

Research Article**Complications of Ultrasonographic Guided Percutaneous
Nephrostomy In Obstructive Uropathy****¹Nisar Ahmad, ²Khalid Khan and****³Muhammad Ahmad**

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ABSTRACT:

Objective: To observe the complications of ultrasound guided percutaneous nephrostomy in patients with obstructive uropathy.

Materials & Methods: Total 184 patients presented with uremia due to unilateral or bilateral obstructive uropathy in which double J ureteral stenting or retrograde catheterization could not be done or contraindicated otherwise were selected. Patients with BOO, severe coagulopathies and liver or multisystem failure were excluded. In all patients, percutaneous nephrostomy was done under ultrasound guidance by using local anesthetic. Complications i.e. septicemia, bleeding and nephrostomy tube dislodgement or blockage were noted.

Results: Age range in our study was 20 to 60 years with mean age of 41.74 ± 7.91 years. Out of these 184 patients, 127 (69.02%) were males and 57 (30.98%) were females with male to female ratio of 2.23:1. Nephrostomy tube dislodgment or blockage was most common complication of the procedure and was seen in 09 (4.89%) patients. Septicemia was seen in 07 (3.80%) patients. Bleeding was seen in 04 (2.17%) patients.

Conclusion: This study concluded that ultrasound guided percutaneous nephrostomy (PCN) is a safe method of temporary urinary diversion in obstructive uropathy.

Keywords: Hydronephrosis, nephrostomy, bleeding, blockage.

INTRODUCTION:

Obstructive uropathy is one of the commonest urological emergencies. It is a condition occurring due to blockage of urine flow, resulting in increased pressure within the collecting system and damage to renal parenchyma. Interruption of urinary flow results in pain, infection, sepsis, and loss of renal function.¹ It is a potentially life threatening condition and immediate measures are required to decompress the kidneys. This obstruction causes distension of the urinary tract proximal to the point of obstruction. The distension is caused by increased pressure and can result in pain, which may be the first sign of

obstruction. Distortion of the urinary tract and renal failure can develop; the severity depends on the degree and duration of obstruction. When the urinary tract is obstructed, urine stasis can occur, predisposing to infection.^{2,3} If the obstruction in the urinary tract is not removed, the patient's clinical condition will deteriorate at a fast pace⁴ through uremia, water-electrolyte abnormalities and urinary tract infections with a consequent reduction of alertness and subsequent death.^{5,6} The various modalities available for the temporary relief of upper urinary tract obstruction are retrograde stenting, open drainage of kidneys and

percutaneous nephrostomy.^{1,7} Percutaneous nephrostomy (PCN) is a well established therapy for urinary drainage in patients with upper urinary tract obstruction and for urinary diversion in patients with urinary fistulas, leaks, traumatic/iatrogenic ureteral dissection or hemorrhagic cystitis.^{8,9} The procedure is also performed to gain access to the urinary tract for percutaneous stone removal and other endoscopic procedures.¹⁰

As the stone disease is a major affection in this part of Pakistan, a reasonable number of patients present with bilateral ureteric obstruction due to stones or obstructed solitary functioning kidney. This study would help us to evaluate the complications rate of ultrasound guided percutaneous nephrostomy in upper obstructive uropathy in local population, so that particular patients could be provided with an easy and safe procedure for urinary diversion in obstructive uropathy.

MATERIAL AND METHODS:

This descriptive, case series study was conducted at Department of Urology, Sahiwal Medical College Sahiwal from February 2016 to August 2016.

Inclusion Criteria:

- a. Patients with unilateral or bilateral obstructive uropathy in which double J ureteral stenting or retrograde catheterization could not be done or contraindicated otherwise and presented with uremia.
- b. Patients of 20-60 years of age.
- c. Both genders.

Exclusion Criteria:

- a. Patients with obstructive uropathy due to bladder outflow obstruction.
- b. Severe coagulopathies.
- c. Patients with liver or multisystem failure.
- d. Terminal illness in which position for PCN could not be tolerable by patient

OPERATIONAL DEFINITIONS:

1. Complications: Following complications was noted from day of PCN insertion to one week.

a. Septicemia: Characterized by a whole-body inflammatory state caused by severe infection and was deemed as +ive if patient had fever or hypothermia (<36 C or >38 C), rapid breathing (>20/min), elevated heart rate (>90/min), confusion, and edema.

b. Bleeding: Any macroscopic blood loss through PCN site after procedure which required haemostatic agents and blood transfusion.

c. PCN dislodgement or Blockage:accidental removal of PCN tube or blockage due to any debris or blood clot, necessitating reinsertion of PCN.

DATA COLLECTION PROCEDURE:

After approval from local ethical committee, a total of 184 patients admitted to Urology Department fulfilling the inclusion/exclusion criteria were selected. Detailed history and all the baseline investigations were performed in every patient. Then after taking informed written consent and explaining all the risks and complications of the procedure to the patients, percutaneous nephrostomy was performed under ultrasound guidance by using 5-10 ml of 1% lignocaine subcutaneously at the puncture site. Complications i.e. bleeding, septicemia and PCN dislodgment or blockage were noted during or after the procedure upto one week. All this data was recorded on a specially designed proforma which contained two parts. Part 1st included the patient's bio-data while part 2nd contained the study variables. The collected information was analyzed by computer software SPSS version 16. Mean and standard deviation were calculated for quantitative variables i.e. age. Frequency and percentage were calculated for qualitative variables i.e. gender and complications (bleeding, septicemia and PCN dislodgment or blockage). Effect modifiers like age, gender and co-morbid condition like diabetes mellitus were controlled

through stratification. Post-stratification chi square was applied to see their effect on outcome and p-value ≤ 0.05 was considered as significant.

RESULTS:

Age range in this study was from 20 to 60 years with mean age of 41.74 ± 7.91 years. Percutaneous nephrostomy tube dislodgment or blockage was most common and was seen in 09 (4.89%) patients. This was managed by redo percutaneous nephrostomy. Septicemia was seen in 07 (3.80%) patients. It was managed conservatively by injectable antibiotics and anti-pyretics. Bleeding was seen in 04 (2.17%). (Table 1) Patients were divided into two age groups i.e. age group 20-40 years and age group 41-60 years. There were 117 patients were in age group 20-40 years and 67 patients in age group 41-60 years. Septicemia was noted in 05 (4.27%) patients and 02 (2.99%) patients respectively in age group 20-40 years and age group 41-60 years. But the

Table 1 Complications of Ultrasound guided PCN

Complications	Frequency (%)	
	Yes	No
Septicemia	07 (3.80%)	177 (96.20%)
Bleeding	04 (2.17%)	180 (97.83%)
PCN dislodgement or blockage	09 (4.89%)	175 (95.11%)

difference was insignificant ($P = 0.660$). Bleeding was seen in 02 (1.71%) patients and 02 (2.99%) patients but the difference was statistically insignificant ($P = 0.568$). PCN dislodgment or blockage was observed in 05 (4.27%) patients of age group 20-40 years in 04 (5.97%) patients of age group 41-60 years but the difference was insignificant ($P = 0.608$). Table 2

Male patients were 127 and female patients were 57. Septicemia was noted in 06 (4.72%) patients and 01 (1.75%) female patients but insignificant between gender and Septicemia was noted with p value 0.330. Total 04 (3.15%) male patients and 00 (0.0%) female patients found with bleeding. But insignificant association of gender with bleeding was seen with p value 0.176. PCN dislodgment or blockage was noted in 06 (4.72%) male patients and 03 (5.26%) female patients. But insignificant ($P = 0.876$) association was observed. Table 3

Table 2 Relation of complications with age

Complications		20-40 years (n=117)	41-60 years (n=67)	P-value
Septicemia	Yes	05 (4.27%)	02 (2.99%)	0.660
	No	112 (95.73%)	65 (97.01%)	
Bleeding	Yes	02 (1.71%)	02 (2.99%)	0.568
	No	115 (98.29%)	65 (97.01%)	
PCN dislodgment or blockage	Yes	05 (4.27%)	04 (5.97%)	0.608
	No	112 (95.73%)	63 (94.03%)	

Table 3 Relation of complications with gender.

Complications		Male (n=127)	Female (n=57)	P-value
Septicemia	Yes	06 (4.72%)	01 (1.75%)	0.330
	No	121 (95.28%)	56 (98.25%)	
Bleeding	Yes	04 (3.15%)	00 (0.0%)	0.176
	No	123 (96.85%)	57 (100.0%)	
PCN dislodgment or blockage	Yes	06 (4.72%)	03 (5.26%)	0.876
	No	121 (95.28%)	54 (94.74%)	

DISCUSSION:

We have conducted this study to observe the complications of ultrasound guided percutaneous nephrostomy in patients with obstructive uropathy. The age at presentation in our study varied from 20 to 70 years with mean age of 41.74 ± 7.91 years. Majority of the patients 78 (42.39%) were between 31 to 40 years of age. Moreover, in our study, out of these 184 patients, 127 (69.02%) were males and 57 (30.98%) were females with male to female ratio of 2.23:1 which is very much comparable to studies of Naeem M et al¹¹, Wilson JR et al¹² and Karim R et al¹³ who also found higher incidence of male than female patients. Ahmad I et al¹⁴ in their study has found the mean age of 42.33 ± 9.65 years with 72.67% were male and 27.33% female with male to female ratio of 2.6:1. In our study, post-procedure bleeding occurred in 04 (2.17%) patients undergoing nephrostomy tube placement. While Naeem M et al¹¹, Jalbani MH et al⁹ and Romero FR et al¹⁵ had come across this rate as 4.0%, 5.0% and 3.5% respectively which is a little higher as compared to our study. But Karim R et al¹³ and Olivera ST et al⁴ reported a much higher rate of bleeding i.e. 9.5% and 21.5% respectively as compared to our study. Post-procedure bleeding varies in severity, and may range from simple transient hematuria to severe hemorrhage requiring transfusion or intervention.¹⁶ Incidence of post PCN septicemia in our study was in 3.80% (7 patients) while Naeem M et al¹¹ reported its incidence 2.0%, Dyer RB et al¹⁷ 2.5% and Jalbani MH et al⁹ reported it as 7.5% which is much higher as compared to our study. These patients with bleeding and septicaemia were managed conservatively in the ward. Lewis reported sepsis as the most common major complication, occurring in 2.2% of patients in his study.¹⁸

Catheter-related complications such as kinking, obstruction or dislodgement may frequently be encountered and may require further intervention in 14% of cases.¹⁹ Published reports quoted varying rates of catheter dislodgement, ranging from 4.8% to 11.6%. The use of larger bore

catheters (for example 14Fr catheter) may reduce this rate to 1%.¹⁹ Stables recommended advancement of the catheter well into the renal pelvis or calyces to minimize risk of dislodgement.²⁰

CONCLUSION:

This study concluded that the percutaneous nephrostomy (PCN) is a safe and easy method of temporary urinary diversion in obstructive uropathy with the incidence of percutaneous nephrostomy dislodgement in 4.89% patients, Septicemia in 3.80% patients and bleeding in 2.17% patients. So, we recommend that percutaneous nephrostomy is a suitable and preferred modality for drainage of pyonephrotic and azotemic patients with minimal complications. Moreover, ureteric obstruction especially due to malignant disease of pelvic origin can best be relieved by PCN as a palliative measure, which can otherwise be highly fatal.

REFERENCES:

1. Baum M. Overview of chronic kidney disease in children. *Curr Opin Pediatr.* 2010;22:158-60.
2. Campbell SC, Walsh PC. Pathophysiology of urinary tract obstruction. In: Wein J, ed. *Campbell-Walsh Urology.* Vol 2. 9th ed. Saunders; 2007:1195-226.
3. Rose JG, Gillenwater JY, Wyker AT. The recovery of function of chronically obstructed and infected ureters. *Invest Urol.* Sep 1975;13(2):125-30.
4. Olivera ST, Gjulsen S, Katica Z. Obstructive Nephropathy as a Result of Malignant Neoplasms: A Single Centre Experience. *BANTAO J.* 2010;8(2):71-4.
5. Khan SZ, Fahim F, Mansoor K. Obstructive uropathy: causes and outcome in pediatric patients. *J Postgrad Med Inst.* 2012;26(2):176-82.
6. Mendez-probst CE, Fernandez A, Denstedt JD. Current status of Ureteral stent technologies: comfort and antimicrobial resistance. *Curr Urol Rep.* 2010;11(2):67-73.
7. Rose BD, Black RM. *Manual of Clinical Problems in Nephrology.* Boston, Mass: Little, Brown & Co; 1988:337-43.

8. Joshi HB, Obedeyi OO, Rao PN. A comparative analysis of nephrostomy, JJ stent and urgent in situ extracorporeal shock wave lithotripsy for obstructing ureteric stones. *Br J Urol.* 1999;84:264-9.
9. Jalbani MH, Deenari RA, Dholia KR, Oad AK, Arbani IA. Role of Percutaneous Nephrostomy (PCN) in Malignant Ureteral Obstruction. *J Pak Med Assoc.* 2010;60(4):280-3.
10. Kouba E, Wallen EM, Prothi RS. Management of ureteral obstruction due to advanced malignancy: optimizing therapeutic and palliative outcomes. *J Urol*2008; 180(2):435-6.
11. Naeem M, Jan MA, Ullah A, Ali L, Khan S, ulHaq A et al. Percutaneous nephrostomy for the relief of upper urinary tract obstruction: an experience with 200 cases. *J Postgrad Med Inst.* 2010;24(2):147-52.
12. Wilson JR, Klahr S. Urinary tract obstruction. In: schrier RW, Gothschalk, CW, editors. *Diseases of the kidney.* 5th edition. New York: Little brown and company; 1992. p. 657-88.
13. Karim R, Sengupta S, Samanta S, Aich RK, Das U, Deb P. Percutaneous nephrostomy by direct puncture technique: an observational study. *Indian J Nephrol.* 2010;20(2):84–8.
14. Ahmad I, Pansota MS, Tariq M, Saleem MS, Tabassum SA, Mujahid AH. Comparison between double J (DJ) ureteral stenting and percutaneous nephrostomy (PCN) in obstructive uropathy. *Pak J Med Sci* 2013;29(3):725-29.
15. Romero FR, Broglio M, Pires SR, Roca RF, Guibu IA, Perez MD. Indications for percutaneous nephrostomy in patients with obstructive uropathy due to malignant urogenital neoplasia. *Intl Braz J Urol.* 2005;31(2):117-24.
16. Stables DP. Percutaneous nephrostomy: techniques, indications, and results. *UrolClin North Am.* 1982;9(1):15-29.
17. Dyer RB, Assimos DG, Regan JD. Update on interventional urology. *UrolClin North Am.* Aug 1997;24(3):623-52.
18. Lewis S, Patel U. Major complications after percutaneous nephrostomy-lessons from a department audit. *ClinRadiol.* 2004;59(2):171-79.
19. Cowan N. *The Genitourinary Tract; Technique and Anatomy.* Grainger & Allison's Diagnostic Radiology, A Textbook of Medical Imaging. A. K. D. A. Adam, Churchill Livingstone. 2008;1:813-22.
20. Stables DP, Ginsberg NJ. Percutaneous nephrostomy: a series and review of the literature. *AJR Am J Roentgenol.* 1978;130(1):75-82.