Original Article

Role of Percutaneous Nephrostomy (PCN) in Malignant Ureteral Obstruction

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Abstract

Objective: To assess whether PCN placement in patients having malignant ureteric obstruction can provide patient benefit or increase morbidity.

Methods: A prospective study was conducted in the department of Urology CMCH Larkana from 1st January 2004 to December 2006.

Patients having malignant ureteric obstruction admitted in our department either directly or referred from other departments with deranged renal functions and in whom retrograde ureteria catheterization had failed, were included. PCN was placed by the standard technique.

Results: A total forty (40) patients fulfilled the criteria for initial PCN placement for their malignant ureteral obstruction. There were 20 males and 20 females with an age range from 21 to 70 years.

Of the 40 patients 17 (42.5%) presented directly in this department, with 10 (25%) having anuria and 7(17.2%) with symptoms of uraemia. Among them ten patients were already diagnosed cases, and seven were diagnosed in our ward. The remaining 23 patients (57.5%) were referred by other departments and were diagnosed cases of malignancy. It was from this study that patients having early or urogenital malignancies benefited from the PCN placement while patients with advanced malignancies and non-urogenital malignancies showed poor response. The median survival in urogenital malignancies was about 350 days (range was 150 - 700 days), and in non urogenital malignancies except lymphoma it was about 25 days. (Range was 7 - 80 days). Loss of nephrostomy catheter was the most frequent complication observed in this series.

Conclusions: PCN is an excellent initial procedure for relieving the malignant urinary obstruction with minimal complications. It was concluded from this study that patients having early or urogenital malignancies benefit from PCN placement while patients who have advanced malignancy or non-urogenital malignancies showed poor response.

Also patients treated for primary neoplasia that can still be treated with other therapeutic modalities especially radiotherapy, chemotherapy and hormone therapy can also benefit from the procedure (JPMA 60:280; 2010).

Introduction

Uraemia as a result of malignant ureteric obstruction is a recognized event in patients with advanced malignancy usually of pelvic origin. It is rarely observed in non pelvic malignancies such as breast carcinoma and upper gastrointestinal malignancies. If the obstruction in the urinary tract is not removed, the clinical condition deteriorates at a fast pace due to Uraemia, water electrolyte abnormalities, urinary tact infections and can eventually be fatal.[1,2]

Palliative decompression of the obstructed urinary system either by PCN, ureteric stenting or combination of both is a recognized method of improving renal function with presumed low morbidity and improving quality of life.[3,4]

Though ureteric stenting in these conditions is a widely used technique for relieving obstructions of the urinary tract, but the retrograde ureteral stenting is frequently impossible in cancer patients due to presence of anatomic deformities, bleeding or ureteral compression by the tumour. On the other hand PCN does not present technical difficulties even in cases where the retrograde ureteral stenting has failed.[5]

The objective of this study was to assess if drainage of such an obstructed system can provide any benefit or increase morbidity. This can lead to an ethical dilemma. The question also arises that, will such a drainage facilitate treatment with chemotherapy, or radiotherapy or will it perpetuate other problems to develop?

Patients and Methods

This prospective study was conducted in the department of Urology CMCH Larkana from 1st January 2004 to December 2006.

Patients having malignant ureteric obstruction admitted in the department of urology, either directly or referred from other departments with deranged renal function were included in this study.

In all patients' detailed history, physical examination and previous treatment was noted. All the necessary

investigations other than renal function tests like ultrasound KUB, x-ray KUB, Blood complete picture, urine for culture and sensitivity (who were passing urine), coagulation profile and tumour markers (if necessary) were carried out.

Those patients in whom retrograde ureteric catheterization had failed were included in the study.

After taking informed consent, patients were taken to Operation Theater and procedure was performed under local anaesthesia either blindly or under ultrasound guidance by Seldinger technique. Patient was positioned 30° prone oblique position on the operating table. After cleansing and draping the area 1% plain lignocaine was infiltrated in the site of puncture and tract. Puncture site always remained below the tip of the twelfth rib as it provides the shortest track.

A stab incision was made at the site of the puncture. The puncture needle was inserted either under ultrasound guidance or blindly. When confirmed that the needle was in the kidney, the stylet was taken out. Urine or pus drained out spontaneously or was sucked with a disposable syringe and sample was sent to the laboratory for culture and sensitively. A floppy J guide wire was passed through the needle and then the needle was removed. The tract was dilated with Teflon facial dilators up to 2Fr more than the diameter of the nephrostomy tube. After tract dilation a pig tail nephrostomy tube was passed over the guide wire into the collecting system and then nephrostomy tube was secured.

All continuous variables were expressed as Mean ± S.D. Paired t-test was used to compare the Pre and Post PCN Blood Urea and Serum Creatinine. P value <0.05 was considered as statistically significant and all calculations were performed through statistical package SPSS version 15.

Results

A total of forty (40) patients fulfilled the criteria for initial PCN placement for malignant ureteral obstruction.

The types of malignancy in these patients are shown in Table-1.

The age ranged from 21 to 70 years with the maximum patients (15) in the 51 to 60 years bracket.

Of the 40 patients, 17 (42.5%) presented directly in this department, among them 10 (25%) with anuria and 7 (17.2%) with symptoms of Uraemia. Of these, ten patients were already diagnosed cases, and seven were diagnosed in our ward. The remaining 23 (57.5%) patients were referred by other departments and were already diagnosed cases of malignancy.

In forty (40) patients, 60 PCN were placed (in 20 it was bilaterally placed). All the patients except one, showed improvement in their symptoms within 24-48 hours with a decline in their renal function parameters. One patient having carcinoma gall bladder did not show any improvement and was started on haemodialysis. Though her renal function test parameters decreased but symptoms did not improve and she expired in a weeks time due to her primary disease.

Significant improvement was seen in 30 (75%) patients and 25 (62.5%) had normalization of their Blood urea and Serum Creatinine levels.

All continuous variables like Ca Urinary Bladder, Ca Prostate, Ca Uterine Cervix etc were expressed as Mean ± S.D. Paired t-test was used to compare the Pre & Post PCN of Blood Urea and Serum Creatinine. P value <0.05 was considered as statistically significant and all calculations were performed through statistical package SPSS version 15. Both values are less than 5% level of significance which shows that the difference of levels in pre and post PCN is significant (Table-1).

Five (12.5%) patients died during hospitalization due to advanced malignancies. There was no case of mortality related to the surgical procedure.

In seven (17.5%) patients who were undiagnosed cases of malignancy following normalization of their Blood urea and Serum Creatinine, 5 (17.5%) underwent surgical procedures and 2 (5%) were referred to oncology department for radiation/chemotherapy.

Among 35 patients who were discharged from hospital

Table-1: Comparison of Mean Blood Urea and Serum Cretenin Levels at Pre & Post PCN in Malignant Ureteric Obstruction.

Primary Malignancy		Blood Urea			Serum Creatinine		
	No. of Patients	Pre PCN Mean ± SD	Post PCN Mean ± SD	P- Value	Pre PCN Mean ± SD	Post PCN Mean ± SD	P- Value
Ca Urinary Bladder	10	163.9 ± 13.8	49 ± 12.4	<0.001	7.3 ± 1.2	1.9 ± 0.7	<0.001
Ca Prostate	5	144.4 ± 10.9	46.6 ± 13.2	<0.001	7.6 ± 1.6	1.5 ± 0.6	<0.01
Ca Uterine Cervix	15	148.1 ± 9.4	39.2 ± 14.3	<0.001	7.8 ± 1.5	1.4 ± 0.6	<0.001
Ca Ovary	2	137 ± 16.9	32 ± 19.7	0.012	6.6 ± 2.6	0.9 ± 0.4	0.174
Rectum	3	144.3 ± 14.1	64.3 ± 11.3	<0.01	7.6 ± 2.2	2.2 ± 0.5	0.035
Lymphoma	3	156.6 ± 12.5	31.3 ± 12.5	<0.01	5.9 ± 1.8	1.0 ± 0.2	0.041
Breast	1	325	155	<0.001	16.8	6 mg	<0.001
Gall Bladder	1	275	185	<0.001	19.3	8 mg	<0.001

13 were readmitted for readjustment of nephrostomy tubes in 6 and 7 for the conversion to ureteric stents.

When separately analyzed according to primary sight of the neoplasia patient survival was seen better with urogenital malignancies as compared with non urogenital malignancies. The median survival in urogenital malignancies was about 350 days (range 150 - 700 days). While in non urogenital malignancies except lymphoma it was 25 days (Range 7 - 80 days) (Table-2).

Table-2: Median survival of patients after insertion of PCN in malignant ureteric obstruction.

Malignancy	Median Survival in Days	Range in Days
Bladder	475	170 - 700
Prostate	385	125 - 680
Ca Uterine Cervix	425	200 - 700
Ovary	252	280 - 500
Rectum	35	30 - 70
Lymphoma	190	110 - 370
Breast	-	26
Gall Bladder	-	07

Better out come was observed in patients who were less than 52 years of age as well as those who were recently diagnosed for malignancies.

Loss of nephrostomy catheter was the most frequent complication observed in 15 (37.5%) patients. Of these, 10 required new procedure and five patients required readjustment of tubes, 3 (7.5%) developed urinary tract infection which was treated according to culture & Sensitivity report. Two (5%) patients developed transient heamaturia which subsided spontaneously.

Discussion

Goodwin et al reported the first percutaneous puncture in 1955[6] since then PCN has been indicated for patients with unilateral or bilateral ureteric obstruction in several benign diseases where retrograde urinary shunt is impossible especially in the presence of infection or sepsis. This procedure is usually relatively safe, simple, and fast and presents low morbidity and mortality rates.[7]

Thus many experts could feel a strong urge to perform this procedure in patients with cancer derived obstruction before properly assessing each patient's individual situation.[8]

Though retrograde ureteral stenting is a less morbid form of urinary diversion and is comfortable for patients but occurrence of anatomic deformities bleeding, ureteral compression associated with malignancy can prevent its accomplishment.[9,10] Ganatra (2005) and Soper et al; reported failure rates in a range from 40.6% to more than 80%.[11,12] We have also experienced the same especially in patients having bladder and prostatic malignancy with difficulty in locating the ureteric orifices.

The primary site of neoplasia is a factor that can significantly influence the out come of patient's survival. In this study better results were observed in terms of survival and quality of life in patients having ureteric obstruction secondary to uterine carcinoma, urinary bladder tumours and prostatic neoplasia. The patients' survival time was between 1 to 2 years with urogenital tumours which is in accordance with Hoe JW et al[13] who have reported more than one year survival in 60% of their patients with prostate and uterine carcinoma.

It was further observed that non urological malignancies like carcinoma gallbladder, breast, rectum, and colon showed bad prognosis possibly because of advancement of their primary disease before they obstruct the ureters, and these either develop complications which are miserable or die earlier. Our patients with carcinoma of gall bladder breast and colorectal malignancy died during their first hospitalization. This study co-relates well with the results of Donat et al and Kaplesh Jani, who also reported the same in their series as the survival time with colorectal carcinoma and carcinoma of breast was four times less than urogenital tumours. The patients survived merely few weeks after PCN insertion. They concluded that non urological malignancies are worse offenders than the urogenital malignancies.[14,15]

Another factor that must be taken into account is the age. Lee SK et al observed a lower in-hospital mortality rate and longer survival in patients under 52 years of age. For this they are of opinion that young patients usually have larger metabolic and immunologic resources for recovery, during the immediate post operative period after PCN and to respond to subsequent complimentary treatments.[16] We are in agreement with this result as our patients who were less than 55 years showed better response than older patients.

Another factor which must be considered is advancement and aggressiveness of the primary disease. There seems to be little doubt about benefit of PCN for patients in newly diagnosed disease allowing them more time for proper staging and introduction of specific treatment. Kin.A.C and his colleagues (1994) observed a better prognosis in those patients who were either recently diagnosed or had locally advanced disease. Also relieving the ureteral obstruction and allowing these patients to under go surgery, radiotherapy, and chemotherapy or hormone therapy improved the outcome. They reported more than two years survival in patients who were not exposed to anticancer treatment before diversion and patients who had received anticancer therapy survived only thirty eight days.[17] In our study also we observed more than two years survival in patients not exposed to anti-cancer treatment.

A difficult ethical question arises in patients with

incurable malignancies, who are diagnosed with malignant ureteral obstruction, decompression may merely prolong the patients suffering.[18]

Patients with uncontrollable pain, low functional status, significant co-morbidities and disseminated diseases with no possibility of treatment are clearly unfavourable candidates for urinary diversion due to poor quality of life.[19,20]

However, the main factor that should guide the urologist's management is patient's desire. Some patients may refuse the nephrostomy despite being good candidates, others may wish to prolong life even for a short time due to emotional, legal or financial reasons and this wish should be respected. However, patients and their family must be informed about the palliative role of surgery for removing the obstruction, the disease's progression and potential complications of the procedure.[21-23]

Conclusion

PCN is an excellent initial procedure for relieving malignant ureteral obstruction with minimal complications. It is observed from this study that patients treated for primary neoplasia and can still be offered other therapeutic modalities, especially radiotherapy, chemotherapy and hormontherapy, can benefit from the procedure.

However, majority of the patients having advanced neoplasia whose progression is enough to cause ureteral obstruction at least currently, and refractory to any other therapeutic modality, are not good candidates for diversion. In future, advances in radiotherapy and chemotherapy, can enable more effective treatment for these neoplasia and strengthen the role of PCNs in these patients.

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