

Homsy's sign in DTPA renogram- Initial Experience at NINMAS

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ABSTRACT

Introduction: Renogram findings in intermittent hydronephrosis may occur as a delayed double peak curve and can be considered as a possible fourth drainage pattern. It usually occurs 10–15 min post-diuretic injection and presents with an initially rapid tracer elimination followed by a sudden cessation of the effect or reversion to a rising curve resulting from self-obstruction of the pelviureteric junction (PUJ) by forced diuretics. This type of response is known as Homsey's sign and is an indicator of an intermittent PUJ obstruction (PUJO).

Objective: Patients with Homsey's syndrome may easily be mistaken, and eventually an obstructive pattern is missed if the proper duration of the study is not carried out. The purpose of this study is to find out whether these are true obstructive patterns, with particular emphasis on the characteristic clinical and imaging findings in intermittent PUJO.

Patients and methods: A retrospective study was conducted at NINMAS from October 2023 to January 2024 at the scintigraphy division of the National Institute of Nuclear Medicine and Allied Sciences. A total of eight patients with Homsey's sign characteristics in a DTPA renogram with diuretic challenge were included in this study. Clinical H/O and other interventions were evaluated.

Results: Among 8 patients, 6 (75%) were children and 2 (25%) were adults. There was an equal male-female distribution. Serum creatinine level was within the normal limit in six patients (75%), and elevated in two patients (25%). USG of renal system revealed mild HDN with PUJO in 03 (37.5%) patients, moderate HDN with PUJO in 02 (25%), gross HDN with PUJO in 1 (12.5%), extra renal pelvis in 01 (12.5%), and normal findings in 01 (12.5%) patients. Baseline diuretic DTPA renograms showed bilateral Homsey's sign in 1 and unilateral in 7 patients. Among 7 patients, 6 positive Homsey's signs were in the right kidney and 01 in the left kidney. Normal parenchymal function was found in 07, and mild parenchymal impairment was found in 02 affected patients.

Conclusion: Surgical treatment is recommended for intermittent types of PUJO, as eventually it leads to frank obstruction and impairment of renal function. To confirm diagnosis, the F-15 diuretic protocol is recommended, where the maximum diuretic effect can result in either an obstructive or non-obstructive pattern of the curve.

Keywords: Intermittent pelviureteric junction obstruction, Homsey's sign, ^{99m}Tc-DTPA renogram

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INTRODUCTION

A functional or anatomical narrowing of the junction between the ureter and renal pelvis is the cause of pelvi-ureteric junction obstruction (PUJO). Intermittent PUJO is a different clinical entity that is usually acute but self-limited. Intrinsic as well as extrinsic causes are responsible for the condition, like aberrant vessels, bands, adhesions, or kinks. These factors have yet to be identified (1). It produces Dietl's crisis, a unique clinical syndrome characterized by intense episodic abdominal pain, nausea, and vomiting linked to intermittent hydronephrosis, which was first described by Dietl in 1864. Rapid distention of the pelvis and the stretching of the renal capsule cause the sharp pain (2).

Symptoms usually only persist between episodes; as a result, patients remain misdiagnosed (3–7). For an accurate diagnosis, imaging during an attack or during provocative testing such as diuretic IVP, diuretic ultrasonography, or diuretic renal scan is required (8). However, the pelvical system may appear normal or very slightly dilated during attack-free time. Nesbit was the first to observe in 1956 that the intravenous pyelogram (IVP) in patients with intermittent hydronephrosis may be normal in between acute episodes (7).

A commonly used and valuable test for assessing the dilated urinary tract and differentiating between obstructed and non-obstructed systems is diuresis renography. On diuretic renography, the Homsey's curve pattern indicates intermittent hydronephrosis (9).

PATIENTS AND METHODS

Using the F+15 technique, a DTPA renogram with a diuretic challenge was performed. The retrospective study was carried out at the National Institute of Nuclear Medicine and Allied Sciences (NINMAS) scintigraphy division from October 2023 to January 2024. This study included a total of eight patients who had a DTPA renogram with Homsey's sign characteristics (Figure 1,2). Documents included clinical history, symptoms, serum creatinine level, USG findings, and any history of surgical interventions. Every patient's DTPA results that showed the classic Homsey's sign were recorded as baseline results from their first encounter. For each patient, follow-up and DTPA with a pre-diuretic challenge (F-15) are recommended for future evaluation to determine whether the patient improves or develops a frank obstruction pattern.

Image interpretation

With the advent of diuretic renography, it has become

possible to recognize four distinct patterns of pelvic washout: I: normal, II: dilated obstructive, IIIa: dilated non-obstructive, IIIb: equivocal, and IV: Homsey's sign. The renographic response to furosemide can then be called non-obstructive if the fall in the curve is rapid, substantial, and has a concave slope. A renogram curve that shows no, little, or partial decline post-furosemide is classified as obstructive. Drainage patterns falling between these extremes represent an equivocal response, seen in 10–15% of cases, usually the result of impaired (individual) renal function and/or gross renal pelvic dilatation. Some conditions, however, may lead to stepwise or irregular curves depending on other conditions, such as large fluctuations in blood flow, VUR, double moiety, or intermittent hydronephrosis. Figures 1 and 2 show the DTPA renogram of a 9-year-old boy, which shows Homsey's characteristics with raw data from the same scan.

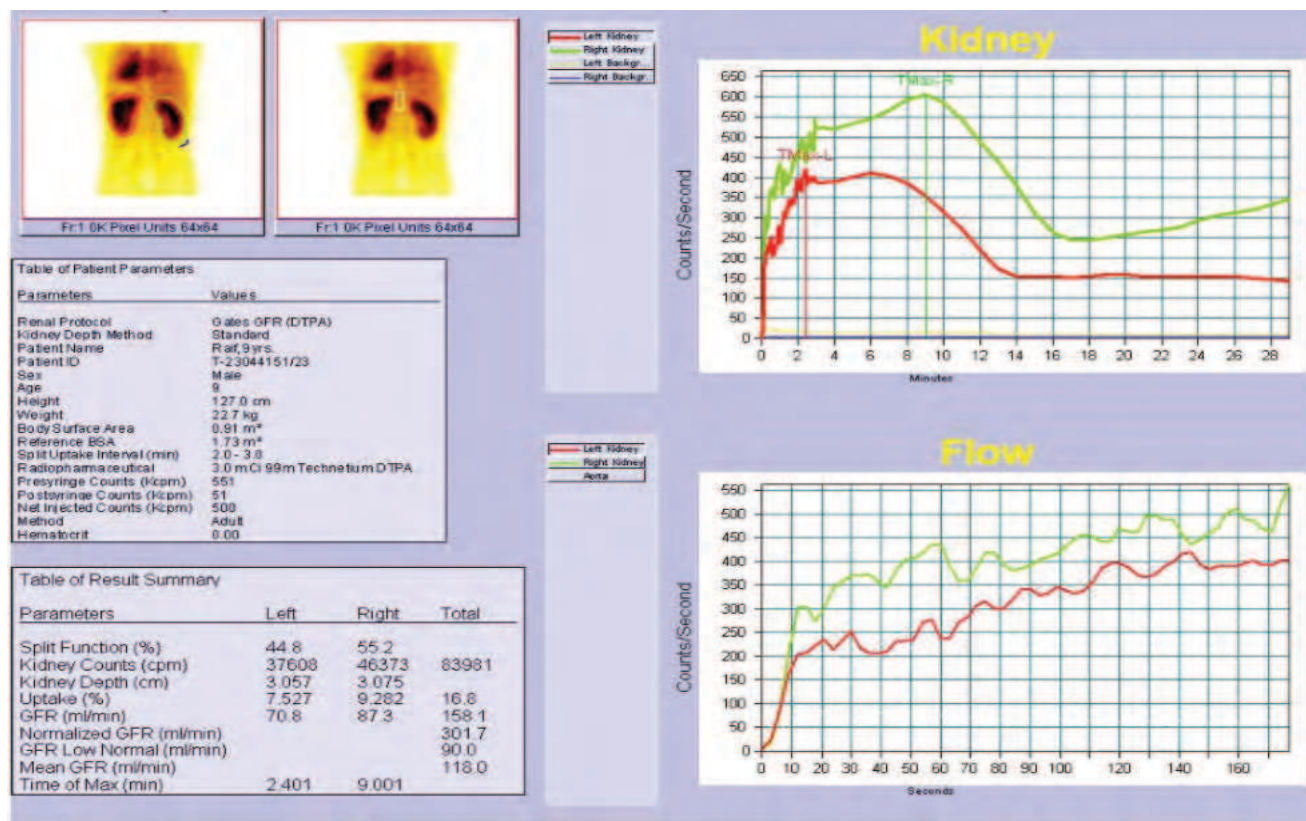


Figure 1: ^{99m}TcDTPA renogram image of a 09-year-old boy showing positive Homsey's sign in right kidney. Diuretic was given at 8 th minute. Curve started declining at 9th minute until 16 minutes, then started uprising again.

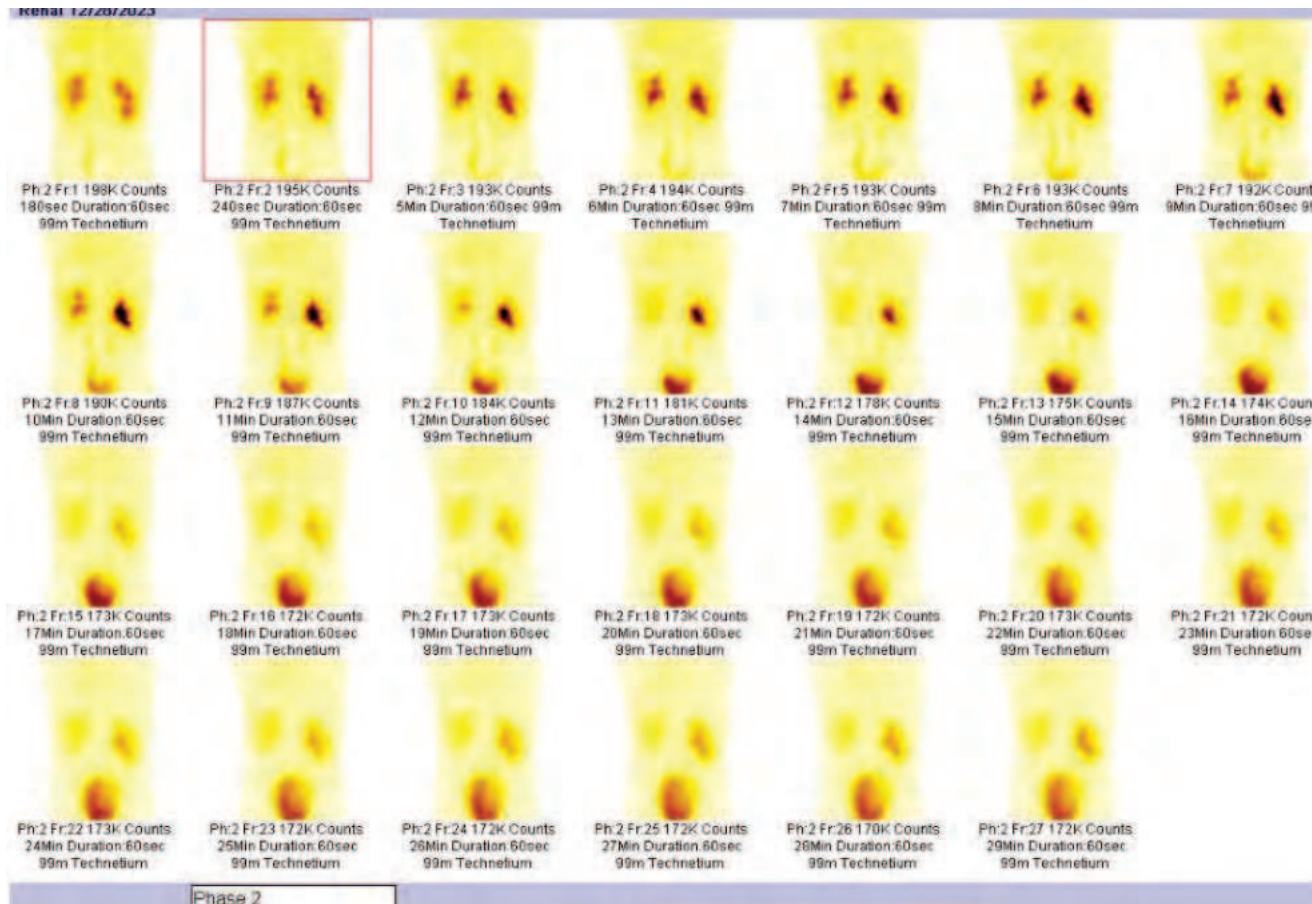


Figure 2: Raw Data of ^{99m}Tc-DTPA renal scan of the same patient showing almost no tracer concentration in right kidney region within first 16 minutes but tracer accumulation started after that till the end of the study.

RESULT

Among the eight patients, six (75%) were children and two (25%) were adult patients with 04 (50%) males and 04 (50%) female. All patients had a history of episodic flank pain with associated nausea and vomiting. Serum creatinine level was within the normal limit in 6 patients (75%), and mildly elevated in 2 patients (25%), (Table 1). Ultrasound of renal system revealed mild HDN with PUJO in 03 (37.5%) patients, moderate HDN with PUJO in 02 (25%), gross HDN with PUJO in 01 (12.5%), extra renal pelvis in

01 (12.5%), and normal findings in 01 (12.5%) patient (Figure 1). However, only 1 patient had a bilateral positive Homsy’s sign in the renogram with bilateral mild hydronephrosis on Ultrasound. Baseline post-diuretic DTPA renograms in other patients showed bilateral Homsy’s sign in 1 and unilateral in 7 patients. Among 7 patients, 6 positive Homsy’s signs were in the right kidney and 01 in the left kidney (Table 2). Normal parenchymal function was found in 7 Homsy’s sign-affected kidneys, and mild parenchymal impairment was found in 2 affected kidneys.

Table 1: Serum creatinine level: within normal serum creatinine level were found in 06 patients (75%) and elevated creatinine level were found in 02 (25%) patients.

Serum creatinine level	Number	Percentage %
Within normal limit	06	75
Elevated	02	25

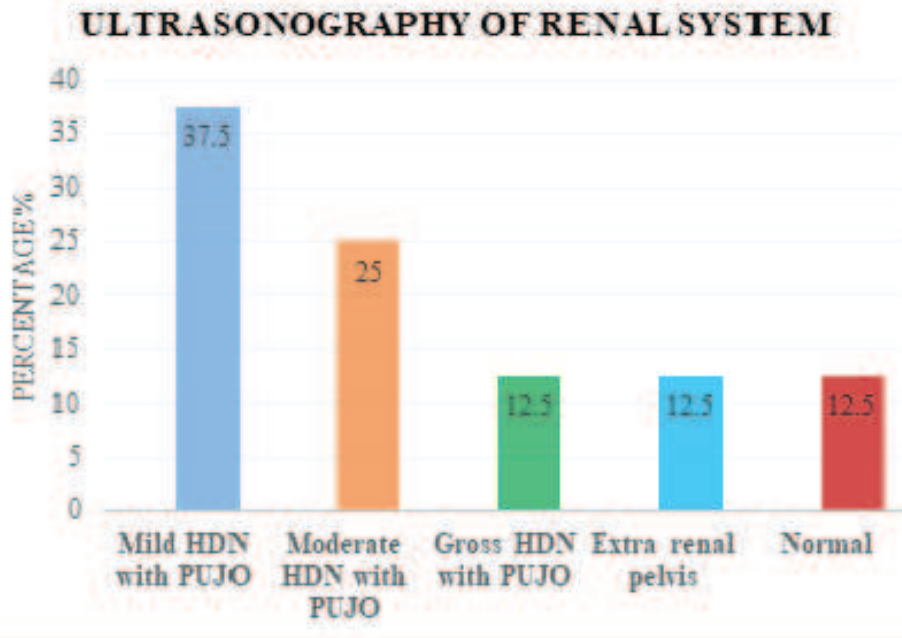


Figure 3: Ultrasound findings of renal system among the study patients

Table 2: Distribution of Homsy's sign among the eight patients, seven had unilateral and one patient had bilateral positive Homsy's sign. Right kidney was more affected in case of unilateral findings.

Pattern	Number	Site	
		Right kidney	Left kidney
Unilateral Homsy's sign positive	07	06	01
Bilateral Homsy's sign positive	01		

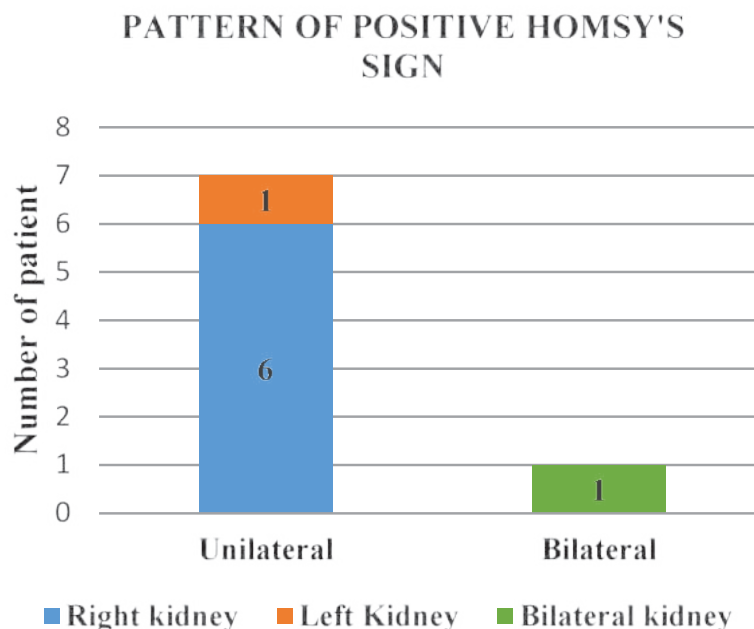


Figure 4: Distribution of pattern of Homsy's sign positive kidneys among the study patients