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CT scan diagnosis of nutcracker syndrome about two cases report at the CNHU HKM of Cotonou

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Abstract
Nutcracker syndrome is the compression of the left renal vein between the superior mesenteric artery and the abdominal aorta, causing symptoms related to renal congestion. We report two cases whose diagnosis was confirmed on CT scan. They were two adolescents aged 14 and 15 years respectively. The first had been received for hypogastric pain with radiation to the left testicle and the second for left scrotal pain. Clinical examination in both cases concluded a grade III left varicocele and confirmed by testicular doppler ultrasound. The abdominal CT scan found in the first case a compression of the left renal vein with an aorto-mesenteric angle measured at 8° and a renal vein caliber at the clamp measuring 1.5 mm. The second presented with a mesenteric beak with an aorto-mesenteric angle measured at 15.2° and a ratio of hilar diameter of the left renal vein and the aorto mesenteric vein of about 3.75 confirming the diagnosis. Both patients had left renal vein transposition by laparotomy. Surgical follow-up was favorable.

Keywords: Nutcracker syndrome, varicocele, CT scan

1. Introduction
Nutcracker syndrome (NCS) is the compression of the left renal vein between the superior mesenteric artery (SMA) and the abdominal aorta (AA), causing symptoms related to renal congestion. This is a rare entity. Affected patients may have hematuria, left flank pain, or a left varicocele [1,2]. It is necessary to distinguish the phenomenon of the nutcracker of the left renal vein (LRV) between the abdominal aorta and the superior mesenteric artery of the NCS which designates all the characteristic symptoms resulting therefrom, associated with a compatible radiological image. Thus, the phenomenon of the nutcracker is a fortuitous, asymptomatic discovery, whereas the NCS presents the aforementioned symptoms [3]. NCS can occur from infancy to age 70, with a peak prevalence in young adults (mean age: 20-30 years) [4]. The exact prevalence of NCS is unknown due to the lack of defined diagnostic criteria and the variability of clinical manifestations [3]. Imaging plays an important role in diagnosis.
We report two cases whose diagnosis was confirmed by CT scan at the Hubert Koutoukou Maga National University Hospital Center (CNHU-HKM) in Cotonou in 2025.

2. Observations
Case 1: This is a 14-year-old teenager consulting for a hypogastric pain radiating to the left testicle, of intermittent evolution, of moderate intensity with painful crisis for about 30 minutes then fading spontaneously and evolving for a year. The pain is aggravated by the flexion of the pelvis. We did not note any particular antecedents. On examination, a soft, varicose, left testicular, painless mass was found, 3 cm in diameter, suggesting a grade III left varicocele according to the Dublin-Amelar clinical classification. Testicular Doppler ultrasound confirmed left varicocele grade III with testicles of normal morphology. The abdominal CT scan found a compression of the left renal vein with an aorto-mesenteric angle measured at 8° and a caliber of the renal vein at the level of the clamp measuring 1.5 mm (Figure 1).

Fig 1: Abdominal CT scan in axial section at arterial phase showing compression of the left renal vein measuring 1.5 mm in the aorto-mesenteric clamp

The surgical indication was given and a left renal vein transposition was chosen as the surgical technique. A median laparotomy straddling the umbilicus was performed. A dilated left renal vein was observed intraoperatively, pinched between the aorta and the superior mesenteric artery; dilation of the left gonadal and left inferior adrenal veins. A section of the left renal vein at its implantation on the inferior vena cava (IVC) followed by its reimplantation in a lower position on the lateral face of the IVC was performed (Figure 2). The surgical aftermath was favorable.

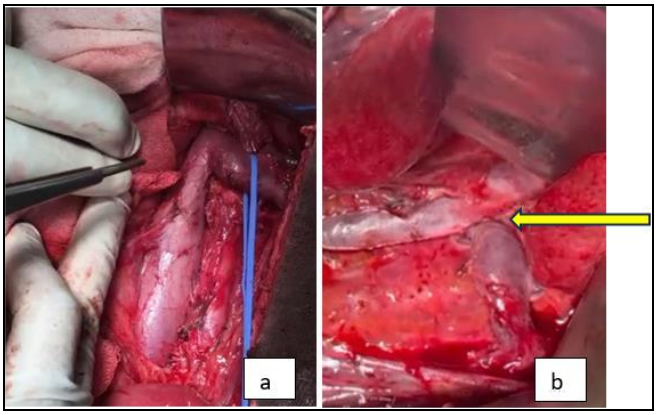

Fig 2: Intraoperative images showing compression of the left renal vein (a) and its transposition (yellow arrow) (b).

Case 2: This is a 15-year-old teenager consulting for intermittent left scrotal pain, irradiating to the hypogastrium, with an estimated intensity of 5/10 according to the numerical scale without triggering factors, calmed by painkiller self-medication and evolving for 8 years. On examination, a soft, varicose, painless bilateral supratesticular mass, was noted, 4 cm in diameter on the left and 3 cm on the right, suggesting a grade III bilateral varicocele according to the Dublin-Amelar clinical classification. The doppler ultrasound confirmed grade III varicocele with normal volume testicles without morphological abnormality and found a reduction in the distance between the superior mesenteric artery and the abdominal aorta measuring 4 mm, suggesting aorto-mesenteric clamp syndrome. The abdominal CT scan found a mesenteric beak with an aorto-mesenteric angle measured at 15.2° and a left renal vein and aorto-mesenteric hilar diameter ratio of about 3.75, thus confirming the diagnosis of NCS (Figure 3)

Fig 3: Abdominal CT scan at arterial phase in sagittal reconstruction showing a narrowing of the aorto-mesenteric angle measured at 15.2°

The operative indication had been established and as an operative technique a transposition of the left renal vein had been chosen. A median laparotomy straddling the umbilicus was performed. A dilated left renal vein was observed intraoperatively, pinched between the aorta and the upper mesenteric artery; dilation of the left gonadal and left inferior adrenal veins. A section of the left gonadal and left lower adrenal veins had been performed allowing good mobilization of the left renal vein which is sectioned at its implantation on the IVC followed by its reimplantation in a lower position on the lateral face of the IVC. The surgical aftermath was favorable.

3. Discussion

Nutcracker syndrome (NCS) is the compression of the left renal vein (LRV), most often between the anterior face of the AA and the SMA, accompanied by distension of the upstream vein. There are two types of NCS; the most common being the anterior syndrome related to the compression of the LRV between the SMA and the aorta; the other, rarer, is the posterior NCS related to the compression of the LRV between the aorta and the vertebral body when the LRV is retro-aortic. The two types may exceptionally be combined in the event of duplication of LRV [2]. Both of our patients had anterior NCS.

NCS can occur from infancy to age 70, with a peak prevalence in young adults (mean age: 20-30 years) [4]. In our case, the average age of occurrence of the NCS was earlier at 14.5 years.

Clinical manifestations are varied and the main symptoms are: hematuria (micro and macroscopic, 79%), left low back pain (38%), varicocele (36%), proteinuria (30%) and anemia (13%) [4]. Rarer symptoms such as chronic fatigue and orthostatic discomfort, related to insufficient cortisol secretion due to the effect of stasis of the LRV on the adrenal gland, are also described [5]. In our case, abdominal

pain and varicocele were the most common symptoms.

The CT diagnostic criteria are represented by narrowing of the LRV at the level of the aorto-mesenteric portion corresponding to the beak sign which is significant if < 32°; a ratio of the diameter of the LRV hilar portion/aorto-mesenteric portion ≤ 4.9; an aorto-mesenteric angle < 35° and the visualization of a collateral venous circulation [6,7]. These different criteria are found in our patients and made it possible to evoke the diagnosis.

Supportive treatment is sufficient if symptoms are minimal. But in cases of severe pain, obvious hematuria and deterioration of renal function [8], surgical or radiological treatments may be indicated. In our patients, the presence of chronic pain and varicoceles led to surgical treatment. Open surgery consists of the transposition of the left renal vein or renal transplantation [3]. Nephropexy, which is the lowering and fixation of the left kidney lower than its initial position, has also been described [5]. The transposition of the left renal vein to the IVC by transabdominal-peritoneal minilaparotomy is the most widespread and effective surgical approach [9]. In our patients, transposition of the left renal vein was performed.

4. Conclusion

Nutcracker syndrome is uncommon but underestimated. CT scan confirms the diagnosis.

Conflict of Interest

Not available

Financial Support

Not available

5. References

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