A Case Report: Bilateral synchronous percutaneous nephrolithotomy

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Introduction. Bilateral synchronous Percutaneous Nephrolithotomy (PCNL) begins to be considered as an effective therapy as the staged PCNL for bilateral kidney stone treatment, but it remains to be an challenging procedure. Especially on bilateral obstruction patients that already developed severe hydronephrosis.

Case. We present a case of a 49 years old male with flank pain on both sides continuously. From non-contrast abdominal CT-scan showed bilateral pyelum stone and bilateral severe hydronephrosis. From laboratory findings, the creatinine serum was 1,5 mg/dL and ureum serum was level 69,8 mg/dL. We performed bilateral synchronous PCNL in a prone position, and stone fragmentation with a pneumatic lithotripter. The operation lasted for about 2 hours with minimal amount of bleeding. After 5 months of follow-up, he already has no stone with normal ureum-creatinine level (0,77mg/dL; 43,7 mg/dL) and did not have any complaint.

Conclusion. Bilateral synchronous PCNL is a safe choice to be done in order to treat bilateral pyelum stone, it can decrease length of stay, total cost therapy, and morbidity of the patient.

Keywords: Bilateral synchronous PCNL, pyelum stone, severe hydronephrosis

Introduction

Kidney stone is the most common urological condition, and its prevalence was about 8,8% globally, 12% in men and 7% in women, it can occur both unilaterally or bilaterally. If it is bilateral kidney stone, it will cause bilateral obstructive uropathy and renal failure, so consideration is needed for immediate intervention [1].

Percutaneous Nephrolithotomy (PCNL) now becomes the golden standard for kidney stones with size >2cm, it can remove larger stones with only minimal damage to the kidney [2]. Even after the introduction of Extracorporeal Shock Wave Lithotripsy (ESWL), PCNL is still the preferred method in patients with large, dense stone or staghorn stones. It can be performed with various position such as supine, prone, modified supine, etc [3]. In order to decrease the patient morbidity and total cost therapy further, bilateral synchronous PCNL has been introduced and turned out to show great results compared to staged PCNL [4].

Although some studies stated that supine PCNL offered more effectivity compared to prone in term of transfusion cost, disposable equipments costs for surgery, disposable cost for anesthesia, and total cost [5], but on this case, we did bilateral synchronous PCNL on prone position to gain easier access on both kidneys.

Figure 1. Ultrasonography Examination

Figure 2. Non-contrast Abdominal CT
Case Report

A 49 year old male complained about sharp bilateral flank region pain, continuously for about 3 months, the pain was worsening last month. He's been working as a truck driver for 3 years, and only drinks less than 1.5 liters of water per day. He got a history of vesicolithotripsy due to bladder stone about 2 years ago. From physical examination, there were bilateral costo-vertebrae angle knocking pain, ultrasonography (USG) examination (Fig. 1) showed there were multiple stones on right and left kidney with severe hydronephrosis.

Non contrast abdominal CT-scan (Fig. 2) indicated stone in right UPJ with the size of 1.5x1.3x1.2 cm, severe hydronephrosis, while there was also 1.6x1.3x1 cm stone on left kidney, appropriately on left UPJ, and moderate hydronephrosis. From blood analysis the creatinine serum was 1.5 mg/dL and ureum level was 69.8 mg/dL. We performed bilateral synchronous prone PCNL for both kidneys (Fig. 3), the puncture was performed under fluoroscopy guidance. Lower calyx approach was done for both kidneys (Fig. 4), one lateral to approach the stone, and we performed lithotripsy using pneumatic lithotripter for fragmentation. The whole operation lasted for 2 hours with 30cc total bleeding, after that we inserted a DJ stent on both kidneys and PCNL guidewire was removed.

![Figure 3. Patient placed on prone position](image)

![Figure 4. APG from left and right kidney](image)

We found no rest stone on both kidneys with DJ Stenton right and left kidney (Fig. 5) in the post operation evaluation. And from evaluation with Kidney Ureter Bladder (KUB) and USG showed there was no stone in both kidneys (Fig. 5). After 3 months of follow-up, the patient showed excellent condition with 0.77mg/dL of ureum serum level and 43.7 mg/dL of creatinine serum level.

![Figure 5. (A) Abdominal X-Ray, (B) Ultrasonography](image)

Discussion

Patients with obstructive uropathy cause an increase of renal pelvic pressure and intra tubular hydrostatic pressure, causing reduction in glomerular filtration and renal blood flow, which result in kidney damage [6]. If this happens on both of the kidneys, the patient will develop permanent renal failure on both of the kidneys, so immediate action is needed in order to treat the obstruction.

Patients with bilateral kidney stones also faced more morbidity such as longer hospital stay, multiple operations procedure, and many other complications.

The large concurrent bilateral renal stone typically require-peat operations to get stone free condition. Before 1980, this approach meant a potential for significant consequences, including pain, incisional hernia, residual stones, extensive blood loss necessitating transfusion, renal insufficiency or failure, and the need for further open surgery in recurrent or persistent stone.

After its first success of kidney stone extraction through a percutaneous nephrostomy tube in 1976 which was done by Fernstrom and Johanson [4], PCNL became a popular procedure for kidney stone treatment. Percutaneous nephrolithotomy has been demonstrated to be safe for all patient groups, including the elderly, children, the morbidly obese, and those with renal anomalies such as ureteropelvic junction obstruction. Moreover, percutaneous management of bilateral renal stone has been shown to be safe and effective in selected patients [3][4][7][8]. Typically, PCNL for bilateral concurrent stones is performed as a staged endeavor, advised by the surgeon’s preferences; the patient’s medical comorbidities, stone burden, and
degree of obstruction; and the intraoperative difficulties or blood loss [5][9]. The initial procedure is commonly performed on the side which has more complex stone or higher degree of obstruction in an attempt to preserve renal function, and the contralateral procedure is performed several weeks to months later [4][5]. In the European Association Urology guidelines, PCNL is recommended to treat >1,5 cm kidney stone [9]. As time passed, there are many techniques and equipment improvements on PCNL, but management of bilateral kidney stones remains a challenge [7].

In 1987, Colon-Perez and associates first reported on three patients who were treated with synchronous bilateral PCNL for 0.8 cm to 3.8 cm renal stones. They found that blood loss and postoperative pain were not significantly greater than in patients who underwent staged PCNL [10].

In 2004, Silverstein et al first reported from a large retrospective study that compared staged PCNL vs bilateral synchronous PCNL, it reported similar stone free-rates, blood loss per operation, and transfusion rate. But in bilateral synchronous PCNL group, the total operative time, hospitalization, total blood loss, and the total number of procedures were obviously significantly lower, it makes bilateral synchronous PCNL has been considered as an effective treatment for bilateral kidney stone [4][7][8][10].

The profile of patients potentially eligible for bilateral non-simultaneous, the same session procedures was defined by Williams and Hoenig.11 These authors suggested that surgery on the contralateral kidney should not be proceed in patients with the first surgery had resulted in a fall in hemoglobin (Hb) of >3 g/dL, >180 min of operative time, hypotension, or acidosis. Also, they suggested the following exclusion criteria for SBES endoscopic treatment: stone burden of >1000 mm2, complex intrarenal anatomy, age >50 years, >2 ASA score, <12 g/dL preoperative Hb [11].

As many studies showed the efficacy of bilateral synchronous PCNL, for the first time we tried to perform bilateral synchronous PCNL for bilateral pyelum stone at our center, Saiful Anwar General Hospital.

Bilateral synchronous PCNL is a promising procedure to treat bilateral kidney stones, it can significantly reduce the patient's total cost therapy, and morbidity because they only need to have one operation procedure. It offers similar stone free rate and complication rate with staged PCNL.

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Conflict of interest

The authors declare that they have no conflict of interests.

References


