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Ureteroscopy-assisted retrograde nephrostomy (UARN) without ureteral access sheath (UAS)



Takashi Kawahara^{a,b,*}, Hiroki Ito^{a,b}, Hideyuki Terao^a, Hiroji Uemura^b, Masahiro Yao^b, Junichi Matsuzaki^a

^a Department of Urology, Ohguchi Higashi General Hospital, Japan

^b Department of Urology, Yokohama City University, Graduate School of Medicine, Japan

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ABSTRACT

INTRODUCTION: We previously described ureteroscopy assisted retrograde nephrostomy (UARN). In UARN, it is possible to continuously visualize the dilation of the ureter from puncture to insertion of the nephroaccess sheath with minimal complication. But in the course of making nephrostomy, UARN requires ureteral access sheath (UAS). UAS has a potential risk of ureteral stricture. Herein, we report the first case of UARN without the use of UAS.

PRESENTATION OF CASE: A 53-year-old female was referred to our hospital for treatment of her right renal stone. Because her stone burden was 27 mm, we planned to perform percutaneous nephrolithotomy (PCNL) using UARN without UAS.

DISCUSSION: UAS facilitates a decrease in the intrarenal pressure due to irrigation, and it makes controlling the URS easier. However, in terms of the risk of ureteral stricture, unnecessary insertion of a UAS should be avoided.

CONCLUSION: We describe the first case of a renal stone successfully treated by PCNL using the UARN method without the use of a UAS.

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1. Introduction

We previously reported a new procedure: ureteroscopy (URS)-assisted retrograde nephrostomy (UARN) for percutaneous nephrolithotomy (PCNL), and confirmed the effectiveness, as indicated by higher stone-free rates and fewer complications [1,2]. UARN facilitates continuous visualization under URS. UARN is highly effective in cases without hydronephrosis, in whom, it is sometimes difficult to make a percutaneous nephrostomy using ultrasonography even when using an occlusion balloon catheter.

The ureteral access sheath (UAS) is a useful tool to easily control URS, and is associated with a lower intrarenal pressure, which might lead to a lower rate of postoperative urinary tract infections. Although the risk of ureteral stricture, due to the use of UAS is still unknown, we showed that the shorter time required to insert the UAS results in a decrease in postoperative hydronephrosis for the

patients who did not undergo the insertion of a ureteral stent at the conclusion of ureteroscopic lithotripsy [3]. Avoiding the use of UAS might contribute to a decreased rate of postoperative stenting. Herein, we report the case of a patient with a renal stone who was successfully treated by PCNL using UARN without UAS.

2. Case presentation

A 53-year-old female was referred to our hospital for treatment of her right renal stone (Fig. 1a). Because her stone burden was 27 mm, we planned to perform PCNL using UARN. The procedure was described in our previous reports [1,2,4]. Briefly, under general and epidural anesthesia, the patient was placed in a modified Valdivia position (Galdakao-modified Valdivia position) [5]. We usually perform flexible URS after inserting the UAS. In this case, we performed flexible URS without a UAS, and observed the renal collecting system and target stone, then determined the target calyx to puncture (Fig. 2a). Because it was easy to control the flexible URS without a UAS, we inserted the puncture wire through a URS working channel with a covered puncture wire. When we reached the target spot to puncture, we punctured it from the target calyx to the skin (Fig. 2b and c). After making the nephrostomy, dilating it using a balloon dilator and inserting a nephroaccess sheath

* Corresponding author at: Department of Urology, Ohguchi Higashi General Hospital, 2-19-1, Irie, Kanagawa-ku, Yokohama City, Kanagawa, Japan.
Tel.: +81 45 401 2411; fax: +81 45 431 6920.

E-mail address: takashi.tk2001@yahoo.co.jp (T. Kawahara).

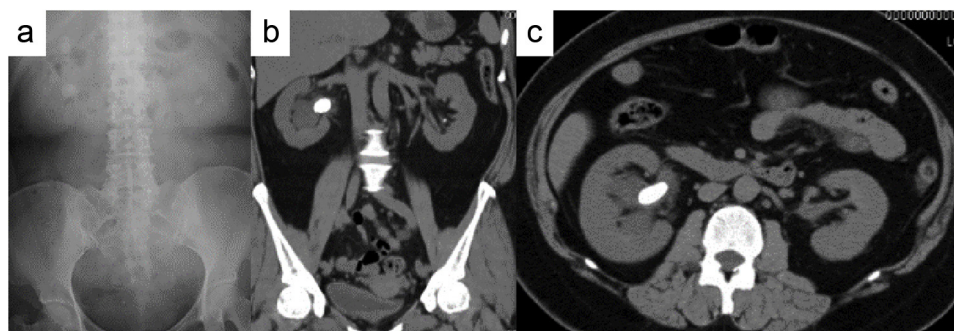


Fig. 1. Preoperative (1) KUB, (2) Coronal CT, and (3) Axial CT.

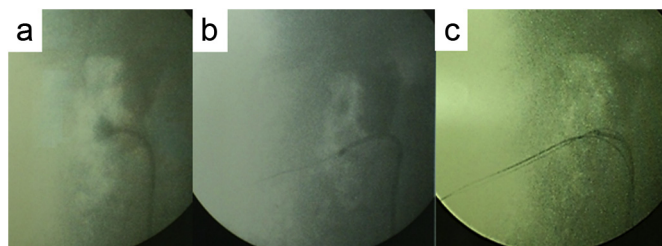


Fig. 2. UARN technique.

(X-Force® Nephrostomy Balloon Dilation Catheter, BARD, Murray Hill, NJ, USA), PCNL was performed. We inserted a ureteral catheter at the conclusion of the PCNL without postoperative nephrostomy, and the ureteral catheter was removed one day after the operation. Two weeks later, the lack of hydronephrosis and a stone-free status were confirmed by computed tomography (Fig. 3a and b). The length of the operation was 82 min, and the chemical analysis of the stone showed that it was composed of calcium oxalate (85%) and calcium phosphate (15%).

3. Discussions

We previously reported that a longer operation was correlated with postoperative hydronephrosis three days after surgery. That study showed that a longer duration of UAS insertion might be a risk factor for postoperative ureteral stricture. In a previous report, postoperative ureteral stricture occurred in 3% of the cases [6]. Therefore, the need for a postoperative procedure is not a common postoperative complication. The same as in our previous report, postoperative ureteral stricture was not seen in a 1.8 month follow-up examination [7].

In a pig model, UAS caused ureteral mucosal ischemia and also resulted in a risk of ureteral stricture (REF). UAS facilitates a decrease in the intrarenal pressure due to irrigation, and it makes

controlling the URS easier. However, in terms of the risk of ureteral stricture, unnecessary insertion of a UAS should be avoided. In our institute, to decrease the risk of ureteral stricture, a small caliber UAS is preferred. Although no postoperative ureteral stricture has been seen so far in our cases, we speculate that using a UAS should be avoided whenever possible.

So far, we treated five patients with UARN without a UAS, however, two of these procedures were unsuccessful, and eventually required the insertion of a UAS. In one case, we could not reach the target calyx because the URS with the puncture wire was too stiff, and the URS did not bend. In the other case, we were able to reach the target calyx, but the URS could not be kept in the appropriate position when the puncture wire was advanced, and the puncture wire could not be straightened out to the skin vertically. In both cases, after inserting the UAS, UARN was smoothly performed, and the subsequent PCNL was successfully completed.

We are now trying UARN without UAS for female patients. It is easier to control the procedure without a URS in female because of their shorter urethra. For the cases with hydronephrosis, we usually perform UARN with a UAS, because it is difficult to keep a flexible URS in the correct position. The most important point when performing such a procedure is to avoid inducing a high intrarenal pressure. We frequently aspirate the irrigation liquid to avoid increasing the intrarenal pressure. On the other hand, it should be kept in mind that a UAS should be inserted as soon as possible when it becomes clear that puncture is impossible. The continuous presence of a high intrarenal pressure might increase the risk of postoperative urinary tract infection.

In this report, we describe the first case of a renal stone successfully treated by PCNL using the UARN method without the use of a UAS. Because using a UAS is associated with a potential risk of ureteral stricture and a risk of prolonging the postoperative hydronephrosis, UARN without a UAS is thought to be effective and to provide some advantages over the conventional procedure.

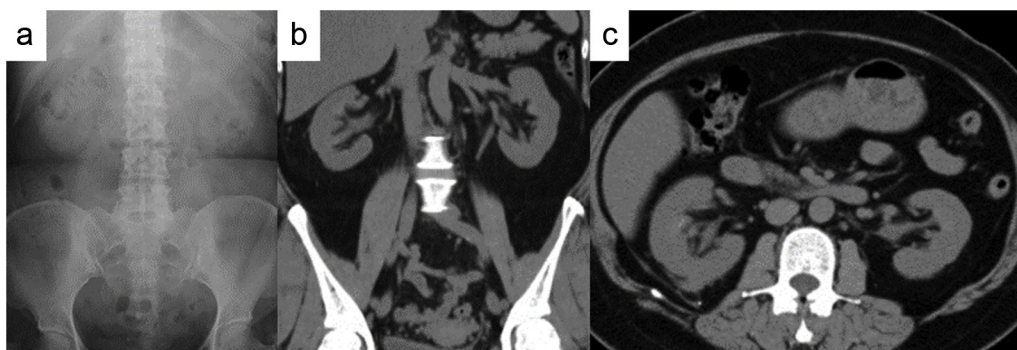


Fig. 3. Postoperative (1) KUB, (2) Coronal CT, and (3) Axial CT.

Conflict of interest

None declared.

Funding

None declared.

Ethical Approval

This article is a case report, and written informed consent for publication from the patient was obtained.

Consent

This study is approved Kanagawa Medical Association Review Board, and written informed consent for publication was obtained from the patient.

Author contribution

TK, HI, JM collected the data. TK wrote the manuscript. TK, MY, HU interpret the data.

Guarantor

The guarantor in this article is Takashi Kawahara.

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