Original Article

# COMPLICATION OF PERCUTANEOUS NEPHROSTOMY (PCN) IN UPPER OBSTRUCTIVE UROPATHY: OUR ECPERIENCE

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**ABSTRACT:**

**OBJECTIVE:**

To evaluate the complications of percutaneous nephrostomy (PCN) in upper obstructive uropathy.

**PATIENTS AND METHODS:**

Total number of 200 patients of age >10 years with unilateral or bilateral obstructive uropathy in which double J stenting or retrograde catheterization could not be done or contraindicated otherwise and presented in uremia were included in the study. Patients with severe coagulopathies, liver or multisystem failure and uremia due to bladder outflow obstruction were excluded from the study. The percutaneous nephrostomy was done under ultrasound guidance by using local anesthetic. Any complications during or after procedure were noted.

**RESULTS:**

Majority of the patients 40.0% were between 26 to 40 years of age with male to female ratio was 2.6:1. The most common cause of obstructive uropathy was the stone disease (65.0%) followed by the carcinomas (18.0%). Mostly patients 56.0% were diagnosed as having mild degree of hydronephrosis and in 195 patients PCN was done successfully. Complications like bleeding and tube blockage or dislodgment was seen in 4.5% patients each while septicemia was in 3.5% patients. In our study, overall success rate was 93.0%.

**CONCLUSION:**

Percutaneous nephrostomy is a safe, quick and easy method of temporary urinary diversion in obstructive uropathy with minimal complications.

**KEY WORDS:** Uremia, hydronephrosis, nephrostomy, bleeding.

## INTRODUCTION:

Obstructive uropathy is one of the commonest urological emergencies with incidence of 20%.[1] This condition occurs due to any obstruction to urine flow, resulting in increased pressure within the collecting system, pain, infection, sepsis, and loss of renal function.[2] This potentially life threatening condition requires immediate measures to divert the urine from obstructed kidneys.[3] This obstruction may be due to intraluminal, intramural and extramural causes.[4] Renal calculi are the main etiological factors of obstruction in young and middle aged patients. In female Gynaecological tract

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obstruction surgery and obstetrical trauma and in old people malignancy contributes to upper obstructive uropathy.[5] Retrograde stenting, open drainage of kidneys and percutaneous nephrostomy are the commonly used methods to relieve the upper obstructive uropathy.[1,5] Before Goodwin and Casey before introduction of Trocar and Canula by Goodwin and Casey in 1955, open nephrostomy was considered as the treatment of choice for relieving upper obstructive uropathy.[6]

The management of obstructive uropathy has been revolutionized with the advent of percutaneous surgery and advancement in diagnostic techniques such as fluoroscopy and ultrasonography.[7] Ureteral stenting and percutaneous nephrostomy have almost completely replaced the open nephrostomy.[8] Currently, retrograde ureteral clearing with double-J ureteral stents is the most widely used technique for relieving obstructions of the urinary tract.[4] However, patients with ureteral stricture, impacted bilateral ureteral stones, extramural diseases and cancer patients due to the presence of anatomic deformities, ureteral compression in which JJ stenting or retrograde ureteral catheterization is not possible, percutaneous nephrostomy (PCN) can be performed easily.[2]

Percutaneous nephrostomy (PCN) is a well established therapy for urinary drainage in patients with supravesical urinary tract obstruction and for urinary diversion in patients with urinary fistulas, leaks, traumatic/iatrogenic ureteral dissection or hemorrhagic cystitis.[9,10] The procedure is also performed to gain access to the urinary tract for percutaneous stone removal and other endoscopic procedures.[7] Access to the renal collecting system is obtained using fluoroscopy alone, or in combination with ultrasound or computed tomographic guidance.[7,10] Although percutaneous nephrostomy was developed using fluoroscopic guidance, ultrasound guided procedures are now safe, easy and effective.[11]

Present study was conducted to evaluate the role, success rate and complications of percutaneous nephrostomy under ultrasound guidance in obstructive uropathy, at the Department of Urology & Renal Transplantation, Bahawal Victoria Hospital, Bahawalpur.

## MATERIALS AND METHODS:

This prospective study was conducted at the Department of Urology & Renal Transplantation, Bahawal Victoria Hospital/Quaid-e-Azam Medical College, Bahawalpur from July 2011 to June 2013. Patients of age 10-70 years with solitary functioning obstructive kidney or bilateral obstructive uropathy in which double J stenting or retrograde catheterization could not be done or contraindicated otherwise and presented in uremia were included in the study. Coagulation profiles done in all Patients. Patients of obstructive uropathy without uremia, those with severe coagulopathies, liver or multisystem failure, patients in which uremia was due to bladder outflow obstruction and terminal illness in which position for PCN could not be tolerable by patient were excluded from the study.

After approval from ethical review committee, total number of 200 patients who fulfilled the inclusion/exclusion criteria admitted or referred to urology department from other departments were selected. Informed, written consent, detailed history and physical examination of every patient was done. The investigations done before the procedure were blood complete examination, urine routine examination, screening for Hepatitis B & C and serum urea and creatinine. Abdominal ultrasonography was done in every patient to see the degree of hydronephrosis and affected side.

## PROCEDURAL DETAIL:

Percutaneous nephrostomy was performed by using 5-10 ml of 1% lignocaine subcutaneously at the puncture site. All the patients were given non-nephrotoxic antibiotics pre-operatively. The patients were placed on the ultrasound table in prone position and a pillow placed under the abdomen on the affected side to support the kidney. As soon as the initial puncture site was chosen it was cleaned and draped. Local anesthesia was injected and a stab incision was given at the puncture site. Then puncture needle i.e. 18-gauge Chiba needle was inserted at the renal angle or at the posterior

axillary line under ultrasound guidance. When confirmed that the needle was in the kidney, the stylet was taken out. Urine or pus drained out spontaneously was sucked with a disposable syringe and sent to the laboratory for culture and sensitively. Then soft end of floppy J guide wire was passed through the needle and the needle was removed. The tract was dilated with Teflon facial dilators more than the diameter of the nephrostomy tube. After tract dilation a pig tail nephrostomy tube or a feeding tube of 8 Fr was passed over the guide wire into the collecting system, secured with silk no. 1 and urinary bag was attached. All PCN were done by the researcher himself under supervision of consultant urologist. Any complications during or after the procedure were noted.

Data analysis was done by using SPSS version 16.0. Mean and standard deviation was calculated for quantitative variable like age. Frequency and percentage was calculated for gender, cause of obstruction, degree of hydronephrosis and complications i.e. procedural failure, bleeding, septicemia, PCN dislodgment or blockage and injury to adjacent organs.

Age range was from 10 to 70 years with mean age of 40 ± 9.65 years. Age of the patients at presentation is shown in Figure-I. Majority of the patients 80 (40.0%) were between 26-40 years of age. Out of these 200 patients, 72% were male and 28% female with male to female ratio of 2.6:1.

Patients presented with anuria were 82 (41.0%), lumbar pain 40 (20.0%) and uremic symptoms were 32 (16.0%). While 26 patients were already diagnosed and 20 patients had referred from other departments. The most common cause of obstructive uropathy was stone disease i.e. renal, ureteric or both and 130 (65.0%) patients presented with it. While 36 (18.0%) patients were presented with carcinoma in which carcinoma of urinary bladder is the most common cause as shown in Table-I. The %age of patients with degree of hydronephrosis were shown in Figure-II.

In all 200 cases PCN was attempted under local anesthesia under ultrasound guidance. PCN was successfully done in 195 patients while procedural failure occurred in 05 patients. The per & post-operative complications are shown in Table-II. Bleeding and septicemia occurred in 09 (4.5%) and 07 (3.5%) patients. They were managed conservatively by hemostatics and blood transfusion in bleeding and by injectable antibiotics in cases of septicemia. PCN dislodgement or blockage had occurred in 09 (4.5%) patients which were managed by re-inserting nephrostomy tube. Procedural failure had occurred in 05 (2.5%) patients which were then subjected to renal replacement therapy. Injury to the gut and any other adjacent organ was not seen in any patient during the procedure. Initially 30/200 (15.0%) patients developed complications and successful outcome was 85.0% but patients with bleeding and septicemia were managed conservatively so overall successful outcome was 93.0%. Out of these, 162 (81.0%) patients had undergone definitive procedure after settlement of their general condition and renal parameters. While 18 (9.0%) patients passed their stone spontaneously.

**Figure-I: %age of patients according to age group (n=200).**

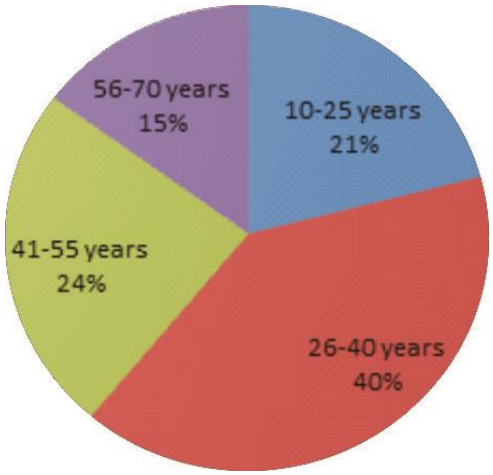


**Table-I: Causes of obstructive uropathy.**

| Causes | No. of Patients | %age |
|---|---|---|
| **Stone disease** | **130** | **65.0** |
| • Renal | 58 | 29.0 |
| • Ureteric | 38 | 19.0 |
| • Renal +Ureteric | 34 | 17.0 |
| **Carcinomas** | **36** | **18.0** |
| • Urinary Bladder | 16 | 8.0 |
| • Prostate | 08 | 4.0 |
| • Cervix | 04 | 2.0 |
| • Others | 08 | 4.0 |
| **Pyonephrosis** | **22** | **11.0** |
| **PUJ Obstruction** | **12** | **6.0** |

**Figure-II: Degree of Hydronephrosis (n=200).**

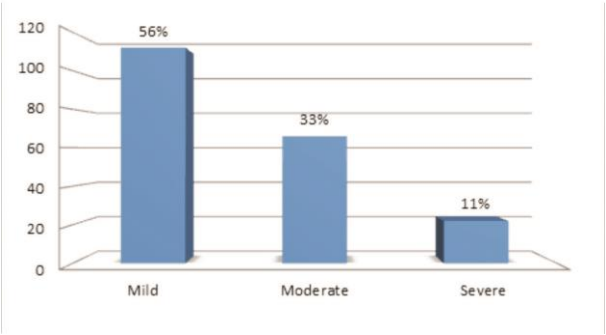


**Table -II: Complication Rate.**

| Complications | No. of Patients | %age |
|---|---|---|
| Procedural failure | 05 | 2.5 |
| Bleeding | 09 | 4.5 |
| Septicemia | 07 | 3.5 |
| PCN dislodgement or blockage | 09 | 4.5 |
| Injury to adjacent organs | 00 | 00 |
| Total | 30 | 15.0 |

## DISCUSSION:

Obstructive uropathy is a potentially life threatening condition and sometimes it is desirable to provide immediate temporary relief of the obstruction, until definitive treatment can be undertaken. Cystoscopy with retrograde catheterization and operative nephrostomy, are two valid options with their own disadvantages.[12,13] Operative nephrostomy is a major surgical procedure requiring general anesthesia for, what may be a transitory obstruction and already impaired renal function may make it hazardous.[5] Though retrograde ureteral stenting is a less morbid form of urinary diversion and is comfortable for patients but sometimes it may be impossible to pass the ureteric catheter above the obstructing lesion due to anatomic deformities, impacted stones and malignancy.[14]

Goodwin et al[6] reported the first percutaneous puncture in 1955 since then PCN has been indicated for patients with unilateral or bilateral ureteric obstruction in several benign diseases where retrograde urinary stent is impossible especially in the presence of infection or sepsis. Drainage of upper urinary tract obstruction by percutaneous nephrostomy under local anesthesia is usually relatively safe, simple, fast and has limited morbidity and low failure rate and therefore appears to be a technique of choice.[1,15] Although percutaneous nephrostomy was developed using fluoroscopic guidance, ultrasound guided procedures are now safe, easy and effective.[11,16]

The age at presentation in our study varied from 10 years to 70 years with mean age of 40 ± 9.65 years. Most of the patients 40.0% were presented between 26-40 years of age. Moreover, in our study 72.0% patients were male and 28.0% were female with ratio of 2.6:1 which is very much comparable to studies of Naeem M et al[5], Wilson JR et al[17] and Karim R et al[13] who also found higher incidence of male than female patients. The most common presenting complaints in our study were anuria, lumbar pain and uremic symptoms as was also observed in many previous studies.[1,5,9,11,18]

The most common cause of obstructive uropathy observed in our study was stone disease either renal or ureteric stones as was also found by Naeem M et al[5] and Anwar K et al.[19] Other causes of obstructive uropathy observed in our study were carcinoma of urinary bladder, prostate, cervix and other organs, pyonephrosis and pelviureteric junction obstruction (PUJO) which were similar to many previous studies.[1,5,11,13]

Before the advent of recent endourology techniques, patients with locally advanced or metastatic urogenital neoplasias underwent open nephrostomy and presented high morbidity and mortality rates[20]; however, even after the advent of the percutaneous nephrostomy, morbidity and mortality rates have remained high in this group of patients.[3,20]

Percutaneous nephrostomy can be performed on an outpatient basis on selected patients. Patients who live alone, or who are at high

risk of complications, such as those with infection, solitary functioning kidney with renal failure, or uncorrected coagulopathy are best treated in an inpatient setting so they can be appropriately monitored.[21]

A percutaneous nephrostomy was successfully placed in 97.5%% of patients in our study while Naeem M et al[5], Anwar K et al[19] and Wah TM et al[22] had come across this rate as 96.05%, 95.9% and 98.0% respectively. The success rate is lower in patients with non-dilated collecting system, staghorn calculi or patient was not cooperative. Those patients in which nephrostomy could not be possible were then subjected to renal replacement therapy.

The most common complication of percutaneous nephrostomy was bleeding, which occured in 09 (4.5%) patients undergoing nephrostomy tube placement in our study. While Naeem M et al[5], Jalbani MH et al[9] and Romero FR et al[23] had come across this rate as 4.0%, 5.0% and 3.5% respectively which is very much comparable to our study. But Karim R et al[13] and Olivera ST et al[12] reported a much higher rate of bleeding i.e. 9.5% and 21.5% respectively as compared to our study. Incidence of post PCN septicemia in our study was 3.5% while Naeem M et al[5] reported its incidence 2.0%, Dyer RB et al[24] 2.5% and Jalbani MH et al[9] 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. Post procedural blockage or dislodgment of the nephrostomy tube observed in different studies range from 04-37%[1,5,9,20,22] while in our study it was found in 4.5% patients. Adjacent organ injury is another complication, the colon and pleura may be inadvertently injured; the former had the need of a colostomy, the latter, a tube thoracostomy. Dyer RB et al[24] observed adjacent organ injury in 0.3% of patients while many authors have found no such injury to adjacent organs in their studies as was also observed in our study.[1,5,13,22] So, in our study initial success rate was 85.0%% and overall success rate upto 93.0% which is very much comparable to many previous studies.[5,7,9,11,13,25] But Sood G et al[1] and Nariculum J et al[20] have shown a much lower success rate of percutaneous nephrostomy of 72.0% and 76.0% respectively.

## CONCLUSION:

This study concludes that percutaneous nephrostomy (PCN) is a safe, quick and easy method of temporary urinary diversion in obstructive uropathy with an overall success rate of above 90.0%. 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.

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Submitted for publication: 05-04-2014

Accepted for publication: 15-05-2014