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ORIGINAL ARTICLE

Impact of percutaneous nephrostomy in obstructive uropathy in advanced malignancies: A tertiary care cancer hospital experience

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Author`s Contribution

[1] Conceived study design & protocol
[2-4] Collected & analyzed data on patient outcomes, performed statistical analysis, interpreted results
[5] Contributed to writing, discussion, conclusion
[6] Supervised, reviewed final manuscript

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A B S T R A C T

Introduction: To assess whether percutaneous nephrostomy (PCN) placement in malignant ureteric obstruction provided any additional benefit or reduced patient morbidity and mortality, to review renal function recovery post-PCN insertion, length of hospital stays, and survival post-PCN insertion.

Methodology: We retrospectively analyzed 100 out of 300 patients who underwent PCN insertion while receiving active cancer treatment at SKMCH from January 2019 to June 2022. Data was collected on demographics, primary disease, stage, renal function recovery, complications, hospital stay, and mortality.

Results: Most patients were males over 60 years. Bladder Cancer was the most common malignancy, and most people had locally advanced diseases. Almost half of the patients returned to EAR (Emergency Assessment Room) due to symptoms related to PCN. Most visits were within the first 30 days. PCN displacement was the most frequent complication. Almost one-third of patients require repeat PCN insertion (most within 60 days). Most patients' renal function recovered to baseline, however a significant proportion (more than 1/3rd) developed Chronic Kidney Disease (CKD). The renal function never recovered in about a quarter of patients. Almost 50% of patients either died or were lost to follow-up. Poor survival in people with recurrent/ metastatic disease.

Conclusion: PCN insertion may not improve outcomes in patients with advanced malignancies but can be performed as a palliative procedure to improve the quality of life in a selected set of patients. Unnecessary intervention may add discomfort and a socioeconomic burden on patients and their families so it should be avoided by good initial clinical assessment.

Keywords: *Percutaneous nephrostomy; Ureteric obstruction; Uremia*

Introduction

A variety of pelvic, retroperitoneal, or metastatic malignancies may cause ureteric obstruction either by direct invasion or external compression of the ureter. Cervix, bladder, germ cell tumors, and prostate cancer are the most common malignancies causing obstructive uropathy followed by malignancies of the gastrointestinal tract and ovaries.[1] However, obstruction can also occur by retroperitoneal fibrosis after abdominal surgeries, chemotherapy, and/or radiotherapy.[2] Uremia as a result of malignant ureteric obstruction is a recognized event in

those with advanced malignancy, which, if left untreated, is quickly a terminal event. Palliative decompression of the obstructed urinary system, either by PCN, ureteric stent, or a combination of both is a recognized method of improving renal function, with presumed low morbidity.[3] PCN is a very valuable radiologic procedure for providing temporary or permanent urinary diversion of an obstructed upper urinary tract anyways but its role is not clearly defined in patients with advanced malignancies with palliative intent.[4] Ureteric obstruction is a cause of significant morbidity and mortality in cancer patients. It may cause uremia and severe AKI. PCN is a well-established intervention for rapid relief of obstruction and improvement of renal function. The complete restoration of renal function is contingent upon various factors, including patient age, comorbid conditions, the stage of the disease, serum albumin levels, and the timing of the intervention. Ureteric obstruction persisting for more than 4 to 6 weeks is typically regarded as irreversible.[5]

However role of PCN insertion in the management of acute kidney injury resulting from advanced abdominopelvic malignancy is controversial and there are no clear guidelines to predict whether such patients benefit from such intervention both in terms of survival time and quality of life.[6] Major post-procedural complications include Septic shock (4%), pyonephrosis (10%), Hemorrhage requiring transfusion support (4%), Vascular injury requiring embolization or nephrectomy (1%), and Pleural complications (1%). Prior studies showed few late complications including nephrostomy blockage in (5%) of patients, and dislodgement of the catheter in 7 (2.3%).[7,8] The purpose of this study was to evaluate the impact and possible improvement in performance status after PCN insertion in patients with advanced malignancies, to compare rates of complications post PCN insertion to Standards, to review renal function recovery post PCN insertion, Length of hospital stay and to compare our results with previously available data.

Methodology

We retrospectively evaluated a patient who underwent percutaneous nephrostomy for a duration of 1.5 years in Shaukat Khanam Memorial Cancer Hospital & Research Centre (SKMH). The total number of patients who underwent PCN insertion during the period from January 2019 to January 2022 was 300 (all patients who were receiving active cancer treatment at SKMH). Out of these 300 patients, we selected every 3rd consecutive patient (n= 100), which were retrospectively analyzed.

Results

The data was collected for parameters like demographic details primary disease, stage of malignancy (Table 1), recovery of renal function post-PCN, post-procedure common complications, hospital stay, and mortality. The most common complication was the displacement of the nephrostomy tube (27%), infection (14%), and peri PCN leakage (6%). 32% of patients required repeat PCN insertion mostly in the first 2 months. One of our patients required a repeat procedure thrice.

Table 1: Demographic details and primary disease site with its staging

Data	Patients (%)
Age (years)	
Above 60	42
41-60	34
21-40	19
18-20	5
Gender	
Male	72
Female	28
Primary Disease	
Bladder Cancer	34
Prostate Cancer	9
Rectal Cancer	15
Germ cell tumor	9
Cervical cancers	5
Ovarian	12
Others	16
Disease Stage	
Early (I/II)	17
Locally invasive (III/IV)	54
Metastatic	29
Common complications Post PCN insertion	
PCN Displacement	27
Infection	14
Peri-PCN Leakage	6
PCN displacement and need for repeat insertion	
Yes	27% (n=27)
Once	59% (n=16)
Twice	37% (n=10)

Thrice	2.7% (n=1)
No	53% (n=53)
Need for repeat PCN (within 3 months)	
Yes	32%
Once	n=27
Twice	n=4
Thrice	n=1

In our data majority of patients were elderly and frail with extensive disease burden only 24 % of patients were below 40 years of age. 72 % were males and the most common malignancy was bladder cancer. 54% of patients had locally advanced (Stage III and IV disease) and 29% of patients had metastatic disease. 47 patients presented to EAR with symptoms related to PCN (within 30 days) as shown in Figure 1. Mostly between a time scale of 15 to 30 days and 53% of patients never came in EAR likely they had no complication/absconded/died.

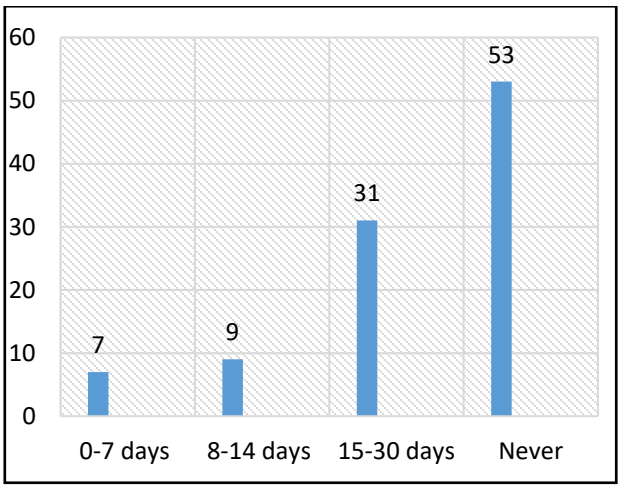

Figure 1: Time of presentation to EAR after PCN (with PCN-related issues)

In our data, we also calculated the length of stay during the post-PCN phase for post-procedure care or possible complications. The average length of stay was 4-6 days. The length of stay was prolonged in people with advanced malignancies (Stage III & IV), it was around 7-10 days. Baseline creatinine was more than 1 in 40 patients. Renal function recovered to baseline in 64 patients (64%). Residual CKD in 36 patients (36%). Renal function recovered to baseline in 64 patients (64%). Usually within the 1st week. Residual CKD in 36 patients (36%) mostly have early-stage CKD but CKD 5 in almost 7 % of individuals (Table 2).

Table 2: Baseline renal functions and recovery to baseline

Renal Parameters	Patients (%)
Baseline creatinine	
< 0.5	20%
0.5-1	40%
>1	40%
Function recovered	
Yes	64%
No (residual CKD)	36%
CKD I	42%
CKD II	17%
CKD III	13%
CKD IV	21%
CKD V	7%
Time to renal recovery	
0-7 days	23%
7-14 days	22%
14-30 days	11%
>1 month	16%
Never	24%
Lost to follow up	4%

30% of patients died within a period of 12 months and 23% lost follow-up so cannot comment exactly on the outcome. Overall median survival post PCN insertion is 2-3 months. Survival decreased with the advancement of disease (Table 3).

Table 3: Outcomes/Survival and Occlusion of stents and timescale for presentation to hospital

Follow up status	Patients (%)/n
Alive with no disease	9%
Alive with disease	35%
Lost follow up	26%
Died	30%
Median survival: Time scale	
<1 month	12%
1-6 months	19%

Follow up status	Patients (%)/n
Alive with no disease	9%
Alive with disease	35%
Lost follow up	26%
Died	30%
6-12 months	5%
>1 year	24%
Lost to follow up	4%
Disease extent	
Early (I/II)	>6 months
Locally advanced	<6 months
Metastatic	<3 months
Site of disease	
Bladder Cancer	05
Prostate Cancer	05
Cervical Cancer	02
Rectal Cancer	02
Time duration	
< 1 months	03
1-6months	02
6 -12 months	02
>1 year	07

Discussion

There is the benefit of PCN insertion for patients who have newly diagnosed pelvic/abdominal malignancies causing obstruction secondary to local pressure allowing them more time for proper staging and introduction of specific treatment.[9] It was observed a better prognosis in patients who were recently diagnosed or had locally advanced disease. Also relieving the ureteral obstruction and allowing these patients to undergo surgery, radiotherapy, and chemotherapy or hormone therapy improved the outcome. They also reported > 2-year survival in patients who were not exposed to anticancer treatment before decompression.[10] some other published data series reported median survival ranging from four to six months.[11-13] These series, however, included patients with benign ureteric obstruction and gynecological malignancy which we suggest performing more favorably than other pelvic malignancies. Apart from clinical and surgical complications, postoperative quality of life was impaired because of impairment from urinary symptoms, pain, and worse performance functional status has already been reported after stenting[14] and PCN placement.[15]

Post-PCN need for ureteric stenting was there in 39% of patients most of them required unilateral stenting (23%) rest of them had bilateral stenting (16%). 22 patients were not suitable for stenting, suitability was assessed by a urologist, nephrologist, and medical team keeping in view disease extent, site, risk of repeated infection, and risks related to General anesthesia. In a small population, 13% of our people's stenting wasn't indicated as renal functions completely recovered and later patients were assessed by a doctor for the need for removal of PCN as temporary obstruction was relieved. Stent insertion had its complications like occlusion and repeated urinary tract infection, 14% of patients had stent occlusion requiring repeat stenting in a period of 1.5 years. A debatable ethical query arises in patients with incurable advanced cancers, who have malignant ureteral obstruction, PCN insertion/ decompression procedure may only lengthen the patient and his family's suffering. Patients with debilitating pain, poor ECOG, co-existent co-morbidities, and advanced metastatic diseases with no possible oncological treatment options are unfavorable candidates for urinary diversion due to poor quality of life. Diversion procedures are usually suggested to provide patients with some time to bridge for chemotherapy or palliative care[6,7] although success is not guaranteed.[5]

There is the benefit of PCN insertion for patients who have newly diagnosed pelvic/abdominal malignancies causing obstruction secondary to local pressure allowing them more time for proper staging and introduction of specific treatment. It was observed that there was a better prognosis in patients who were recently diagnosed with or had a locally advanced disease. Also relieving the ureteral obstruction and allowing these patients to undergo surgery, radiotherapy, and chemotherapy or hormone therapy improved the outcome. They also reported >2-year survival in patients who were not exposed to anticancer treatment before decompression. Some other published data series reported median survival ranging from four to six months.[12,13] These series, however, included patients with benign ureteric obstruction[12] and gynecological

malignancy[11] which we suggest perform more favorably than other pelvic malignancies Apart from post-procedural complications, quality of life is impaired due to impairment from urinary symptoms, pain, and worse performance functional status has already been reported after stenting[14,15] and PCN placement.[14,15] The study is limited by the retrospective nature of the audit and the low number of patients. The lack of short- and long-term follow-up data was a major limitation. Information retrieved from patient's online records led to non-response and selection bias in this study. Furthermore, this is a single-center study; further studies will be needed to establish the value of these findings in the context of current clinical practice in our region.

Most people with malignant ureteric obstruction had locally advanced diseases and almost half of the patients presented with complications related to PCN in a short period and a significant proportion (more than 1/3) developed CKD despite PCN. Each patient with malignant ureteric obstruction should be assessed on an individual basis for the need for PCN insertion after clear consideration of costs, benefit yield (in terms of improved renal function), and complications. One needs to plan PCN insertion based on the overall prognosis related to the underlying disease by establishing a timely liaison with the nephrologist and urologist keeping in mind patient wishes and expected improvement in quality of life.

The study suggests that the PCN should primarily be seen as a palliative measure aimed at relieving patients' pain and distress. However, it also highlights that unnecessary interventions can occasionally prolong a patient's suffering.

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