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Brief report – Endourology/urolithiasis

New technique to perform percutaneous nephrolithotripsy total dorsal decubitus

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A B S T R A C T

Introduction: Based on the knowledge of percutaneous surgeries performed by Valdivia-Uría technique, we developed changes which set a new technique to perform percutaneous nephrolithotripsy.
Material and methods: A retrospective study encompassing 1775 procedures was performed from 1996 to 2009, including all the patients who had undergone percutaneous nephrolithotripsy to treat urinary lithiasis. Patients were in total dorsal decubitus position, and it a puncture was performed in the posterior axillary line, dilation and placement of the Amplatz sheath in parallel position to the radio transparent table or slightly inclined downward.
Results: The median operating time was 55min and a complete clearance of the stones was achieved in 81.8% of the cases. In 12% of the cases the concurrent removal of the renal and ureteral lithiasis was performed.
Conclusion: This technique facilitates simultaneous ureteroscopy and nephroscopy without the need of repositioning the patient, and it is also a good option for percutaneous access.

Nueva técnica para realizar nefrolitotripsia percutánea «decúbito dorsal total»

Palabras clave:
Nefrolitotripsia percutánea
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R E S U M E N

Introducción: Basado en los conocimientos de la cirugía percutánea realizada con la técnica de Valdivia-Uría, implementamos modificaciones que establecen una nueva técnica para realizar nefrolitotripsia percutánea.
Material y métodos: Fue realizado estudio retrospectivo en el período de 1996 a 2009, con 1.775 procedimientos, siendo incluidos en el estudio todos los pacientes sometidos a nefrolitotripsia percutánea por litiasis urinaria. Los pacientes fueron posicionados en decúbito dorsal total, siendo la punción realizada en la línea axilar posterior, con dila-

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tación y colocación de la vaina de Amplatz en posición paralela a la mesa o con ligera inclinación inferior.

Resultados: El tiempo quirúrgico promedio fue de 55 min, con remoción total de los cálculos en 81,8% de los casos. En el 12% de los casos fue realizada la remoción de la litiasis uretral y renal concomitante.

Conclusión: Esta técnica facilita la realización simultánea de ureteroscopia y nefroscopia sin movilización del paciente, siendo una buena opción para acceso percutáneo.

Introduction

Percutaneous renal access was first described in 1955 by Goodwin et al for a temporary nephrostomy in a patient with hydronephrosis.

The patient was placed in the prone position probably to avoid injury to the colon. In 1976, Fernstrom and Johansson performed the first percutaneous nephrolithotomy.[1]

Subsequent reports of percutaneous renal access for both nephrostomy and the treatment of kidney stones were all with the patient in that position.

Thus, nephrostomy and nephrolithotomy were popularized and firmly established; today they constitute the gold standard for several conditions, and have even replaced open surgery for the treatment of complex calculi.[2]

From its inception to this date, percutaneous surgery and the equipment used have evolved significantly and now incorporate modern technical and instrumental modifications.

In 1988, Valdivia-Uría et al[3] published a series of 557 nephroscopies on patients in the dorsal decubitus position, which represented an alternative for percutaneous renal access. Since the publication of that article, percutaneous renal surgery became more widely used, and modifications of the Valdivia technique have been incorporated in some endourology centers.[4]

The objective of this study is to describe a modified position for the Valdivia-Uría technique.

Material and methods

A retrospective study from May 1996 to May 2009 was conducted; 1,775 percutaneous nephrolithotripsies in total dorsal decubitus in the three urology services in the Florianopolis region in Santa Catarina, Brazil, were performed. All patients undergoing percutaneous nephrolithotripsy for urinary lithiasis were included; there were no exclusion criteria. Surgical time was analyzed.

Description of the technique – Patients were placed in total dorsal decubitus on a radio-transparent table; the operated flank was situated next to the edge of the table. No pad or other means of elevating the flank was used.

The lower extremity ipsilateral to the puncture site was slightly abducted and elevated approximately 15 cm above the table. The contralateral lower extremity was abducted in a position similar to the lithotomy position.

The upper extremity contralateral to the puncture site was extended and parallel to the trunk. The ipsilateral upper extremity was abducted.

Surgical fields were placed, leaving exposed the flank to be operated on; a sterile plastic bag with adhesive backing for fluid collection was secured on the flank.

The table and instruments in the operating room should be arranged in order to facilitate cystoscopy and/or ureteroscopy simultaneously with the percutaneous procedure. The radioscopy monitor is placed on the upper side opposite to the percutaneous access, and the laser and video tower with the video camera, monitor, light source, lithotripter, and recording system are placed towards the lower area. The table with surgical instruments is placed to the left of the surgeon (fig. 1).

After a video cystoscopy and ureteral catheterism for the purpose of performing a pyelography, saline solution is used for distending the renal pelvis and calyces to facilitate the puncture. The puncture is done under radioscopic guidance, usually on the posterior axillary line, one centimeter under the twelfth rib; the needle is inserted parallel to the table tilted no more than 15 degrees.

Figure 1 – Arrangement of the OR and patient position permitting simultaneous retrograde and percutaneous access.

Figure 2 – Location of the puncture site, safety guidewire and Amplatz Sheath parallel to the table which is tilted no more than 15 degrees.

If the kidney is in a high position or the superior calyx access is necessary, the puncture is intercostal.

Dilation can be achieved with a balloon or with facial and coaxial dilators with a diameter no larger than the Amplatz Sheath used; a safety guide is left in place (fig. 2).

After establishing the path to the calculus, a direct-vision video nephroscopy with low water pressure is done.

After the calculus is extracted, a revision takes place, and a 22 Fr Foley catheter with the balloon slightly inflated (2-3 mL of contrast medium) is placed in the renal pelvis and secured to the skin with mono-nylon 3-0.

If necessary, a double J catheter is placed to prevent ureteral obstruction with residual fragments or clots.

Results

In these 1,775 cases of percutaneous nephrolithotripsy in total dorsal decubutus, the surgical time, including cystoscopy and ureteral catheterism for the pyelography, ranged from 12 to 195 min, with a mean of 55 min. Access was renal unilateral in 85.6% of cases, renal and ureteral in 12%, and percutaneous bilateral in 1.1%; 0.4% of cases were single kidneys, and 0.9% were horse shoe kidneys.

Calculi were located in the renal pelvis and calyces in 72% of cases; 19.2% were staghorn stones, and 8.8% were located in the upper ureter.

This new renal approach yielded a stone-free rate of 81.8%. Shock wave lithotripsy was required in 5.7%; in another 3.5% of cases, a flexible ureter was required; in 4.6% of patients a new percutaneous procedure in total dorsal decubitus was necessary; and in 4.2% the procedure was non-surgical.

The overall complication rate was 1.12% distributed as follows: 0.16% pyonephrosis/nephrectomies, 0.67% bleeding requiring arterial embolization and blood transfusion, 0.22% pseudoaneurysm or arteriovenous fistula, and 5.05% rupture of the pyeloureteral juncture requiring open surgical repair. No hollow viscus or pleural injury occurred in this series.

Discussion

The position described can also be used for ureteroscopic procedures simultaneous with nephroscopy. For upper ureteral stones, the procedure starts with a ureteroscopy; if necessary, a percutaneous anterograde access can be achieved without the need of repositioning the patient. In a very dilated and tortuous urinary tract where the retrograde guidewire cannot be passed, a renal puncture can be done for decompression, or an antegrade guidewire passed.[5]

As many punctures as necessary are done to remove all stones from the kidney; a flexible nephroscope is used for laser fragmentation if needed to facilitate the procedure. Punctures may be of the "Y" type or individualized for each patient, and are facilitated by the distention of the renal pelvis and calyces by injecting saline solution or contrast medium when necessary. A hydrophilic guidewire is left in all punctures for subsequent dilatation, which should be oriented towards the ureter whenever possible in order to ensure the dilation of the percutaneous path and reduce the risk of puncture loss.

Whenever possible, a safety guidewire should be left inside the lumen or outside the Amplatz Sheath in order to facilitate the procedure and make it safer.

The puncture on the posterior axillary line goes parallel to the infundibular vessels and enters Brödel's bloodless line; this reduces the likelihood of a vascular injury.[6]

Obese patients benefit from the total supine position especially because of the ventilatory condition during anesthesia, and because they are not repositioned after they are anesthestized.[7-9]

The stone can be fragmented with an ultrasonic, ballistic, or laser lithotripter. Fragments are removed with a tridentate or foreign body forceps.

The myth of the risk of colon perforation in a supine patient should be corrected, since it is in the prone position that the colon is pushed against the kidney, which theoretically may increase the risk of accidents.[10]

Due to the position of the patient and of the Amplatz Sheath, the high-pressure infusion of large amounts of fluid is not necessary for visualization; thus, we can almost always work in a dry field; this reduces the risk of fluid absorption, sepsis, and mobilization of fragments to the ureter or to other calyces.[7,10]

The nephrostomy remains in place for 12 h, and the JJ catheter for 7-10 days. The patient is released 24 h after the surgery. Imaging and laboratory follow-up are performed at 30 days.

Conclusion

Based on the results presented here, we conclude that percutaneous nephrolithotripsy on a patient in the total dorsal decubitus position is safe, feasible, has an easier

learning curve, and is more comfortable for the surgeon, and it allows simultaneous percutaneous and ureteral access.

Conflict of interest

The authors state that they have no conflicts of interest.

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