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SKILL AND TALENT

Micropercutaneous nephrolithotomy. A new therapeutic option for pediatric renal lithiasis☆

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Abstract
Introduction: Micropercutaneous nephrolithotomy is an evolution from the conventional percutaneous surgery in which pyelocaliceal access is obtained through minimum bore holes. Its objective is the complete removal of the calculi, lowering the morbidity associated with larger bore percutaneous tracts.
Materials and methods: We present the case of a micropercutaneous nephrolithotomy performed in a 14-year-old female patient with a 35 mm diameter kidney stone located in the renal pelvis. Surgery was performed in the Galdakao-modified supine Valdivia position. Puncture was done under ultrasound and fluoroscopic guidance. The 4.85 Ch needle of the Microperc® set was used, completing the procedure through the 8 Ch working shaft. Lasertripsy was done with the Ho:YAG laser. An indwelling double J stent was placed at the end of the procedure.
Results: Operating time was 170 min. Hospital stay was one day. She suffered renal colic after 72 h, which was resolved with oral analgesic treatment at home (Clavien I). She returned to school on the fifth postoperative day. The double J was removed at two weeks. At one month of the surgery, the patient is asymptomatic, a 4 mm lower calyx residual stone being observed in the abdominal ultrasound.
Conclusion: Micropercutaneous nephrolithotomy is a step forward toward the search for a less invasive kidney stone treatment. It is a safe and effective technique in the pediatric population, and it can be performed in the supine position, even in orthotropic kidneys. Future studies and collaborative works will help to better define its indications, to optimize its technique and to analyze its cost-effectiveness compared with other treatment options.

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PALABRAS CLAVE
Nefrolitotomía percutánea;
Cálculos urinarios;
Pediatría;
Técnica quirúrgica

Nefrolitotomía micropercutánea: una nueva opción terapéutica para la litiasis renal pediátrica

Resumen

Introducción: La nefrolitotomía micropercutánea es una evolución de la cirugía percutánea convencional en la que se accede al sistema pielocalicial mediante orificios de mínimo calibre. Su objetivo es la completa eliminación del cálculo, disminuyendo la morbilidad producida por la realización de trayectos percutáneos de mayor diámetro.

Material y métodos: Presentamos la realización de una nefrolitotomía micropercutánea en una paciente de 14 años con litiasis renal de 35 mm de diámetro situada en la pelvis renal. La cirugía se realiza en posición supina de Valdivia modificada en Galdakao. Punción guiada por ultrasonidos y fluoroscopia. Se emplea la aguja 4,85 Charrière (Ch) del set de Microperc®, completando el procedimiento a través de la vaina 8 Ch. Lasertricia con láser Ho:YAG. Se deja catéter doble J al finalizar el procedimiento.

Resultados: Tiempo quirúrgico de 170 min. Estancia hospitalaria de un día. Cólico renal a las 72 h resuelto con analgesia en domicilio (Clavien I). Reincorporación a la vida escolar al 5.° día. Retirada del catéter doble J a las 2 semanas. La paciente está asintomática al mes de la intervención, observándose en la ecografía abdominal un resto de 4 mm en el cáliz inferior.

Conclusión: La nefrolitotomía micropercutánea es un nuevo paso adelante hacia la búsqueda de la menor invasividad en el tratamiento de la litiasis renal, siendo una técnica segura y efectiva en la población pediátrica, pudiendo ser realizada en decúbito supino en riñones ortotópicos. Futuros estudios y trabajos colaborativos ayudarán definir mejor sus indicaciones, a optimizar su técnica quirúrgica y a analizar su coste-efectividad comparada con otros tratamientos.

Introduction

The goal of treatment of renal lithiasis should be the removal of the stone burden, with no or minimal harm to the patient, providing a benefit in quality of life and reducing the risk of disease recurrence as much as possible.

These premises should guide our decision tree, now being able to choose between different options: observation, extracorporeal shock wave lithotripsy (ESWL), retrograde intrarenal surgery (RIRS) and percutaneous nephrolithotomy (PNL).

Percutaneous surgery is the technique that provides the best results in terms of absence of residual stones, but at the expense of higher morbidity than other treatment options. The main complications of PNL are derived from the creation of the percutaneous tract. In this regard, the decrease in the size of the access probe has demonstrated a lower incidence of complications, mainly at the expense of bleeding reduction.[1]

Technological advances have enabled us, mainly through the miniaturization of endoscopes and litofragmentation and extraction systems, to walk to the minimal invasiveness in the treatment of kidney stones. This fact becomes even more important when facing the treatment of renal lithiasis in a pediatric patient, wherein the disease is usually chronic, associated with anatomical abnormalities or metabolic disorders, and where recurrence is the norm.

The aim of this paper is to present the first case performed in our country of micropercutaneous nephrolithotomy in a pediatric patient, describe the technique and discuss the possible indications of this novel approach. To date this is the first case in the literature performed in supine position in a kidney in orthotopic location, and larger pediatric lithiasis successfully resolved through micropercutaneous surgery.

Materials and methods

We report the case of a 14-year-old patient, with a body mass index of 19.3 kg/m^2, hypercalciuria in thiazide therapy, and history of right renal stones treated by extracorporeal shock wave lithotripsy. The patient had mild intermittent hematuria and occasional right lumbar pain pictures. Sonographically, lithiasis is seen in the right renal sinus, with minimal associated calyceal ectasia. Plain abdominal X-ray is requested, in which an intensely radiopaque 35 mm × 28 mm stone becomes evident (Fig. 1). Initially, ESWL is indicated as first-line treatment, not achieving fragmentation thereof. Given the large lithiasic volume and failed lithotripsy treatment, it is proposed for right percutaneous nephrolithotomy. Being a pediatric patient with recurrent lithiasis and several failed treatments on this renal unit, we decided to perform the approach using micropercutaneous surgery, given its theoretically lower aggressiveness.

Surgical technique

The procedure is performed under general anesthesia and in Galdakao-modified supine Valdivia position (Fig. 2A). Initially right ureteral catheterization is performed with 6 Ch catheter, to darken the excretory tract. Percutaneous puncture is made with the 16 gauge (G) needle of the Microperc® micropercutaneous surgery equipment (PolyDiagnost,