

Simultaneous bilateral multipuncture tubeless percutaneous nephrolithotomy in patient with orthotopic bladder substitution

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ABSTRACT

We report the successful treatment of a patient that presented with bladder tumor, bilateral multiple renal stones, right lower ureteral stone, and bilateral hydronephrosis with progressively rising serum creatinine. Initially, he was managed by drainage of the upper tract by left percutaneous nephrostomy tube until serum creatinine dropped to normal value then he was managed by radical cystectomy and orthotopic bladder substitution. Three weeks later, he was subjected to simultaneous bilateral multipuncture tubeless percutaneous nephrolithotomy. In addition, we report on the feasibility of opacification of the collecting system via ascending pouchogram by direct passage of the dye through the directly implanted ureters thus avoiding intravenous contrast injection.

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Percutaneous nephrolithotomy (PCNL) is a well-established method for the treatment of renal and upper ureteral stones. An integral part of the standard technique is placement of a percutaneous nephrostomy (PCN) tube in the tract at the end of the procedure with several reported advantages.¹ However, recently this practice has been argued by many authors and many reports have been published showing the feasibility and safety of what is known now as "tubeless PCNL."^{2,3}

Nevertheless, this new trend still has limitations and requires strict selection criteria.^{4,5} In our center we have started this practice in selected cases and we approached 72 cases with satisfactory results. Herein, we report this case to show the feasibility of simultaneous bilateral multi-puncture tubeless PCNL, to show the possibility of opacification of the collecting system by ascending pouchogram avoiding cystoscopic manipulation and ureteral catheterization and finally to report about the use of temporary nephrostomy tube for tamponade of bleeding during tubeless PCNL.

Case Report. A 45-year-old male farmer presented to our center complaining of recurrent attacks of bilateral flank pain of 6 months duration and irritative lower urinary tract symptoms (LUTS) of 3 months duration. General, abdominal and local examinations were unremarkable. Laboratory investigations were within normal values except elevated serum creatinine of 2.3 mg/dl (0.9-1.2 mg/dl). He presented with kidney, ureter, and bladder plain film (KUB) and an intravenous urogram (IVU) study, which show multiple bilateral renal stones, right lower ureteric stone, bilateral hydronephrosis, and non-conclusive cystographic phase of the study (Figures 1a & b). He was scheduled for cystoscopy and retrograde study, which surprisingly revealed the presence of a large trigonal tumor involving both ureteric orifices. Bimanual examination under anesthesia revealed a large T3 bladder mass. Biopsy of the tumor revealed high grade moderately differentiated squamous cell carcinoma. Due to the progressive rise of serum creatinine from 2 mg/dl to 5.5 mg/dl, drainage of the upper tract by left PCN was carried out with rapid return to the value of 1.3 mg/dl. Computed tomography (CT) evaluation of the tumor was carried out which showed no regional or distant metastases. Once he was fit for surgery, he was subjected to radical cystectomy and orthotopic ileal W- neobladder substitute with direct wide end to end ureteroileal anastomoses to bilateral terminal 5 cm ileal segments

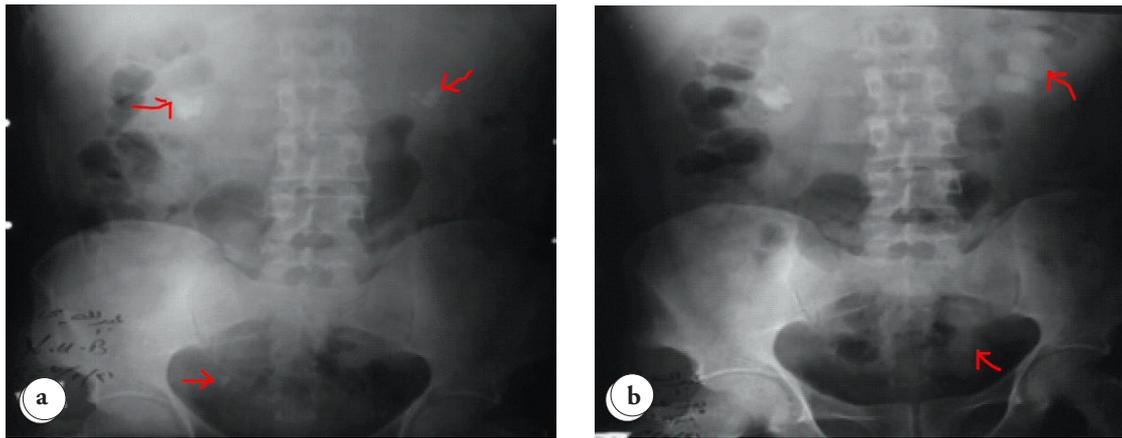


Figure 1 - a) Kidneys, ureter, bladder film showing multiple bilateral renal stones and stone in the course of the right pelvic ureter (red arrows). b) Intravenous urogram showing faint delayed dye excretion by both kidneys with bilateral hydroureteronephrosis more prominent in the left side (red arrows).

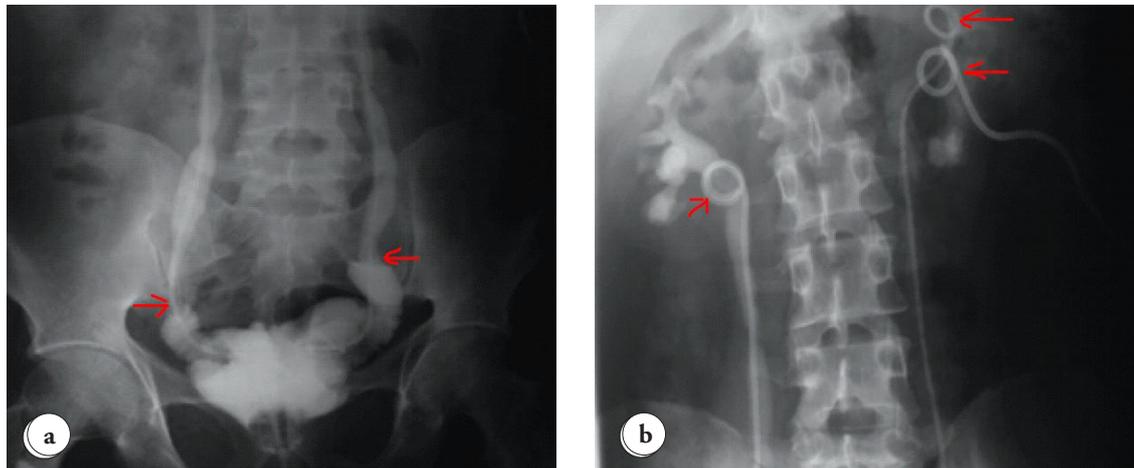


Figure 2 - Ascending pouchogram showing a) good pouch capacity, free reflux of the dye into both ureters with clear sites of ureteroileal anastomoses (red arrows) and b) the upper tract with bilateral double J stents and left percutaneous nephrostomy and showing the free opacification of both collecting systems (red arrows).

over double J (DJ) stents. The postoperative course was smooth and after 3 weeks, an ascending pouchogram showed intact pouch with free reflux of the dye into the upper tract (Figures 2a & 2b). He was scheduled for treatment of the renal stones. We planned for rapid approach via PCNL with aim to retrieve all bilateral stones in one setting. Opacification of the collecting system was carried out by ascending pouchogram. We started with the right kidney, and fortunately, it was performed in 30 minutes without any complications and so was left without PCN. Then we shifted to the left side in which there was an already established PCN.

Dilatation of the tract was carried out, and retrieval of multiple stones was achieved. Unfortunately, bleeding occurred and there were 2 residual stones in another calyx, which could not be reached from this puncture. Therefore, we left a 24 Fr PCN in this tract and left it clamped to act as a tamponade. Another puncture was carried out directly into the stone-bearing calyx, and the stones were extracted. Control opacification showed no extravasation, no residual stones, and opening of the clamped PCN showed no bleeding (Figure 3a). We decided to remove the PCN, and for



Figure 3 - Photograph of **a**) the patient in prone position immediately after completion of the procedure with the clamped percutaneous nephrostomy (PCN) in the first left percutaneous tract and **b**) after removal of the PCN and closure of its site with no evidence of bleeding.

safety we inserted a guide wire through it, which then was removed. There was no bleeding coming from the tract so we closed the puncture sites (Figure 3b). The operative time on the left kidney was 55 minutes, and no blood transfusion was given. The next day, follow up KUB and ultrasonography (US) showed no residual stones, no retroperitoneal collections, and no back pressure on the kidneys. Postoperative hemoglobin level was 10 g/dl compared to 11.7 g/dl preoperatively, and the urethral output was clear. The urethral catheter was removed, and the patient was discharged on the 2nd day postoperatively. Ultrasonography was repeated after one week and showed the same findings; so the DJ-stents were removed on an outpatient basis. Follow up US was carried out one month later and showed no abnormalities. He is doing well with serum creatinine level of 1.5 mg/dl.

Discussion. Until the late 90s, placement of nephrostomy tube at the end of any PCNL was considered mandatory. The advantages reported for this policy include tamponade of bleeding, adequate drainage of the kidney, assessment in healing of the collecting system in case of any inflicted injuries, and its role in establishment of a mature tract in case of a second look for residual stones.¹ In the last 7-8 years, this policy however has been challenged by many urologists, and many reports from different regions of the world have been published demonstrating the feasibility and safety of omission of placement of PCN after PCNL.^{2,3} The early reports on "tubeless PCNL" showed the advantages of this policy in reducing complications, postoperative

pain and analgesia, as well as reduced hospital stay. However, this approach was limited to selected cases with strict selection criteria such as small stone burden, no bleeding, no collecting system injury, no more than one access and no residual stones.^{2,4} Gaining more experience with this policy some of these limitations had been overcome. To avoid bleeding, some authors reported about use of hemostatic sealants to seal the percutaneous tract or cauterization of the bleeders in the tract.⁶⁻⁸ The stone burden was not a limitation for some,² and to prevent urinary leakage, internal or external ureteral stents are routinely used by many authors,^{2,4,7,8} although in some reports, ureteral stents are also omitted in selected cases.^{5,9} Although simultaneous bilateral tubeless PCNL had been reported in the early reports, it was limited to one puncture in each kidney.⁴ Unilateral or bilateral multi-puncture tubeless PCNL also had been reported previously, but if there is intraoperative bleeding it was considered a contraindication for tubeless PCNL.^{10,11} In this case, considering that the patient is stone former with bilateral renal stones that may pass into the ureters, the markedly dilated ureters, and the anticipated risk of stone formation in the future due to the urinary diversion, both ureters were directly end-to-end anastomosed to the terminal 5 cm ileal segments. This technique was also valuable for opacification of the collecting system during the PCNL procedure. Bilateral DJ-stents were left also to ensure drainage of the upper tract in case of spontaneous passage of any of the stones into the ureters. The need for second puncture on the left kidney was not anticipated, and when this was necessary intraoperatively, we were confronted by the

bleeding so we did not removed the PCN clamped in the first access to stop the bleeding. By the end of the procedure, declamping of the PCN showed that the bleeding had stopped. Insertion of a guide wire before removal of the tube was an important step to avoid any mishap if bleeding recurs after tube removal. We believe that this method will aid in doing multi-puncture tubeless PCNL instead of cauterization or sealing of the tract. Another alternative is to leave the Amplatz sheath in the tract until performing the other puncture and removal of the stones.

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