

Antegrade endoscopic dilatation as an alternative approach to primary obstructive megaureter

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ABSTRACT

Objectives. Congenital primary obstructive megaureter (POM) is caused by ureterovesical junction stenosis, reduced peristalsis, and the resulting dilatation. Even though ureteral re-implantation remains the current gold standard technique, retrograde dilatation is considered as an effective therapeutic alternative with good results and growing proponents – to the extent it has become the technique of choice in some healthcare facilities. The objective was to present an alternative approach for treatment purposes.

Materials and methods. This is the case of a 5-month-old infant with POM and pyonephrosis requiring nephrostomy and intravenous antibiotic therapy. Endoscopic dilatation was carried out by means of a percutaneous drainage in an antegrade fashion and did not require cystoscopy.

Results. The procedure was uneventful. During follow-up, ureterohydronephrosis decreased, while ureteral dilatation persisted to a lesser extent with an adequate peristalsis and absence of secondary VUR. The patient has had no symptoms after an 11-month follow-up.

Conclusions. POM antegrade dilatation is an effective alternative in selected patients as it makes the pathology disappear.

KEY WORDS: Primary obstructive megaureter; Urinary tract infection; Endourology; Uropathy.

DILATACIÓN ENDOSCÓPICA ANTERÓGRADA COMO ABORDAJE ALTERNATIVO DEL MEGAUÉRTER OBSTRUCTIVO PRIMARIO

RESUMEN

Objetivos. El megauréter obstructivo primario congénito (MOP) se produce por la estenosis de la unión ureterovesical, disminución en la peristalsis y su consecuente dilatación. Aunque actualmente el *gold standard* para el tratamiento de esta entidad sigue siendo el reimplante ureteral, la dilatación retrógrada se considera una alternativa terapéutica eficaz con buenos resultados y que está ganando cada vez más adeptos, siendo en algunos centros la técnica de elección. El objetivo es presentar una alternativa de abordaje para su tratamiento.

Material y métodos. Se presenta el caso de un lactante de 5 meses con MOP afecto de pionefrosis que precisa nefrostomía y

antibioterapia endovenosa. La dilatación endoscópica se realizó a través del drenaje percutáneo de manera anterógrada sin necesidad de cistoscopia.

Resultados. El procedimiento se llevó a cabo sin incidencias. En el seguimiento se apreció una disminución de la ureterohidronefrosis, persistiendo la dilatación del uréter en menor grado con adecuada peristalsis y la ausencia de RVU secundario. Tras 11 meses de seguimiento, permanece asintomático.

Conclusiones. La dilatación anterógrada del MOP es una alternativa efectiva en pacientes seleccionados que permite la resolución de la patología.

PALABRAS CLAVE: Megauréter obstructivo primario; Infección del tracto urinario; Endourología; Uropatía.

INTRODUCTION

Megaureter is defined as a ureter with a > 7 mm diameter. There are four categories based on obstruction and reflux levels – refluxing obstructive megaureter, non-refluxing obstructive megaureter, refluxing non-obstructive megaureter, and non-refluxing non-obstructive megaureter⁽¹⁾.

Congenital primary obstructive megaureter (POM) is caused by an alteration of the connective tissue of the ureter's distal portion. This translates into ureterovesical junction stenosis, thus reducing peristalsis and subsequently causing dilatation.

It is more frequent in boys and in the left ureter.

Ureterovesical junction stenosis, along with pyeloureteral stenosis, are the two most frequent obstructive causes of renal dilatation. Ultrasound examination is considered the test of choice when it comes to identifying the degree of hydronephrosis or ureterohydronephrosis, even prenatally⁽²⁾.

When not diagnosed prenatally, megaureter manifests as a urinary infection⁽³⁾.

If POM is suspected, whether diagnosed prenatally or as a result of a urinary infection, diagnosis should be complemented with various techniques, such as ultrasound

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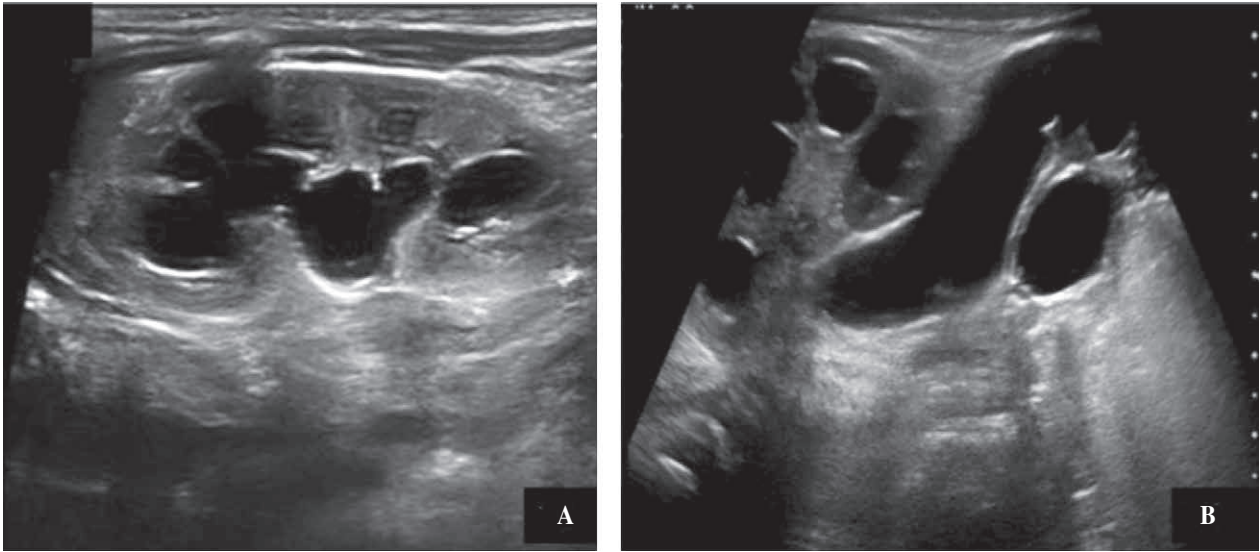


Figure 1. Severe dilatation of the pyelocalyceal system (15 mm) and the left distal ureter (13 mm).

examination, intravenous urography – which has fallen into disuse owing to its intrinsic irradiation –, MAG-3 diuretic renogram, voiding cystography, and most recently urosonography^(4,5).

Open ureteral re-implantation associated or non-associated with ureter remodeling is the gold standard technique in terms of vesicoureteral junction stenosis treatment⁽⁶⁾. In the last years, thanks to the advances made in endourology, a minimally invasive therapeutic alternative has emerged – endoscopic dilatation through the bladder via cystoscopy⁽⁷⁻¹⁰⁾ with or without scope verification, depending on the author⁽⁸⁾.

However, in cases of septic complication as a result of a urinary infection, urgent percutaneous renal puncture may be required to allow for a quick urinary diversion.

We present an antegrade alternative for endoscopic POM dilatation in cases where percutaneous puncture of the hydronephrotic kidney is required without the need for cystoscopy.

CLINICAL CASE

This is the case of a 5-month-old infant not diagnosed prenatally who developed a urinary infection with fever. Ultrasound examination demonstrated a significant left ureterohydronephrosis with a 15mm dilatation of the calyces and the pelvis (Fig. 1A), and a 13mm distal ureter (Fig. 1B). Given the suspicion of an obstructive pathology, a urosonography was carried out, which ruled out the presence of reflux, and a MAG-3 renogram was performed, which showed delayed radioactive tracer elimination (Fig. 2), with a 43.1% left differential renal function. Antibiotic treatment was initiated, and at 5 months of age, the patient developed a second UTI with fever. Emergency ultrasound examination demonstrated a significant pyeloinfundibulocalyceal dilatation and the previous ureteral dilatation, with isoechogenic material occupying the urinary tract, possibly as a result of severe pyonephrosis (Fig. 3). The urinary sediment showed high leukocyte levels (> 100 leukocytes/

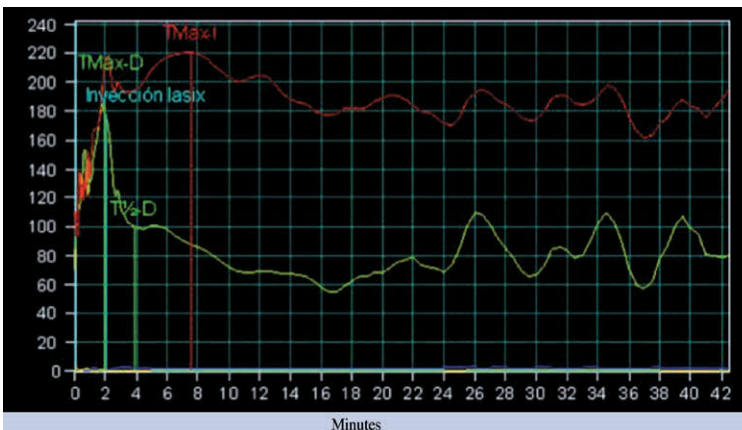


Figure 2. MAG3 renogram showing an obstructive curve with delayed radioactive tracer elimination.

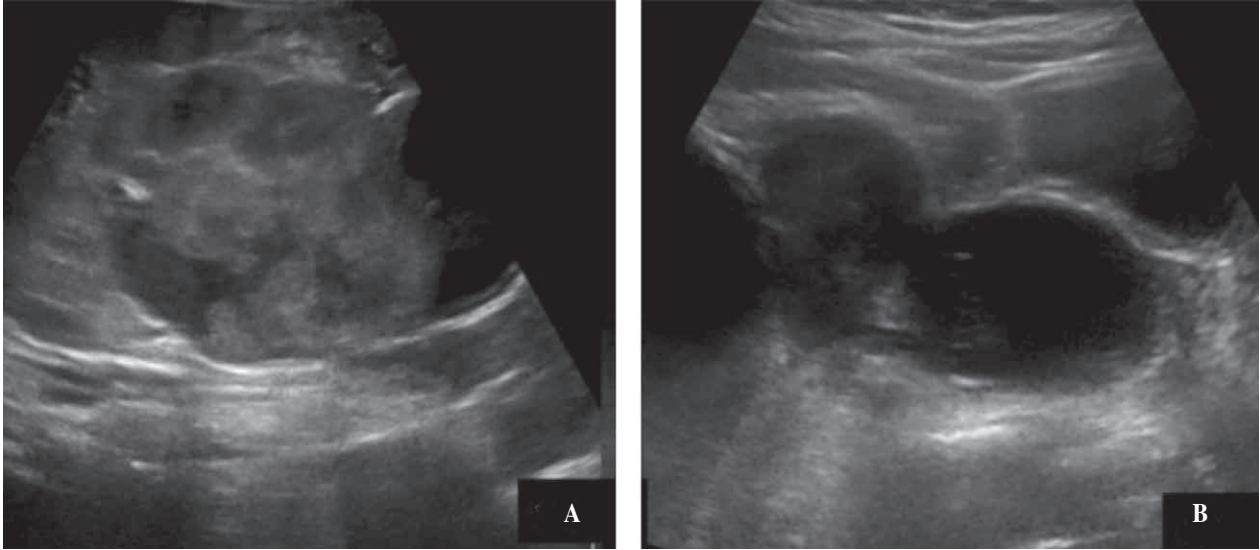


Figure 3. Collecting system occupied by isoechogenic material (pyonephrosis) at the level of the renal pelvis (A) and the ureter (B) along the whole tract.

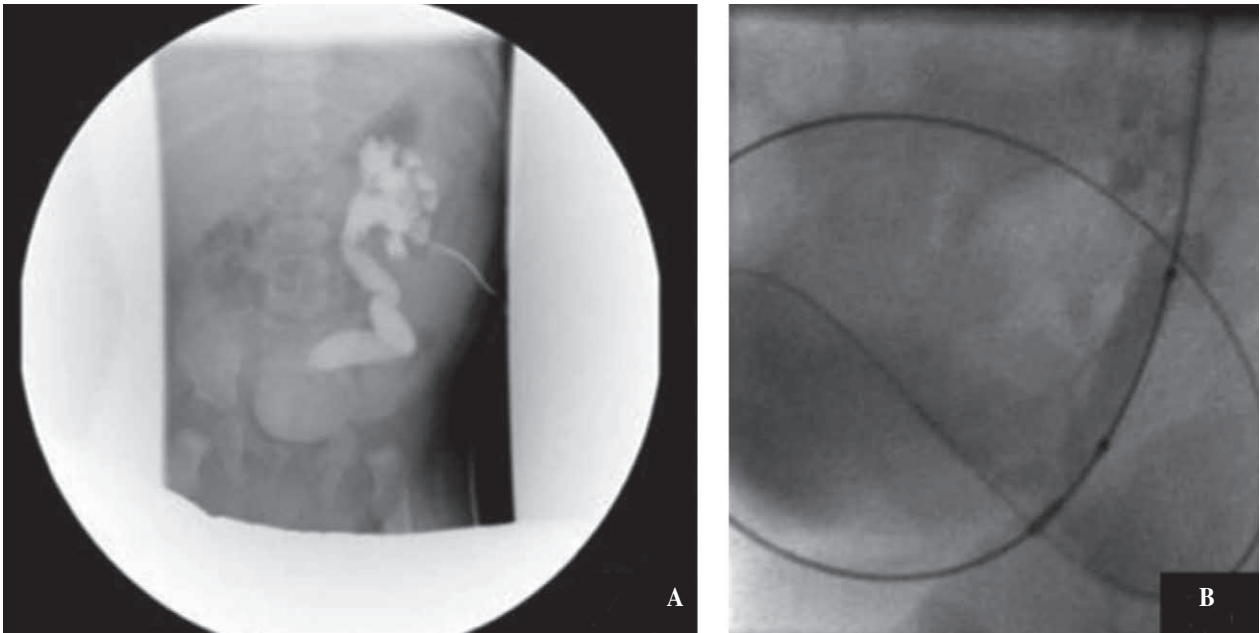


Figure 4. A) Antegrade pyelogram showing a severe dilatation of the left ureter and kidney, with a pencil-tip distal end of the ureter suggestive of POM. B) Antegrade dilatation through percutaneous drainage under radioscopic control.

field), and urine culture demonstrated numerous colonies of *Morganella morganii*. Given the clinical situation and the need for urgent urinary diversion, an 8Fr pigtail percutaneous nephrostomy was placed, and intravenous antibiotic therapy (80 mg/kg/day cefotaxime + 7 mg/kg/day gentamicin) was administered for 10 days in accordance with our healthcare facility's protocol.

Once the acute infection episode was over, endoscopic dilatation under general anesthesia was carried out through

the nephrostomy 23 days later. Decision was made not to remove the nephrostomy for antegrade dilatation purposes, without the need for cystoscopy.

A 0.014" ureteral guide was introduced via a 4Fr ureteral catheter (PT2, Boston scientific®), and dilatation was performed using a 7 mm Terumo® high-pressure balloon, with intermittent scope control following antegrade pyelogram (Fig. 4). Mean dilatation pressure was 14 atm (range: 12-16). It was maintained for approximately one minute,

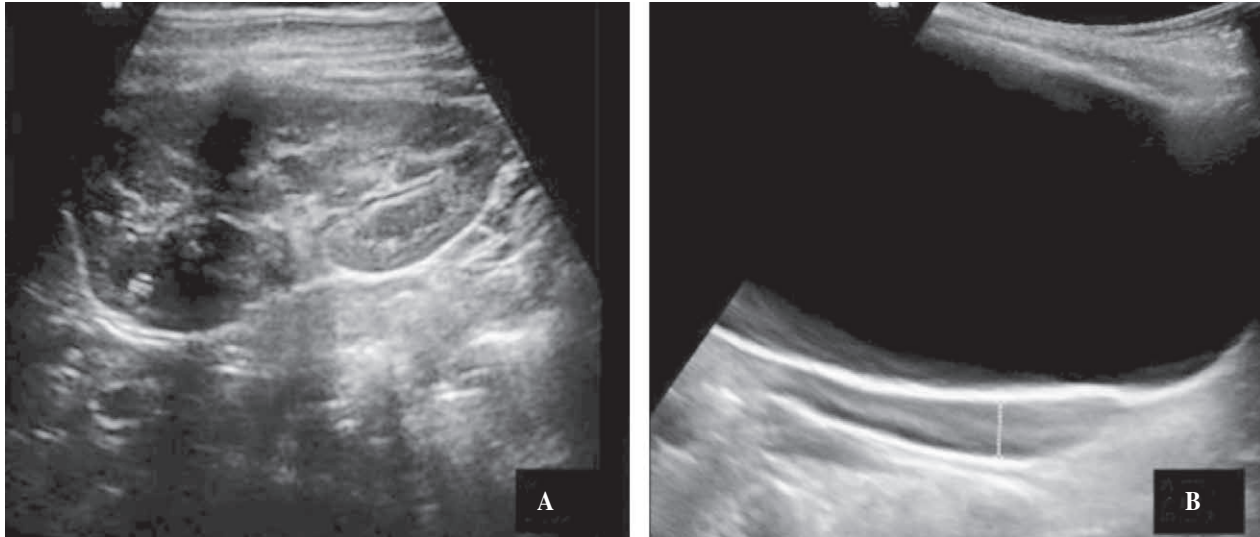


Figure 5. Decrease in pyelocalyceal dilatation (A) and distal ureter (B) (5 mm and 9 mm, respectively) at postoperative control.

and the dilatation maneuver was repeated twice⁽⁸⁾. The procedure took 21 minutes and ended by placing a 4.8Fr double J ureteral stent using the same antegrade route. No technique-associated complications were recorded, and the patient was discharged 24 hours later.

One month following dilatation, the double J stent was successfully removed. The ureteral meatus demonstrated to have an adequate caliber, since the 4Fr ureteral stent was smoothly passed.

In the urosonography carried out following the first dilatation, a decrease from 15 mm to 5 mm in pyelocalyceal dilatation (Fig. 5A) was observed, and while ureteral dilatation persisted, it had also decreased from 13 mm to 9 mm (Fig. 5B), with an adequate peristalsis and no associated secondary vesicoureteral reflux.

The patient is now 18 months old and has no symptoms. He has not had any new episodes of urinary infection and has a 9mm stable distal ureter dilatation, without pyelocalyceal dilatation in the last ultrasound control carried out 11 months following double J stent removal.

DISCUSSION

Nowadays, minimally invasive surgery is booming as a result of its advantages over open surgery. And in this respect, great advances have also been made in the field of endourology.

In the case of POM, minimally invasive endoscopic dilatation using a high-pressure balloon is a feasible option, with very good short- and long-term results in the recent series published⁽¹¹⁻¹³⁾. However, conventional open surgery – with ureteral reimplantation and megaureter remodeling – remains the gold standard technique⁽⁶⁾. In the article published by Ortiz et al.⁽¹⁴⁾ based on 100 cases

of endoscopic dilatation, the procedure was successful in more than 75% of patients, with a 12.2% percentage of re-stenosis during follow-up. Regarding patient radiation, it is true that radioscopy control during the procedure adds morbidity, with an effective dose of 0.36 mSv per minute. Although radiation entails a 0.012% risk of neoplasia, the fluoroscopy-free technique is currently prioritized, with fluoroscopy being used in selected cases only⁽¹⁴⁾.

At present, indications for endourological treatment are controversial, since there are no long-term studies⁽¹⁵⁾. Urinary infection caused by the introduction of a double J stent, and the occurrence of vesicoureteral reflux following dilatation are the primary morbidity factors associated with this technique⁽¹³⁾.

Sometimes, the fact percutaneous drainage is required in case of pyonephrosis allows this technique to be performed through the catheter itself once the infection has remitted, since there is an antegrade approach available as an alternative to cystoscopy. No references of this approach for POM treatment were found in the literature, but percutaneous antegrade access has been widely described in adults and children for renal lithiasis (percutaneous nephrolithotomy) treatment or ureteral stent placement in case of failed pyeloplasty, postoperative ureteral stenosis, ureteral trauma, or tumor compression⁽¹⁶⁾.

In our case, in spite of the patient's age, no difficulties were encountered. Dilatation could be performed with no technical modifications required, and the procedure was effective.

It can be concluded that the antegrade access is an alternative to cystoscopy and standard retrograde dilatation with balloon in patients with a percutaneous catheter. In our case, it proved to be a technically feasible approach, with good results and no complications.

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