



## Retrograde Intrarenal Surgery with Holmium Laser for Treatment of Bilateral Kidney Lithiasis in 1 Surgical Stage, in a Pediatric Patient

Bertuzzi E<sup>1</sup>, Venturi F<sup>1\*</sup>, Hails E<sup>2</sup>, Renzi M<sup>3</sup>, Sanmartino M<sup>1</sup> and Buniva C<sup>1</sup>

<sup>1</sup>Pediatric Urology Service, Dr Orlando Alassia Hospital, Santa Fe, Santa Fe, Argentina

<sup>2</sup>Third Year Resident of the Urology Service, Dr. Clemente Álvarez Emergency Hospital, Rosario, Santa Fe, Argentina

<sup>3</sup>Fourth Year Resident of the Urology Service, José María Cullen Hospital, Santa Fe, Santa Fe

\*Corresponding Author: Venturi F, Third Year Resident of the Urology Service, Dr. Clemente Álvarez Emergency Hospital, Rosario, Santa Fe, Argentina.

Received: August 11, 2022

Published: September 27, 2022

© All rights are reserved by Venturi F., et al.

### Abstract

We report the case of a 7-year-old female patient with a medical history of B acute lymphoblastic leukemia associated with bilateral kidney stones with recurrent urinary tract infections, in which bilateral laser retrograde intrarenal surgery (RIRS) was performed as complete resolution without new urinary complications.

**Keywords:** Renal Lithiasis; Holmium Lasers; Pediatrics; Retrograde Intrarenal Surgery

### Introduction

The incidence and characteristics of kidney stones show great geographic variability in children. Although urinary lithiasis is considered a relatively rare disease in pediatrics, it is quite common in some parts of the world, being endemic in Turkey, Africa and South American countries [1], especially in patients without metabolic alterations, due to diets rich in sodium and carbohydrates.

In recent decades, the treatment of stones in the upper urinary tract has evolved, making it possible to resolve complex kidney stones by endourology, without the need for major surgery such as percutaneous nephrolithotomy or video laparoscopy. In combination with the new endourological instruments and Holmium lasers, the access and treatment of stone disease through the pediatric urinary tract is effective and safe for the complete resolution of the acute or chronic condition. The main limitation for performing the procedure is the caliber of the equipment and its passage through the pediatric urinary tract.

### Case Presentation

We present the case of a 7-year-old female patient with a history of B Acute Lymphoblastic Leukemia. She was treated with

mercaptopurine and corticosteroid pulses, myopathy secondary to them, renal tubulopathy and hypertension. The urology service was consulted for recurrent urinary infections with rescue in urine culture of Klebsiella Pneumoniae Blee associated with bilateral kidney stones by ultrasound. Computed axial tomography without contrast of the abdomen and pelvis was performed, showing right kidney stones in the middle and lower calyces of 7 x 7mm and 4 x 3mm, respectively (Figure 1 and 2) and left kidney stones in the middle calyceal group of 3 x 4mm (Figure 3). It was decided to place a bilateral double pig tail catheter as a first measure for subsequent RIRS with bilateral Holmium laser. After 1 month, the patient is hospitalized for resolution and RIRS.

Patient in lithotomy position. Double J catheters are removed, bilateral retrograde pyelography is performed, and then RIRS is performed with a 7.5 Fr disposable flexible ureteroscope without the use of ureteral sheath, 3.6 Fr working channel, a 1.7 Fr NGage frontal catch ureteral basket was also used, fiber 272 µm Holmium laser with low power and high frequency settings (0.7 J; 10 Hz) [1]. Stone fragmentation of both kidneys was achieved, retrograde pyelography was performed again, confirming an expedited urinary tract without the need for ureteral catheter placement. The patient



Figure 1



Figure 2



Figure 3

tolerated the procedure favorably, going to the general hospital ward with a bladder catheter. Procedure duration 87 min.

At 24 hours, the patient had a good postoperative evolution, a bladder catheter was removed, confirming spontaneous diuresis, hospital discharge was granted at 48 hours with prophylactic antibiotic therapy.

Currently a patient with 8 years in multidisciplinary follow-up, with ultrasound control without evidence of renal lithiasis and without new infectious intercurrents.

Pending result of physicochemical analysis of the lithiasis.

### Discussion

According to the European guidelines for pediatric urology, the incidence of kidney stones in children is increasing. The increased availability of smaller endourological equipment has made it possible to effectively treat renal and ureteral stones endoscopically, using a similar technique in adults as in children.

Comparative literature between extracorporeal lithotripsy (ESWL) and RIRS is scarce. An American study that included 2000 patients showed that RIRS outperformed LEC as first-intention treatment [12]. Another retrospective study supported a higher resolution rate in a single session with 37% success for RIRS versus 21% LEC [13]. Different lithotripsy techniques including ultrasound, pneumatic and laser have all been shown to be safe and effective. Due to the smaller size of the fibers, laser energy is easier and more beneficial to use in pediatric patients.

A resolution rate greater than 87% with RIRS including ureteral stones has been described in children [6]. When the results are limited to intrarenal stones, this rate varies from 58 to 91% with the first treatment [7-11]. For kidney stones between 10 and 20mm, RIRS has a similar success rate, complications, hospital stay and less irradiation than micro perc [5].

### Conclusion

Our patient with a history mentioned above presented us with a therapeutic challenge to achieve complete resolution with the least invasiveness possible. In our institution, this was the first experience of bilateral RIRS with Holmium laser, which yielded encouraging results. Currently, the application of this technique is being evaluated in younger patients, waiting for the advent of new smaller caliber endoscopic equipment.

## Bibliography

1. C Radmayr (Chair), *et al.* "European Association of Urology Guidelines on Pediatric Urology (2022).
2. Campbell-Walsh Urology. 10<sup>th</sup> edition. Volume 4. Wein; Kavoussi; Novick; Partin; Peters. Pan-American Medical Publishing House. Year (2015).
3. Alice F and Romain B. "The optimal settings of holmium YAG laser in treatment of pediatric urolithiasis". *Journal of Pediatric Urology* 16.2 (2020): 244-250.
4. Mehmet S., *et al.* "Is Retrograde Intrarenal Surgery as Safe for Children as It Is for Adults?" *Urologia Internationalis* 105.11-12 (2021): 1039-1045.
5. Okan B., *et al.* "Comparison of Retrograde Intrarenal Surgery and Micro-Percutaneous Nephrolithotomy in Moderately Sized Pediatric Kidney Stones". *Journal of Endourology* 30.7 (2016): 765-770.
6. Ishii H., *et al.* "Ureteroscopy for stone disease in the pediatric population: a systematic review". *BJU International* 115 (2015): 867-873.
7. Smaldone MC., *et al.* "Is ureteroscopy first line treatment for pediatric stone disease?" *Journal of Urology* 178 (2007): 2128-2131.
8. Tanaka ST, *et al.* "Pediatric ureteroscopic management of intrarenal calculi". *Journal of Urology* 180 (2018): 2150-2153.
9. Abu Ghazaleh LA., *et al.* "Retrograde intrarenal lithotripsy for small renal stones in prepubertal children". *Saudi Journal of Kidney Diseases and Transplantation* 22 (2011): 492-496.
10. Erkurt B., *et al.* "Treatment of renal stones with flexible ureteroscopy in preschool age children". *Urolithiasis* 42 (2014): 241-245.
11. Uygun I., *et al.* "Efficacy and safety of endoscopic laser lithotripsy for urinary stone treatment in children". *Urological Research* 40 (2012): 751-755.
12. Tejwani R., *et al.* "Outcomes of Shock Wave Lithotripsy and Ureteroscopy for Treatment of Pediatric Urolithiasis". *Journal of Urology* 196 (2016): 196-201.
13. Freton L., *et al.* "Extracorporeal Shockwave Lithotripsy Versus Flexible Ureteroscopy for the Management of Upper Tract Urinary Stones in Children". *Journal of Endourology* 31 (2017): 1-6.