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Original Research Paper

# Percutaneous Nephrostomy for Urinary Diversion in Obstructive Uropathy- An Appraisal

Urology

KEYWORDS : obstructive uropathy, percutaneous nephrostomy, quality of life, HADS.

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## ABSTRACT

***BACKGROUND***- *Obstructive uropathy (OU) is a frequent complication to many benign and malignant conditions. The urinary obstruction must be relieved immediately to avoid deterioration of kidney function. Percutaneous Nephrostomy (PCN) is a known method for relief from symptomatic or asymptomatic OU. However the benefits and morbidity associated with the procedure have long been debated without a proper consensus.*

***MATERIALS AND METHODS***- *The forty patients (n=40) presenting with urinary obstructive features due to various causes constituted our study group. The patients were evaluated before and after PCN insertion with respect to the clinical and renal parameters. They were worked up on the basis of the Hospital Anxiety and Depression Score (HADS) Inventory and other questions pertaining to the intervention, in the six (6) weeks (wks) following PCN insertion.*

***RESULTS***- *The general condition and laboratory parameters improved drastically after PCN insertion citing a favourable stance. The median HADS score and the responses to direct procedure related questions, all denoted a positive incline in favour of PCN. Patients having obstruction due to calculus disease were surgically managed for their underlying cause soon after stabilisation of the renal parameters and control of infection.*

***CONCLUSION***- *PCN insertion has a positive impact on the quality of life in patients with OU whether due to benign or malignant causes, such that the patients with renal calculi can be surgically cured at a very short interval while patients with malignant obstruction can get rid of the sheer misery during the terminal stages of their lives.*

## INTRODUCTION

OU is a well established entity encountered in clinical practice.[1] Be it benign causes like renal calculi, ureteral strictures, retroperitoneal fibrosis or malignant conditions such as cancers of the cervix, bladder or prostate, all have had its notorious share in terminally causing obstruction of either the upper or lower urinary tract with deleterious consequences.[1] It has a progressively damaging effect on the renal nephrons[1] manifesting in the long run, with features of uraemia or sepsis, with the possibility of eventual death of the patient.[2] This advocates a timely and unprecedented intervention which may either reverse the breakdown of nephrons or at least halt the ongoing insult, to alleviate the patients' sufferings.

PCN has been dubbed by majority as a potent surgical intervention for temporary urinary diversion in both upper and lower urinary tract obstruction, involving minimal technical difficulties.[1, 2, 4, 9] The immediate improvement in the symptoms of the patients as well as the biochemical parameters have been documented by authors worldwide.[2] Proponents of JJ stenting or open renal drainage, as alternative modalities, have equally found space in the existing literature.[3, 5, 7, 8]

However, stark guidelines regarding optimal urinary diversion having not been established, many studies claim that the eventual choice of procedure should be individualised from case to case depending on clinician preference, patient choice or facility availability.[5] PCN insertion has a much argued impact on patients with OU, be it related to the timely surgical cure of renal calculi or leading grossly asymptomatic terminal lives post malignant obstruction.

## MATERIALS AND METHODS

Between 2014 and 2016 we performed PCN in forty (n=40) patients presenting with features of OU due to either a benign or a malignant causes. The mean age of the patients presenting to us was 51.75 years (yrs) (Mean ± S.D= 51.75 ± 10.17) with the sex ratio being 1.5:1 (M:F). 28 patients (28/40= 70%) presented to us with features of urinary sepsis/acute renal failure (ARF) including anuria, breathlessness, vomiting, pallor, weakness, decreased appetite and/or epigastric pain. PCN was performed in the remaining 12 patients (12/40= 30%) in view of generalised symptoms attributed to OU keeping in mind the impending ARF/sepsis.

All patients were clinically evaluated and baseline investigations in the form of blood urea (Bl. Urea), serum creatinine (Sr. Cr.), serum electrolytes and renal ultrasound and X ray KUB were obtained. Procedurally patients were started on non-nephrotoxic antibiotic prophylaxis. PCN was performed with ultra-sonograpy (USG) guidance under local anaesthesia (LA) and with all aseptic precautions. The Seldinger's technique was followed to put the appropriate sized nephrostomy tube just below the 12$^{th}$ rib with the patient being in 30 degree prone position. The tube was placed in the renal pelvis and stitched to the skin, followed by connection to a sterile urine bag. Changes in the general condition of the patients and the renal biochemical parameters were noted. The patients were followed up, after discharge, on an outpatient basis, at 1 wk intervals, for 6 wks.

## RESULTS

The indications for performing PCN in our patients (n=40) have been tabulated as below. (Table 1). All forty cases for PCN were successfully accomplished and there was no requirement of any secondary or alternative procedures in any of the cases. PCN was performed in all our patients as a discretionary choice over ureteral JJ stenting due to lack of proper emergency and interventional radiological facilities in our setup, required for the latter procedure.

Table 1: Statistics of our patients undergoing PCN

| Indications for performing PCN | Number of patients (n=40) |
|---|---|
| Stone disease | 24 |
| Cancer cervix | 9 |
| Bladder cancer | 6 |
| Cancer prostate | 1 |

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Complications in the form of haemorrhage, which was conservatively managed and subsided within 6-8 hours (hrs), was seen in 4 patients (4/40= 10%). Wound infection was seen in 3 patients in all (3/40= 7.5%). Accidental removal occurred in 1 patient (1/40= 2.5%).

The mean duration of hospital stay was 18 days (d) for our patients (Range, 12d to 45d). The general condition of the patient improved and a marked decline in the laboratory values were noted within the first two (2) wks. The mean values prior to the procedure were 185.6 mg/dl and 7.4 mg/dl for Bl. Urea and Sr. Cr. respectively. Within 2 wks, the mean values were noted to be 45.5 mg/dl and 1.8 mg/dl respectively. The mean values, 4 wks after PCN, were noted to be 37.4 mg/dl and 1.5 mg/dl respectively (Table 2).

Table 2: Blood parameters measured in our patients serially after PCN

| Blood parameters | Mean Values prior to PCN (mg/dl) | Mean Values after 2 weeks (mg/dl) | Mean Values after 4 weeks (mg/dl) |
|---|---|---|---|
| Blood Urea | 185.6 | 45.5 | 37.4 |
| Serum Creatinine | 7.4 | 1.8 | 1.5 |

The patients were followed up as out-patients at 1 wk intervals for the next 6 wks. Follow up of the patients were done on the basis of the HADS Inventory, which is an established general quality of life questionnaire, encompassing question indices on anxiety/depression (Total score =21; 0-7: Normal; 8-10: Borderline; 11-21: Abnormal)[13]. HADS Inventory showed the median utility scores for the patients to be 7.4 on the Depression scale and 9.2 on the Anxiety scale, which was a positive outcome in terms of the general well being and state of the mind of the patients with OU, post PCN.

The patients were also evaluated on the basis of direct procedure related questions - ''Do you have any reduction in pain''; "Do you have an improved appetite"; "Do you have decreased nausea/vomitting"; the answers of which were recorded as either 'YES' (denoting a positive response to the query whether PCN alleviated their symptoms of OU) or 'NO' (denoting a negative response to the query whether PCN alleviated their symptoms of OU). The patients were also questioned "Do you have difficulty in managing the nephrostomy tube" and "Do your daily activities get affected by the presence of the nephrostomy tube", the answers of which were recorded as either 'YES' or 'NO'.

Nephrostomy, in patients with renal calculi disease, was removed after a duration of 22.4 ± 3.4 d (Mean ± S.D), after the definitive surgical management for the stone removal. Patients with OU due to malignant causes, continued with their respective treatment protocols concerning the underlying disease, in the follow up period and thereafter.

**DISCUSSION**

Distinct terminologies have been used for denoting a disease as a consequence of urinary tract obstruction- OU, Obstructive Nephropathy and Hydronephrosis, but each in different connotation.[5] Ureteral dilatation due to impaired flow of urine leading to parenchymal damage is termed as OU.[5] PCN and JJ stenting are two main methods of temporary urinary diversion each with their own merits and de-merits.[3] The choice of the diversion modality is made by the urologist at initial presentation and can be affected by factors like etiology of obstruction, disease severity, or availability of in-house interventional radiology services.[8] PCN was performed in our setup in all patients presenting with OU.

In our study of PCN in forty patients, the most common cause of OU was identified to be renal stone disease (24/40=60%). Malignant lesions causing OU formed the remaining bulk (16/40=40%) of the patients studied. The male to female ratio, amongst the patients was seen to be 1.5:1. The age group of patients undergoing PCN because of OU due to stone disease was between 26 yrs and 66 yrs. The age group of patients undergoing PCN because of OU due to malignant causes was between 40 yrs and 70 yrs.

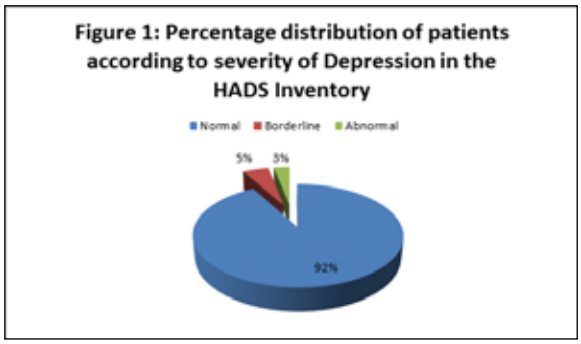
Success rates in putting nephrostomes with USG guidance have been recorded as high as 100% by Joshi *et al*[9] and Mokhmalji *et al*[3]. Raedecka *et al*[4] reported a 98% success rate in performing PCN. In our, albeit, small study, we were successfully able to perform PCN in all our patients in a single attempt.

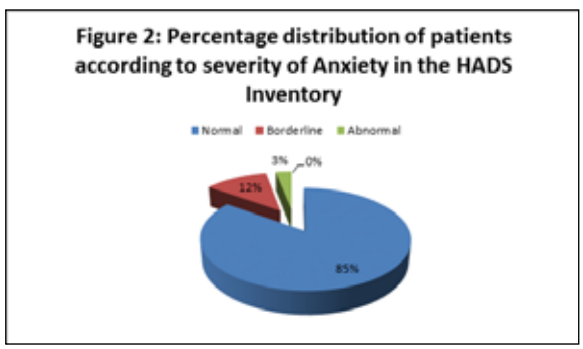
A successful PCN placement and improvement in renal failure and treatment of initial infectious syndromes is found in as high as 90% patients, as claimed by previous studies.[7] Naeem *et al*[1] showed that, except for a minor percentage of patients with ESRD in their study, all patients had favourable renal profiles after PCN in their follow up period. All our patients, in our study, showed dramatic improvement in their renal biochemical values over the 2 wks and 4 wks, post PCN (Table 2). Patients showed marked improvement in their general conditions. Renal stone disease patients, studied as a part of our group, were able to undergo a definitive surgical procedure very soon, which their azotemia and worsening renal and electrolyte profiles, would not have otherwise allowed. Surgical or palliative procedures were also successfully aided in patients with malignant OU, because of the improvement in their overall clinical status.

Watkinson *et al*[10] found that no worthwhile benefit is obtained if PCN is used as a palliative measure in the absence of definitive treatment for malignancies[10]. We counselled all our patients to regularly follow up on their respective treatment protocols, whether surgical management/chemotherapy/radiotherapy or just palliative care, for their respective diseases.

The questions about improvement in quality of life (QoL) after PCN in cases of OU, have been raised since time immemorial. Studies by Mokhmalji *et al*[3], Hsu *et al*[8] and Joshi *et al*[9] suggest that urinary diversion by PCN for non-malignant OU, decreases the QoL, although short term PCN does improve their renal profile to aid to a quick definitive management. Lapitan *et al*, in their prospective cohort of 198 patients, concluded that there is no significant difference in QoL with or without urinary diversion in cancer cervix patients.[12] Fuer *et al*, on the other hand, emphatically concluded that PCN improves quality of life in patients with OU due to gynaecologic cancers.[11] Thus there are varied views on improvement in QoL post urinary diversion in the setting of non-malignant and malignant OU.[8] Urinary decompression may be justified if improvement in renal function will facilitate systemic therapy and alleviate symptoms of OU.[8] All treatment decisions should however, be taken on an individual basis.[8]

We evaluated our patients in the, follow-up period, on the basis of the Hospital Anxiety and Depression Score (HADS) Inventory[13] which showed categorically for Depression 92% Normal, 5% Borderline and 3% Abnormal (Figure 1) whereas for Anxiety 85% Normal, 12% Borderline and 3% Abnormal (Figure 2).




The procedure related questions that were put in front of the patients post PCN had a stark response. Analysis of the procured data showed that 92% of the patients had a positive response, in terms of PCN alleviating their symptoms of OU, while 8% were of a negative opinion. As far as, daily care of the nephrostomy tube was concerned, 76% patients complained that they had trouble looking after their nephrostomy tubes while 24% patients could well take care of themselves. Moreover most of these patients complained that their daily activities were influenced to a great degree because of the nephrostomy tube (Table 3).

Table 3: Survey of our patients with regarding to the quality of life post PCN

| Question | Positive Response (%) | Negative Response (%) |
|---|---|---|
| Queries related to alleviation of symptoms- *''Do you have any reduction in pain"; "Do you have an improved appetite"; "Do you have decreased nausea/ vomitting"* | 92 | 8 |
| Queries related to daily care of nephrostomy tube- *"Do you have difficulty in managing the nephrostomy tube"* | 76 | 24 |

## CONCLUSION

PCN can be effectively performed under ultrasound guidance and should be the initial intervention in obstructed kidneys with pyonephrosis and/or poor renal function, attributable to either a benign or a malignant cause. It is effective in improving renal function and general quality of life in patients with malignant ureteric obstruction, rendering an acceptable morbidity. Calculus nephropathy can be salvaged using PCN with early improvement in renal function. PCN helps in pre-operative stabilization, quick surgical treatment of calculus disease and good peri-operative care. Patients with OU improve substantially on the psychological/emotional front, though self care and effect on-daily activities, post PCN, remains a dilemma.

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