PERCUTANEOUS NEPHROLITHOTOMY IN SUPINE DECUBITUS. VALDIVIA’S POSITION

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Summary.- OBJECTIVES: The accidental puncture of the renal cavities and the performance of anterograde pyelogram by Goodwin in 1955 gave way to the beginning of modern endourology. The possibility to insert thick caliber catheters in the excretory system through the renal parenchyma had led to the current state of percutaneous surgery techniques in the treatment of urinary lithiasis.

Percutaneous nephrolithotomy (PNL) in the supine position makes possible, nowadays, to treat a high number of patients with outstanding results and a fast recovery.

METHODS: We describe the technique used for the surgical treatment of renal lithiasis in supine position and the established indications.

RESULTS: From 2004 to 2007 we treated 150 patients using the PNL technique in supine position. We show a brief analysis of the results obtained while applying these techniques and evaluated the trans and post operative complications, post operative stay, evolution and kind of technique used for the extraction of the gravel.

CONCLUSIONS: The good results achieved during the application of the supine position gives credit to its use for the treatment of renal lithiasis.

Keywords: Nephrolitotomy. Lithiasis. Multiple access.

Resumen.- OBJETIVO: La punción accidental de las cavidades renales y la realización de la pielografía anterógrada en 1955 por Goowin marcó el inicio de la endourología moderna. La posibilidad de introducir catéteres de grueso calibre en el sistema excretor a través del parénquima renal ha llevado al estado actual de las técnicas de cirugía percutánea en el tratamiento de la litiasis urinaria.

La nefrolitotomía percutánea en decúbito supino permite en la actualidad tratar un alto número de pacientes con resultados excelentes que permiten una recuperación rápida del paciente.

MÉTODOS: Se describe la técnica utilizada para el tratamiento quirúrgico de la litiasis renal en posición supina así como las indicaciones establecidas.

RESULTADOS: Han sido tratadas del año 2004 al 2007 un total de 150 pacientes con técnicas de Ne-
frolitotomía Percutánea en decúbito supino se muestra
análisis de resultados obtenidos durante su aplicación
evaluando complicaciones trans y post operatoria, es-
tadía post operatoria, evolución, tipo de técnicas para
la extracción.

CONCLUSIONES: Los buenos resultados obtenidos en
la aplicación de posición supina para la NLP avalan su
uso en el tratamiento de la litiasis renal.

Palabras clave: Nefrolitotomía. Litiasis. Acceso múltiple.

INTRODUCTION

The first efforts to remove renal calculus, obviating the open surgery, appeared with Rupel in 1941 when he extracted a gravel located in the renal pelvis using rigid tweezers and under a radiological control through a chirurgical nephrostomy.

Years later and based on the advance produced by the accidental puncture of the renal cavities and also the realization of the anterograde pyelography by Goowin in 1955 marked the beginning of the modern endourology.

In 1974, Brantly and Bissada used and endoscopy pan and a pair of flexible tweezers to remove renal calculus. In 1976, Ferstran and Johanssen, established that non cruel therapy when combining the puncture, expansion and extraction of lithiasic concretions with radiological control using a Dormia’ s catheter gravel extractor tweezers.

The PNL reached a higher degree of perfection in 1981 when Alken and Cols introduced their nephroscopy, sonotrode and telescopic set used for the facial enlargement. This device made possible the percutaneous access to the kidneys, eased the fragmentation of the gravel and the fragments removal with only one surgical act.

Perhaps, in no other surgical field, the treatment of an affection underwent such a drastic change, and in such a very short time like the surgical treatment of the nephrolithiasis. In the last 25 years we have witnessed a notable displacement from the sky open procedures like the nephrolithotomy and the ureterolithotomy to the endourological abordage such as the striking wave lithotripsy (SWL), the ureteroscopy (URS) and the percutaneous neprolithotomy (PNL).

The PNL method is not as cruel as the open surgery eventhough the presence of the extracorporeal techniques make it look more invasive and technically speaking more exigent. Nevertheless, as all the techniques have specific indications that make them effective in front of certain kind of lithiasis it is very important to adequate select the patient to reach success.

Compared to the classic lumbotomy, the PNL is less aggressive and ease the treatment of the relapse lithiasis. This technique diminishes the stay in the hospital, has low analgesic medication and offers a short period to recover. These are the reasons why this technique is highly accepted among the patients and it is considered the first surgical choice in the treatment of many cases.

During all this time, and in an attempt to standardize this chirurgical technique, they arrived to the conclusion that the decubitus prone position was the ideal to access the renal cavities. Of course, nobody counted on the anaesthesia doctors when considering this. Nevertheless, years passed until doctor Valdivia Uria described the supine position which demonstrated to have a very low morbility through the years and outstanding results. As doctor Valdivia said, the starting point for the use of this position was the contradictions that came forth with the anaesthesia doctors when usin the prone position, especially when operating fat patients. Regarding this, he was also influenced by the idea of doctor Hans Reuter who placed a percutaneous mininephrostomy in a laterally placed patient while doing the ureterorenoscopy aiming to reduce the intrarenal pressure.

After several investigation and clinical tests the position in decubitus supine appeared as a safe way to access the renal cavities. Even though the prone position is more used than the supine position, its effectiveness, especially with fat patients, the possibility to work with very low pressure in the renal cavities the anaesthetic advantage and also the possibility of accessing both the ureter and the renal cavities indistinctly during the same procedure make the use of this technique hard to leave once you have implemented it.

MATERIAL AND METHOD

We have adopt the doctor’s Valdivia classic position for this work. The patient in supine position, we keep the inferior member on the side we are going to work extended and the opposite one bended. We place a bag with 3 liters of water in the lumbar fossa getting the patient closer to the edge of the
bed. We use the C arch in A-P position; we catheterize the meatus passage and place an ureter catheter to draw the renal cavities.

Once we select the calyx to enter we mark on one side of the patient using a puncture needle and a radioscoppy flash. We trace a cranium caudal direction and made this imaginary line coincide with the rear axillar line and set the entrance point. When the puncture is done and we have already arrived to the renal capsule it is very important to observe through a radioscoppy how the needle displaces the kidney to realize that we are in the correct position. Once we are in front of the calyx, this should be depressed due to the pressure of the needle (fovea sign). This sensation, visual and feeling at the same time. As Dr Valdivia says, is very important to know if we are in the right position in front of the chosen calyx. When we puncture the calyx we place the guiding wire and expand it using the Arken telescope until amplax #32 fr since only have a 30 fr nephroscopy. To fragment the gravel we use a pneumatic lithotriide named TIWIN-ZA and developed by doctor Alfonso Espinosa Erazo from the Teodoro Maldonado Hospital in Guayaquil, Ecuador. We use spinal and general endotracheal anaesthesia in all cases. We have included all the patients that came to the urology service at the Faustino Perez Hospital having a lithiasic mass over 4 cm² (it includes also some coral shape gravels) and of hard consistence or embedded with or without dilatation of the renal unit but able to be recover, also patients with only one kidney and with controlled risk factors.

To evaluate these factors we analyzed the following conditions:
- Lithiasis position
- Access times
- Trans and post operative complications
- Time to remove the nephrostomy
- Presence of residual lithiasis
- Post operative stay

RESULTS

In the period of these comprehended between June 2004 and October 2007 we assisted a total of a 150 cases. 17 of these were classified as coral shape gravels, 67 cases with a lithiasis located in the renal pelvis, 15 cases in pelvis and calyx groups and 51 patients with calculus located in different calices. In 8 patients we have to do two percutaneous access due to different gravels located also in different calices, one of those had an intercostals access to remove a lithiasis from the superior calyx.

As Tran operative complications we reported some migration of the lithiasis to the superior calyx and such situation obliged us to convert the operation into open surgery. A bleeding caused by a severe arterial high pressure that also obliged us to convert into a sky open surgery due to a very posterior entrance close to the renal ileus and we had a third patient with whom we could not access properly to the entrance calyx and we had to place a catheter in the retro peritoneum and in a second time we could remove the lithiasis.

As post operative complications we had 16 patients with fever that disappeared with no additional treatment, two patients with a late post operative severe sepsis and one of them also presented a pneumonia in the right lung and we had to penetrate twice, two others presented nephritic colic due to obstruction of the catheter and the nephrostomy, and another one caused by a lithiasis fragment expulsion. The average time to remove the nephrostomy catheter was 3.2 days.

Of the total of the patients intervened only 26 had residual fragments and of these 17 had a rescue nephrolithotomy (second look). 8 of them had extra corporeal lithotritry and in 1 case the patient remained with no symptoms so we decided not to do any complementary treatment. The average post operative stay was in 3.7 days.

DISCUSSION

The PNL in supine position is a technique that allows us to treat different kind of lithiasis with minimum complication and these go from a unique one with only one light obstructive component to complex coral form lithiasis with serious drain disorders allowing us also to do accessories procedures to solve the obstruction and multiple accesses even via inter costal with no morbidity associate to this procedure.

Some authors show skepticism when using this position because they doubt that a successful initial access would be possible in lithiasis of difficult treatments such as when they need the access to the urinary via through the medium and superior calices or when they need multiples accesses due to calculus in different calices and in situations with similar complexity.

This results show that the supine position is of advantage in all the before mentioned situations we had had 7 cases with double access. 17 with coral form calculus, 14 in pelvis and calyx groups, 1 case with inter costal access with no complications.
As with any other chirurgical techniques we need to go beyond an apprenticeship curve but once you overcome it you will realize that the supine position not only allows the treatment of lithiasis but also to board the renal cavities for other procedures in safety way like the endo pyelotomy.

The number of Tran operative complications is been really low in the first 150 cases with only 2.0% (these complications appeared only in the first 17 patients).

The adequate selection of the right entrance point and the right direction have impeded a second access that can provoke bleeding like it is the case of one patient, the change of the original position with the inferior member of the side to be accessed stretched out and the opposite one blended and the possibility to do multiple accesses have made possible a better access to the superior calyx and like this we eliminated the difficulty supposed by the migration of fragments toward it which obliged us to convert one of our patients. Practice allows us to better up the sense of feeling and also the visual which as Doctor Valdivia said it is very important to know if we are in the right position, that is, in front of the selected calyx allowing also the right entrance to the cavities impeding false entrances.

Regarding the post operative complications the fever was present with no other manifestation as the sign prevailing in the series. The acute post operative urinary sepsis is manifested as for the reports in less than 1% of course, due to the bacterial charge implicit in the lithiasis. This is the factor that requires more observation in the post operative. The fever in this kind of surgery inform us of the apparition of a severe infectious complication that can, in a short period, end with the life of the patient.

Usually, we control this infection with wide spectrum antibiotics and guarantying a correct drain of the nephrostomy. Also, the residual lithiasis has increased lately after the first procedure, arriving to a 14%, due to the incorporation to the treatment of cases with a mayor lithiasic mass and mayor complexity too. At first, we started associating the extra corporal lithotripsy (ECL) to the initial treatment of the nephrolithotomy but now we mostly do a rescue nephrolithotomy 7 to 15 days after the procedure. We only use the ECL for small fragments located in calices with difficult access. Nowadays, the recommendation of the AUA for the treatment of lithiasis with a great complexity or with oral forms, based on an updated revision, Proposes the use of one therapy at a time due to the very poor results reported lately when combining both the ECL and PNL.

The rescue nephrolithotomy(second look) can appear uncomfortable for the patient at first, especially if do not explain to him the possibility to do the procedure on a second time but in practice the procedure is simpler because we always use the same tracks created the first time and this minimizes the chances of blooding and diminishes the swollen produced by the lithiasis in the interior of the cavities and allows the reorganization of the fragments to ease the access to them.

The post operative stay is 3.7 days and usually the patient is ready to go when the nephrostomy is removed explaining the patient that the fistula should be closed in 24 hours.

Finally we can say that the supine position for the access to the renal cavities has advantages that give credit to its use.

CONCLUSIONS

1. To commence the procedure with local anaesthesia and if an inconvenience appears the anaesthesia doctors then find no difficulties to change to the general one since this position enables an ease access to the aerial via.

2. Free trasureteral access during the procedure easing the treatment of the ureteral lithiasis that is concomitant to the renal lithiasis.

3. The intermittent irrigation due to the position and angle of the AMPLAX shirt and also allows to work at very low pressure and it avoids the migration of the fragments during the fragmentation and the pyelointerstitial reflux. It saves solution and besides its own declivity of the via that we use for the access eases the spontaneous way out of the lithiasic fragments and the clots(coagulated blood).

4. It is not as complex since we do not have to change the position of the patient avoiding the potential complications that can appeared in a patient with tubes and a canalized via, ureteral catheter,etc and allows saving time.

5. Saving money since we do not have to wear a different set of clothes for the first surgical time where we catheterize the ureters.

6. The patient tolerates well and with no iatrogenic risk the supine position. It do not interfere with the diaphragmatic ventilation, easy intravenous circulation return, no damage is produced to the osseous relief especially in broncoapatic, fat or old patients.
7. The risk to damage the colon is lower than when we do the access in decubitus pronus since the colon is rather impelled toward the front instead of the back.

8. The posture of the urologist is better since he can work comfortably sit.

REFERENCES AND RECOMMENDED READINGS
(*of special interest, **of outstanding interest)