MAG3-99mTC DYNAMIC RENAL SCINTIGRAPHY: A VALUABLE TOOL IN DETECTING INTERMITTENT PYELO-URETERAL JUNCTION SYNDROME - INSIGHTS FROM TWO CASE REPORTS

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INTRODUCTION:

Intermittent pyelo-ureteral junction obstruction in pediatric patients presents as a distinctive clinical condition. The primary causes often involve either external compression, typically from the inferior polar pedicle crossing the pyelo-ureteral junction anteriorly, or an intrinsic abnormality within a segment of the proximal ureter. Dynamic renal scintigraphy serves as a diagnostic tool for investigating urine drainage obstructions. It aids in distinguishing between organic and functional obstructive syndromes while also providing an assessment of the individual functional capacity of each kidney.

OBJECTIVE: The contribution of dynamic renal scintigraphy with MAG3 in the diagnosis of intermittent pyeloureteral junction syndrome.

MATERIAL AND METHOD :

In this report, we highlight two distinct cases :

1. A 13-year-old child who has a medical history marked by recurrent urinary tract infections and presents with moderate right hydronephrosis. Intriguingly, a CT urogram reveals no apparent obstruction.
2. Our second case features a 2-year-old child with a recurrent history of urinary tract infections, showing left hydronephrosis. Remarkably, a CT urogram fails to identify any obstructions in this instance as well.

Dynamic imaging with a gamma camera was performed post intravenous injection of 70.67 MBq (1.91 mCi) for the first patient and 23 MBq (0.62 mCi) for the second, using 99mTc-labeled MAG3. Two phases of imaging, along with 1 mg/kg furosemide at the 20th minute, were conducted. Evaluation included early and late post-voiding static images.

Figure 1: The isotopic renogram of the first patient shows a double delayed HOMSY peak, suggesting intermittent obstruction of the pyeloureteral junction (volume-dependent obstruction).

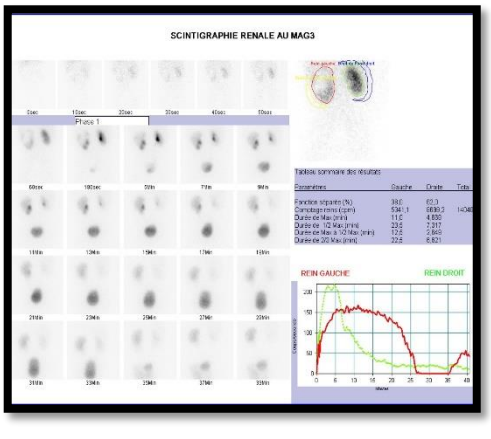

Figure 2:The isotopic renogram for the second patient displays a dual delayed HOMSY peak, indicating intermittent obstruction at the pyeloureteral junction.

CONCLUSION :

The presence of a double-peaked delayed curve or the HOMSY sign observed in dynamic renal scintigraphy with MAG3 is a rare characteristic of intermittent hydronephrosis. Without treatment, this condition typically progresses to complete obstruction within a few months to a few years.

RESULTS :

The scintigraphic examination revealed the following:

Case n° 1 :

The right kidney displayed an increased size, heterogeneous uptake, marked by central and medial photopenic areas with a double-peaked HOMSY delayed image, suggestive of intermittent pyeloureteral junction obstruction (volume-dependent obstruction). The relative renal function (RRF) was assessed at 41.7%.

The isotopic nephrogram of the left kidney appeared normal with a relative renal function evaluated at 58.3%.

Case n° 2 :

The left kidney exhibited an enlarged size and showed heterogeneous uptake. Notably, it displayed central and medial photopenic areas, which were further confirmed by a double-peaked HOMSY delayed image. These findings collectively suggest intermittent pyeloureteral junction obstruction. The relative renal function (RRF) for the left kidney was assessed at 38%.

In contrast, the isotopic nephrogram of the right kidney appeared to be within normal parameters, with a relative renal function assessed at 62%.

DISCUSSION:

Isotopic renography was first described in the 1970s to assess upper urinary tract obstruction, and it was categorized into three types based on the renogram appearance: I= Normal Pattern, II= Dilated Obstructive Pattern, IIIa= Dilated-Nonobstructive Pattern, IIIb= Equivocal Patterns. In 1988, a new type, IV, was introduced as the "HOMSY sign," characterized by a characteristic double-peaked delayed curve indicative of intermittent hydronephrosis during non-painful intervals. This sign is rare but plays a crucial role in early diagnosis of intermittent obstruction and, consequently, in therapeutic intervention before progressing to complete and overt obstruction.

BIBLIOGRAPHY:

1-Yves L. Homsy, Prashant H. Mehta, Denis Huot, Slevin Danais,Intermittent Hydronephrosis: A Diagnostic Challenge,The Journal of Urology,Volume 140, Issue 5, Part 2,1988,Pages 1222-1226,ISSN 0022-5347,https://doi.org/10.1016/S0022-5347(17)42007.

2- Signes d'une possible obstruction pyelo-uréterale à haut débit chez les enfants et les adolescents Sophie Turpin, Diego Barrieras, Marie-Josée Clermont, Julie Franc-Guimond, Anne-Marie Houle, Veronique Phan, Orchidee Djahang, Raymond Lambert CHU Sainte-Justine, Montréal, QC, Canada. Can Urol Assoc J 2017;11(10Suppl7):S364-80. http://dx.doi.org/10.5489/cuaj.4968