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First Endoscopic-Guided Percutaneous Nephrolithotomy (ePSL) with Prone Split-Leg Position in Manado

Andrien Phoebus,[1] Ari Astram,[2] Christof Toreh,[2] Eko Arianto,[2] Frendy Wihono[2]

[1]Department of Surgery, Faculty of Medicine, Universitas Sam Ratulangi - Prof. Dr. R. D. Kandou General Hospital, Manado, Indonesia
[2]Division of Urology, Department of Surgery, Faculty of Medicine, Universitas Sam Ratulangi - Prof. Dr. R. D. Kandou General Hospital, Manado, Indonesia
Email: andrienphoebus@gmail.com; ari.astram@gmail.com; christoftoreh@gmail.com; ekoarianto90@gmail.com; Fwihono@gmail.com
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Abstract: Literature has not yet defined the best position for percutaneous nephrolithotomy (PCNL) based on the complexity of the stone burden. This case of left-sided complex kidney stones underwent endoscopic-guided PCNL in an PSL (prone split-leg position). A 61-year-old woman with a chief complaint of right pelvic pain. Standard prone PCNL was planned for this patient, however, due to so much debris in the pelviocalyceal system during URS evaluation and ureter catheter insertion, we decided to puncture with ultrasound guidance rather than fluoroscopy. Intraoperatively there was residual superior calyx stone that was beyond the reach of nephroscope. We decided not to do a double puncture because of poor vision due to the floating debris. In the second procedure, the ePSL method was utilized. A C-arm and nephroscope examination revealed no active bleeding, no infundibulum laceration, and no remaining stones. The primary goals of this method were to remove stones from the urinary tract throughout the entire tract using a one-step, one-access procedure that made the most of the full range of endourologic equipment. There were a number of reasons why the prone split-leg position was chosen, including operator preference, familiarity with the position, and the inability to make a direct puncture in the upper pole. The main drawback was that patient would not be able to see how well and safely this method worked over time. In conclusion, complex kidney stones can be treated with ePSL performed in the prone split-leg position, which is a safe procedure with a low risk of complications.
Keywords: percutaneous nephrolithotomy; prone split-leg position; complex kidney stones

INTRODUCTION

The literature has not yet defined the optimal patient positioning for percutaneous nephrolithotomy (PCNL) based on the complexity of stone burden. The best guiding methods for complex stone are also poorly described in the literature.[1] Batagello et al explained that endoscopic-guided PCNL (ePSL) was safe and had a low rate of complications when performed in the prone split leg position. For complex stone management, ePSL produced less radiation and required fewer multiple accesses and secondary procedures.[2] Due to the flexible ureteroscopy (URS)'s direct visual examination, this method also reduces the likelihood of tract overdilatation. Additionally, bleeding and injury to the kidney tissues can be avoided using this strategy.[3,4] We believe that this procedure should be performed for complex kidney stones, despite the fact that it required a lot of equipment and may result in a higher price. In order to achieve the highest possible rate of stone removal from left complex kidney stones, one patient at our center underwent endoscopic-guided PCNL in a prone split-leg position, as detailed in this report.

CASE PRESENTATION

A 61-year-old woman was referred to Division of Urology of Department of Surgery at Prof. Dr. R. D. Kandou General Hospital, Manado. A frozen kidney was discovered intraoperatively during open surgery, and the procedure was stopped. The patient's primary complaint at our hospital was dull, intermittent pain in the right flank without dysuria, hematuria, or a history of passing a stone. The patient did not have a family history of the same diseases and did not take any particular medications on a regular basis. Both the general examination and the vital signs were within normal ranges. The 16 Fr Foley catheters were inserted with normal urinary output.

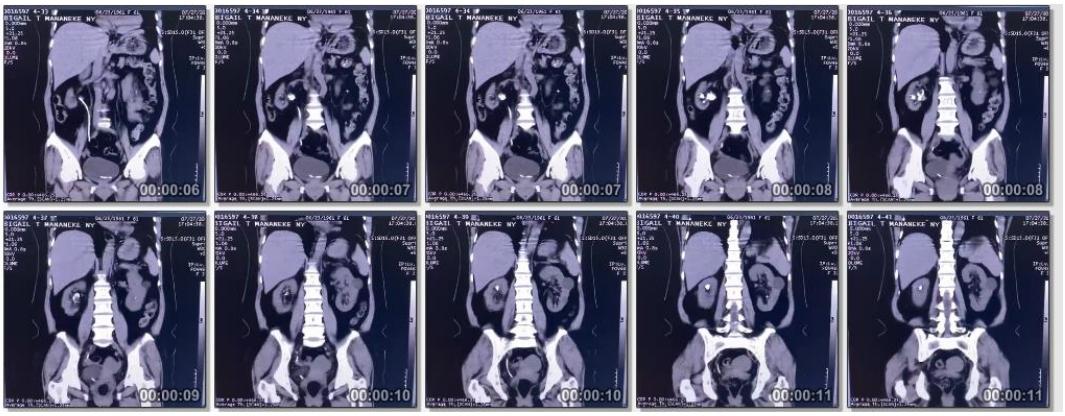

Figure 1. CT-scan coronal view

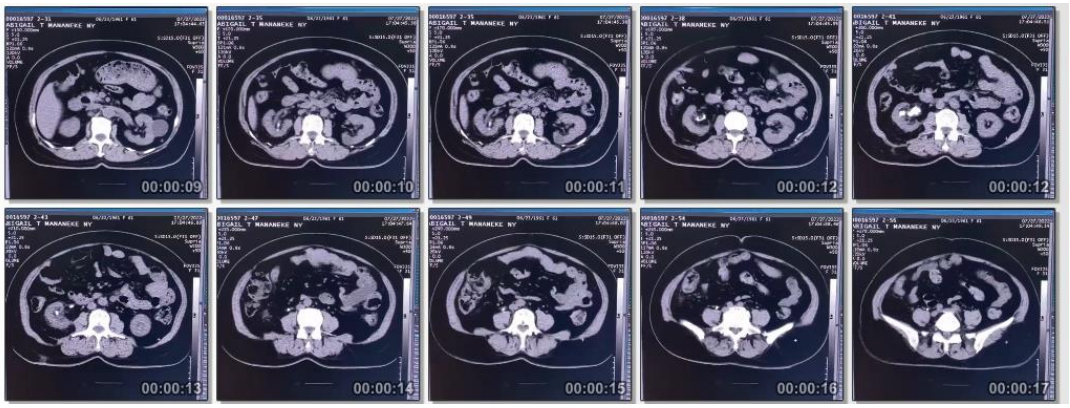

Figure 2. CT-scan axial view

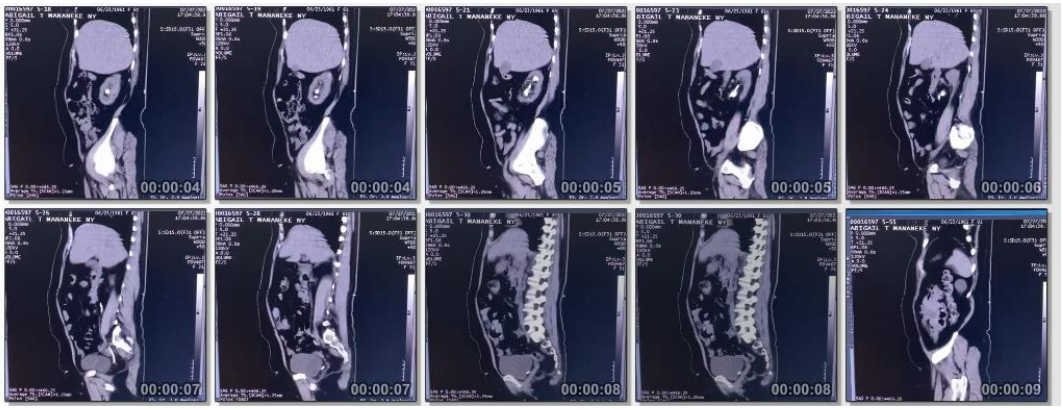

Figure 3. CT-scan sagital view

Figure 4. Endoscopic-guided PCNL in an PSL (prone split-leg position)

The endo-urologist in this case performed endoscopic-guided PCNL in a prone split-leg position with superior calyx puncture (intercostal XI-XII) two months after the previous PCNL. This method is used to ensure accurate puncture and dilation as well as an optimal rate of stone-free kidney function in complex kidney conditions. The flexible URS size 9 Fr with ureteral access sheath was inserted into the left pelvicalyceal system during the initial procedures, and a targeted stone was discovered. After that, a bull's eye technique puncture using flexible URS was made in the superior posterior right calyx. The stone was fragmented with a pneumatic lithotripter and the remaining stone was evacuated with stone forceps. C-arm and nephroscope examination revealed no active bleeding, no infundibulum laceration, and no remaining stones. The patient's condition remained stable following the intervention, and there was no persistent complaint about the genitourinary system. This patient did not experience any major complications. Oral analgesics, on the other hand, were used to treat a minor complaint of mild pain that occurred between one and three days after surgery. Following the intervention, patients reported a significant reduction in their dull, intermittent pain. The patient was discharged postoperative day two. After the ePSL procedure, the patient had a 1 week and 1 month postoperative for outpatient follow-up with no complaints and good results.

DISCUSSION

According to our reports, ePSL was adequate and effective for the removal of complex kidney stones. The accumulation of debris made it more difficult to carry out standard PCNL fluoroscopy. There are no postoperative residual stones or complaints after this procedure, and regular follow-up is free of both. One of the new urology procedures that combines a multistep antero-retrograde approach to the pelvicalyceal system is endoscopic-guided PCNL (ePSL). The primary goals of these methods are to remove stones from the urinary tract throughout the entire tract using a one-step, one-access procedure that makes the most of the full range of

endourologic equipment. In addition, there is functional complementarity when two different kinds of endoscopes are used in the same procedure. The combination of upper and lower endoscopy increases the angle of operation and the field of vision for renal pelvis stones. Consequently, a higher rate of stone-free living could be achieved.[5,6]

The ureteral tract anatomy is typically straight under the pressure of gravity, which makes it easier for the ureteroscope to enter the upper ureter and pelvis from the prone position in our case. The percutaneous nephroscope puncture channel can be dilated under the monitor of the ureteroscope to prevent renal injury. In most cases, the endoscopically guided PCNL was carried out in the modified Galdakao supine Valdivia position.[7] On the other hand, the prone split-leg position was chosen in our circumstance for a number of reasons, one of which is the precarious accumulation of debris in the renal that makes the calyx puncture with standard fluoroscopy guidance difficult. The second reason is that the Lezrek technique, which requires multiple punctures, prevents direct puncture in the upper pole.[8] This increased the likelihood of renal anatomy disruption and blood loss. Position approach may also be influenced by operator preference and familiarity with a particular position. Several reasons and/or advantages of the prone-split leg position were also explained in his study. First, compared to the Galdakao-modified supine Valdivia position, the space available for percutaneous nephroscopy is larger and more extensive, and the likelihood of visceral injury is lower. Second, the absence of cardiovascular problems and obesity in the patient's characteristics (which also apply to our situation). Thirdly, preventing blood vessels in the lower limbs from being compressed by prolonged elevation. Additionally, the bull's eye technique was essential due to its direct focus on the f-URS tip. The bull's eye puncture approach was supported in the prone-leg split position, in contrast to the supine position. Therefore, in this instance, Wen et al, ePSL is superior to ECIRS. In his study, he compared minimally invasive PCNL and Endoscopic Combined Intra-Renal Surgery (ECIRS) for partial staghorn calculi's efficacy and complications.[9] Clinical complications like spleen injury, fever, urinary leakage, urosepsis, hemorrhage, transfusion, nephrectomy, and embolization did not differ statistically between the two groups. This theory was also looked at in this case because there was little bleeding and the patient remained stable after surgery.[10]

There was no long-term follow-up for patients in our study to assess this method's safety and effectiveness. Due to the extensive use of endoscopy equipment, this procedure in our center is still considered a rare one. Multiple patients don't allow for a lot of evidence or information to be gathered. Therefore, a multi-center study is suggested in order to determine the efficacy of ePSL in a prone split-leg position by obtaining a larger database that contains more data that is statistically relevant.

CONCLUSION

Endoscopic-guided PCNL (ePSL) performed in the prone split-leg position is a safe procedure with a low risk of complications. Additionally, it includes the removal of stones from the urinary tract using the most advanced endourology equipment.

Conflict of Interest

The authors affirm no conflict of interest in this study.

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