Ureteroscopy Assisted Retrograde Nephrostomy for Complete Staghorn Renal Calculi

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\textbf{Abstract}

Complete staghorn calculi are typically managed with percutaneous nephrolithotomy (PCNL). However, dilating nephrostomy and inserting a nephro access sheath can be difficult to perform without hydronephrosis. We reported the procedure of ureteroscopy-assisted retrograde nephrostomy (UARN) during PCNL. UARN is effective without dilating the renal collecting system in cases of complete staghorn calculi. A 63-year-old female with a left complete staghorn renal calculus was referred to our hospital. Under general and epidural anesthesia, the patient was placed in a modified-Valdivia position. A flexible ureteroscope was inserted and a Lawson retrograde nephrostomy puncture wire was advanced into the flexible ureteroscope. The puncture wire was forwarded along the route from the renal pelvis to the exit skin. Calculus fragmentation was done using a pneumatic lithotripter and the Ho: YAG laser. UARN during PCNL was effective for the treatment of a complete staghorn calculus.

\textbf{Urine Analysis}

A 63-year-old female was referred to our department for treatment of a left complete staghorn renal calculus (fig. 1a). She had no remarkable previous or family history. Her laboratory data showed no remarkable findings except for microhematuria on urinalysis. In April 2011, the patient was admitted to our department for PCNL to treat the left complete staghorn calculus. We previously reported the technique of UARN and performed this technique in the present case as described below.

We previously reported the procedure of ureteroscopy-assisted retrograde nephrostomy (UARN) during PCNL [3]. UARN is effective without dilating the renal collecting system in cases of complete staghorn calculi.
Fig. 1. Preoperative (a) and postoperative (b) kidney-ureter-bladder films.

Fig. 2. Puncturing under ureteroscopy guidance.

Fig. 3. “Tents” sign was seen at the posterior axillary line.
In recent years, there have been major advances that have made the observation of the renal pelvis easier, making it now possible to perform a wide variety of intrarenal procedures using an ureteroscope [7]. Thus, it is easier to approach the desired renal calyx using a flexible ureteroscope than was possible using previous fluoroscopic approaches [5, 8]. In our experience with UARN, the ureteroscope can continuously afford the ideal angle.

Our case was performed in the Galdakao-modified Valdivia position. In 1987, Valdivia-Uria described a PCNL with the patient in the supine position, with a 3 L serum bag below the flank [9]. In that position, both surgical and anesthesiological advantages were described. Thereafter, Ibarluzea et al. [10] reported a Galdakao-modified Valdivia position. This position has the advantages of allowing simultaneous percutaneous and retrograde access. In our case, we continuously visualized the motion of the ureteroscope under ultrasonography, and were easily able to detect the tent sign. This position did not need a position change from lithotomy to prone and vice versa, which reduced operating time.

Retrograde nephrostomy puncture usually requires a single movement, and since the needle passes from a posteriorly located calyx through the retroperitoneum, the possibility of damage to intra- and extra-renal vessels is less likely [6]. A potential disadvantage of the procedure is the danger of exiting the kidney in a cranial direction, with possible injury to the spleen, liver, or pleural cavity. In the ventral direction, possible injury to the intestines may occur [6]. We made the puncture under ultrasonographic and fluoroscopic guidance to avoid injury to the surrounding organs. Ultrasonography provided excellent visibility from the renal parenchyma to the skin (also along the puncture line route) and was also useful in avoiding injury, especially to the intestines.

The procedure has two limitations. The first is not to puncture the lower calyx. The ureteroscope with puncture wire is so stiff that it cannot bend to the lower calyx. The second is difficulty approaching the target calyx. The inner cavity of the ureteroscope was occupied by the puncture wire, so a lower flow of irrigating solution left the visual field less clear.

**Conclusion**

UARN was effective for treatment of a complete staghorn calculus during PCNL. Further cases are needed to verify the safety and efficacy of the technique.
References


