue arrow).**

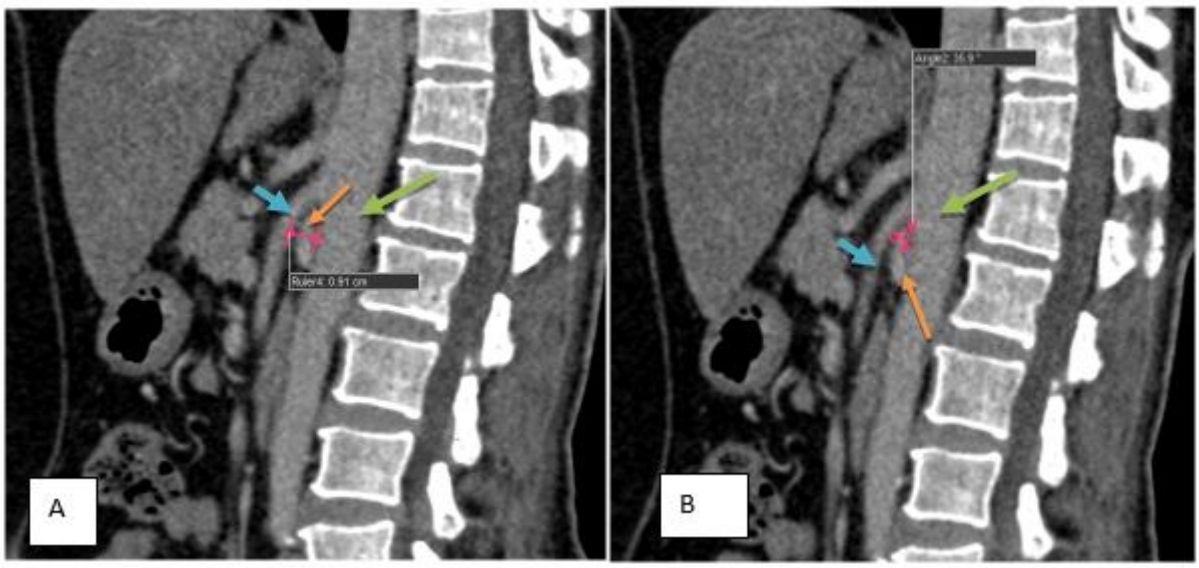


**Figure 2 A & B:Sagittal contrast enhanced tomography imaging shows reduced aorto-mesenteric distance (0.91 cm approx.) in 2A and reduced aorto-mesenteric angle (35.9 degree approx.) in 2B. Left renal vein (orange arrow), abdominal aorta (green arrow) and superior mesenteric artery (sky-blue arrow).**

**DISCUSSION:**

These anatomical findings were first outlined by Schepper in 1972, who coined the term "nutcracker" and explained the pathophysiological mechanisms behind renal hemorrhage related to this phenomenon.

Ovarian veins as a plexus arises from mesoovarium runs along with ovarian artery. Right ovarian vein usually drains directly into inferior vena cava & left ovarian vein ascends similarly but drains into left renal vein at right angles which contributes to high pressure gradient. The ovarian veins is best visualized at level of the origin of the inferior mesenteric artery where it is surrounded by retroperitoneal fat and in the pelvis medial to external iliac vessels.

Since the anatomical changes in relation to Nutcracker syndrome (NCS) do not produce specific clinical symptoms, often it remains underdiagnosed. D'Archambeau et al found an 83% incidence of NCS in patients with pelvic congestion [2]. Factors such as nephroptosis or decreased retroperitoneal fat can lead to elongation of the renal vein and a sharper angle between the SMA and the aorta.

Pain associated with NCS may have a hormonal component, as symptoms often worsen during the premenstrual period due to progesterone-induced vasodilation [3]. Increased pressure on the LRV can cause various symptoms, including flank pain, haematuria, left varicocele, fatigue, and proteinuria [4]. Haematuria may result from the rupture of small septa between veins in the urinary collecting system, complicating diagnosis and often mimicking other conditions like nephrolithiasis.

Our patient initially presented with severe abdominal pain, leading to a misdiagnosis of kidney stones, as symptoms were attributed to premenstrual cramps for years.It is usually diagnosed after exclusion of other diseases [5]. A CT scan ultimately confirmed the diagnosis by revealing LRV compression and pelvic vessel dilation. Notably, our patient did not have haematuria, which is commonly seen in NCS cases.

Diagnosis of NCS is made when the diameter of the LRV is reduced by more than 50% [6]. Although Doppler ultrasound can assist in the diagnosis, it was not conducted in this case. Treatment options for

NCS are still debated. Conservative management may be sufficient for patients with mild symptoms, while surgical intervention is indicated for those with severe anaemia, significant pain, or renal impairment.

Surgical options have evolved, with left renal vein transposition emerging as a safe and effective procedure. Nephropexy is no longer recommended as it does not address the underlying issue [5]. Renal auto transplantation is an alternative that has shown positive results, associated with low rates of morbidity and mortality. Other surgical corrections may involve ligation of the ovarian and pelvic varicose veins via various approaches.

In some cases, conservative treatment has led to improvements in haematuria and proteinuria. For our patient, conservative treatment has shown efficacy and safety in the management of NCS.

## CONCLUSION:

The diagnosis of nutcracker syndrome is established after excluding other possible causes of chronic pelvic pain, including pelvic inflammatory disease, endometriosis, interstitial cystitis, pelvic tumors, and inflammatory bowel disease. In this case, the absence of macroscopic or microscopic haematuria, a common symptom in many cases, complicated the diagnosis.

This highlights the need for increased awareness and understanding of nutcracker syndrome among key medical specialties involved in chronic pelvic pain, particularly gynaecology and urology. Recognizing the various clinical presentations, including cases without haematuria, is essential for accurate diagnosis and management

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