

Hydroperitoneum: A complication of mini PCNL in pediatric age group? -A case report

Farheen Batool¹, Waqar Ahmed Memon¹, Javed Altaf Jat¹, Shewak Ram¹, Taimoor Jatoi¹, Abdul Qayoom Ghangro¹

¹Department of Urology, Liaquat University of Medical & Health Sciences, Jamshoro, Pakistan,

Correspondence:

Dr. Waqar Memon
Department Of Urology,
Liaquat University Of
Medical & Health Sci-
ences,
Jamshoro, Pakistan
Email:
drwaqarmemon@ya-
hoo.com

DOI:

10.38106/LMRJ.2021.3.04-
07

Received: 12.11.2021

Accepted: 22. 12.2021

Published: 30. 12.2021

ABSTRACT

Renal stones account for approximately 40% of renal disorders in Pakistan including silent stones constituting up to 3%. Nephrolithotomy and Pyelolithotomy used to be the only surgical options offered to the patients presenting with large stones, with additional risk of complications. Percutaneous nephrolithotomy (PCNL) has now being offered to the patients with even large renal stones for over the past three decades. With recent advances and provision of more modern equipments and technology, PCNL has become the gold standard treatment with quick recovery and reduced morbidity and mortality, and fewer associated complications. A boy aged 13 years, underwent mini PCNL for treatment of left side renal stone causing hydronephrosis, previously evaluated by KUB X-Ray and non-contrast CT scan. His retrograde-percutaneous access to the collecting system was done under fluoroscopic guidance. After the procedure patient developed rigid and distended abdomen. Aspiration revealed presence of intraperitoneal fluid. Patient was effectively treated with immediate placement of abdominal drain with improvement of clinical presentation Hydroperitoneum is a rare complication of conventional PCNL. Based on our experience and review of published literature, our case of hydroperitoneum after mini PCNL, is the first of its kind. A high degree of sensitivity and knowledge of this complication during PCNL in children would help identify and manage this complication in future. We recommend examination of abdomen post-PCNL in every child before he/she is brought out of anesthesia

Key Words: Hyperperitoneum, Renal Stone, PCNL

INTRODUCTION

Urinary stone disease is a common global health issue involving 12% of the world population. Urinary stones constitute 20% of the patients in the urology OPD (1, 2). There is a geographical and age related variation in the incidence of urolithiasis but remains a major health concern in developing countries (3). Renal stones account for 40% of renal disorders in Pakistan (4), with silent stones constituting up to 3%, which are usually incidentally discovered while undergoing investigation for some other illness or on screening.

Percutaneous approach to access kidney for the first time described by Goodwin *et al.* in 1955 for drainage of an obstructed renal system (5) followed by Fernstrom and Johansson in 1976 who removed a renal stone by using the same approach. These successful procedures opened up a whole new era of percutaneous renal surgery (6). Before introduction of the percutaneous approach the only option available for large stones was the surgical removal by open surgical technique such as nephrolithotomy and

pyelolithotomy, which was associated with a high risk of per-operative and post-operative complications. Percutaneous nephrolithotomy (PCNL) is now being considered as the hallmark of treatment for large renal stones for past three decades(7). With advancement in the modern equipments and technology PCNL has now become the gold standard for this disease, resulting in reduced recovery time, shorter hospital stay and decreased morbidity and mortality (8, 9). PCNL is generally a safe procedure with a fewer complications(10). Some of these complications occur secondary to tract access with injury to the adjacent organs such as lung, pleura, liver, colon and spleen. It may also be associated with general complications which can occur with any surgical procedure including hemorrhage, post-operative pain and fever (11). However, PCNL has advantage of having small incision, much less number of complications and shorter convalescence period (10).

Nevertheless rate of stone removal has been reported to be almost 95% following PCNL. Due to limited facility of ESWL and PCNL open surgery remains the most commonly used procedure in many developing countries including Pakistan(12). Though many centres in Pakistan are now offering these procedures but still limited to cities.

Mini PCNL (mPCNL), was introduced in early 1990s, where the modified procedure was *defined as a PCNL performed through a track of < 22 F* (13, 14). The first report of mPCNL presented 60 pediatric patients, who underwent PCNL using a 16-F sheath and 11-F Pediatric cystoscope (15).

Case Report

A 13-years-old boy was brought to the urology clinic by his mother with 7-months history of left flank pain. He has recently developed pain in the right flank and dysuria for the same duration. He had been seen by many general practitioners and was on empirical medication off and on, with partial or no remission in symptoms. The patient looked well with no specific physical signs. His urine culture showed no bacterial growth. The ultrasound KUB reported bilateral renal stones with hydronephrosis, which were further confirmed on x-ray KUB which showed radiopaque shadows in both renal areas. A CT - KUB was done which revealed 3.5 cm size stone in renal pelvis and 1 cm size stone in lower pole with moderate hydronephrosis on left side and multiple stones without hydronephrosis on right side (Figure. 1 a and b)

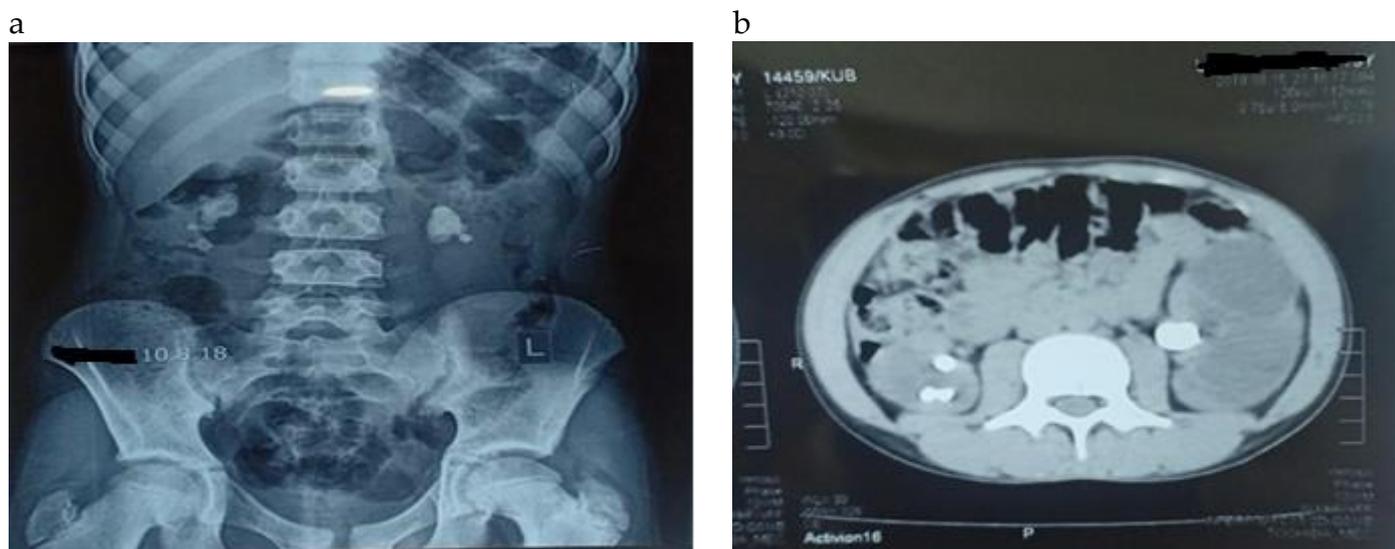


Figure 1: X-Ray (a) and CT KUB (b) of the 13-years-old child showing bilateral stones with left hydronephrosis

He was planned to undergo a mini PCNL in two stages, we opting to operate on the left side first. With the help of a 10 F pediatric cystoscope, a retrograde urogram (RGU) was done using a 4F ureteric catheter. A single radiopaque stone of approximately 3.5 cm size was visualized in the renal pelvis. A smaller stone (approx. 1 cm) was seen in the lower pole. Initial puncture was done in the lower pole with 'Bull's Eye' technique. Serial dilatations were done up to 21F and a 22F Amplatz's sheath was placed. Both stones were fragmented with pneumatic lithoclast. One fragment of stone migrated into upper calyx. For complete clearance of stones, another puncture was done with a simple dilator in upper pole. Outer sheath of nephroscope was used in the tract and the stone was retrieved. The total time for the procedure, from RGU to skin suturing, was 60 minutes.

After the procedure, abdominal distension was seen when the patient was turned supine. Aspiration with 10cc syringe in the dependent part of abdomen was done. The aspirant was clear fluid and was thought to be irrigating fluid. An intra-peritoneal drain was placed. The patient's postoperative recovery was uneventful. The drain output was 800cc on first postoperative day. On 3rd postoperative day, the drain was removed and patient was discharged. The postoperative x-ray KUB showed no evidence of residual stones (Figure. 2).

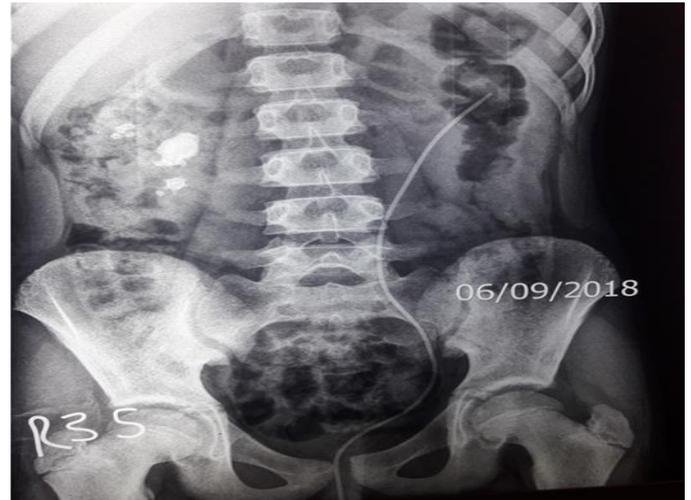


Figure 2: Postoperative x-ray KUB

DISCUSSION

Surgical treatment of renal tract stones has been revolutionized in the recent past with availability of more minimal invasive options and less invasive techniques including ESWL and PCNL (16). PCNL is now being commonly performed procedure in patients presenting with renal stones (17). It is generally safe procedure with quick recovery and shorter hospital stay. Hemorrhage has been reported to the most frequently occurring complication, which can occur during needle passage or at the time of tract dilatation (18-20). Other complications, rare albeit life-threatening, include injuries to colon, pleura, splenic and liver (11). Hydroperitoneum, although a recognized complication of PCNL, is rarely mentioned in the literature. Chen Rui *et al.*, in his article published in 2011, reported 2 cases of hydroperitoneum in a series of 86 adult patient undergoing PCNL (21). Liu Zhong-Ze *et al.* report 11 cases of hydroperitoneum as complication among 436 patient series of PCNL done in age group 14 to 71 years (22). Alfonso Benincasa *et al.* report same complication occurring in two patients, both adults, who were managed by placement of intra peritoneal drain (23). No such complication in pediatric age group has ever been reported. We report hydroperitoneum occurring in a 13-year old boy, who was successfully treated by placement of an abdominal peritoneum drain.

CONCLUSION

Hydroperitoneum is a rare complication of conventional PCNL. Based on our experience and review of published literature, our case of hydroperitoneum after mini PCNL, is the first of its kind. A high degree of sensitivity and knowledge of this complication during PCNL in children would help identify and manage this complication in future. We recommend examination of abdomen post-PCNL in every child before he/she is brought out of anaesthesia.

Ethical Consideration: This is a case report, anonymized. Patient's permission was sorted before using imaging.

Conflict of Interest: There is no conflict of interest.

Funding: No funding involved in this case report.

REFERENCES

1. Moe, O.W., Kidney stones: pathophysiology and medical management. *Lancet*, 2006. **367**(9507): p. 333-44.
2. Romero, V., H. Akpınar, and D.G. Assimos, Kidney stones: a global picture of prevalence, incidence, and associated risk factors. *Rev Urol*, 2010. **12**(2-3): p. e86-96.
3. Resnick, M.I. and L. Persky, Summary of the National Institutes of Arthritis, Diabetes, Digestive and Kidney Diseases conference on urolithiasis: state of the art and future research needs. *J Urol*, 1995. **153**(1): p. 4-9.
4. Naqvi, S.A., Regional problems in Pakistan-most prevalent kidney diseases and related problems. In Jakarta, 1989: p. p.283-8.
5. Goodwin, W.E., W.C. Casey, and W. Woolf, Percutaneous trocar (needle) nephrostomy in hydro-nephrosis. *J Am Med Assoc*, 1955. **157**(11): p. 891-4.
6. Fernstrom, I. and B. Johansson, Percutaneous pyelolithotomy. A new extraction technique. *Scand J Urol Nephrol*, 1976. **10**(3): p. 257-9.
7. Brannen, G.E., et al., Kidney stone removal: percutaneous versus surgical lithotomy. *J Urol*, 1985. **133**(1): p. 6-12.
8. Türk, C., T. Knoll, and A. Petrik, Guidelines on urolithiasis. . European urological association web site, 2014.
9. Lam, H.S., et al., Evolution of the technique of combination therapy for staghorn calculi: a decreasing role for extracorporeal shock wave lithotripsy. *J Urol*, 1992. **148**(3 Pt 2): p. 1058-62.
10. Zilberman, D.E., et al., Tubeless percutaneous nephrolithotomy--the new standard of care? *J Urol*, 2010. **184**(4): p. 1261-6.
11. Michel, M.S., L. Trojan, and J.J. Rassweiler, Complications in percutaneous nephrolithotomy. *Eur Urol*, 2007. **51**(4): p. 899-906; discussion 906.
12. Khan, F.A. and J.H. Khan, Stone survey of Punjab hospitals. *Pak Post Med J* 1990. **1**: p. 7-13.
13. Schilling, D., et al., Nomenclature in PCNL or The Tower Of Babel: a proposal for a uniform terminology. *World J Urol*, 2015. **33**(11): p. 1905-7.
14. D'Arcy, F.T., et al., Renal track creation for percutaneous nephrolithotomy: the history and relevance of single stage dilation. *Can J Urol*, 2015. **22**(5): p. 7978-83.
15. Jackman, S.V., et al., The "mini-perc" technique: a less invasive alternative to percutaneous nephrolithotomy. *World J Urol*, 1998. **16**(6): p. 371-4.

-
16. Khan, S., L.A. Toori, and K. Anwer, The efficacy of percutaneous nephrolithotomy in renal and upper uretric calculi. *Pak J Med Res*, 2005. **44**: p. 89-91.
 17. Srivastava, A., et al., Vascular complications after percutaneous nephrolithotomy: are there any predictive factors? *Urology*, 2005. **66**(1): p. 38-40.
 18. Roth, R.A. and C.F. Beckmann, Complications of extracorporeal shock-wave lithotripsy and percutaneous nephrolithotomy. *Urol Clin North Am*, 1988. **15**(2): p. 155-66.
 19. Lee, W.J., et al., Complications of percutaneous nephrolithotomy. *AJR Am J Roentgenol*, 1987. **148**(1): p. 177-80.
 20. Patterson, D.E., et al., The etiology and treatment of delayed bleeding following percutaneous lithotripsy. *J Urol*, 1985. **133**(3): p. 447-51.
 21. Chen, R., et al., Prevention and management of complications of percutaneous nephrostolithotomy at initial stage. *Clinical Journal of Medical Officers*, 2011.
 22. XUE, L.Z.-z.L.S.-j.Z.F.-q.S.Y.-q.W.X.-w., J.Z.Y.Y.C.-s.J.W.-d.X.R.-t.C.J.-h. JI, and Jie-ming., Analysis of complications of minimally invasive percutaneous Nephrostolithotomy. *Chinese Journal of Urology*, 2006.
 23. Benincasa, A., et al., Hydroperitoneum: A Rare Complication Performing Endoscopic Combined Intrarenal Surgery. *J Endourol Case Rep*, 2016. **2**(1): p. 55-8.