Audit

The role of percutaneous nephrostomy in malignant ureteric obstruction

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Objectives: Uraemia as a result of malignant ureteric obstruction is a recognised event in those with advanced malignancy, usually of pelvic origin, which, if left untreated, is quickly a terminal event. Palliative decompression of the obstructed urinary system, either by percutaneous nephrostomy (PCN), ureteric stent or a combination of both is a recognised method of improving renal function, with presumed low morbidity. The aims of the study were to assess whether PCN placement in malignant ureteric obstruction provided any additional survival benefit or patient morbidity.

Patients and Methods: The case notes of 32 patients with a mean age of 68.1 years (16 male, 16 female) who underwent PCN drainage for malignant ureteric obstruction were retrospectively analysed. Data on the site of primary malignancy, mode of presentation, improvement in renal function, median survival, conversion to internal ureteric stents and intervention-related complications were collected for analysis.

Results: The median survival following PCN insertion was 87 days and was unrelated to the patient's age and renal function. Those patients with primary underlying gynaecological malignancies appeared to survive almost 4 times as long as those with underlying primary bladder cancer. Renal function took a mean of 16.8 days to reach a nadir. Almost 79% of patients were able to be discharged from hospital – each patient, however, being re-admitted back to hospital on average 1.6 times prior to their death through PCN or internal ureteric stent related events. Retrospective 'useful quality of life' was seen in less than half of the patient cohort.

Conclusions: In the presence of malignant ureteric obstruction, palliative percutaneous urinary diversion may be performed and is effective in improving renal function. However, long-term survival is limited and should, therefore, be performed only when the views and wishes of the patient and carers are taken into account and if there is a definitive treatment plan available for the patient as quality of life can be suboptimal.

Key words: Malignant ureteric obstruction – Nephrostomy – Survival – Morbidity

Uraemia as a result of malignant ureteric obstruction is a recognised event in those with advanced malignancy, usually of pelvic origin, which, if left untreated, is quickly a terminal event. Palliative decompression of the obstructed urinary system, either

by percutaneous nephrostomy (PCN), ureteric stent or a combination of both is a recognised method of improving renal function, with presumed low morbidity, and improving quality of life.^{1,2} The concept of internal stent drainage by means of extra-anatomic stent placement has

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also recently been proposed.³ However, drainage of such an obstructed system leads to an ethical dilemma – is such drainage going to facilitate treatment with chemotherapy or radiotherapy, or is it perpetuating and allowing other problems to develop?

Grabstald and McPhee⁴ define a 'useful quality of life' as fulfilling four criteria described as: (i) little or no pain; (ii) full mental capacity; (iii) few complications relating to PCN insertion; and (iv) the ability to return home for at least 2 months prior to death.

Therefore, we set out to assess our own hospital experiences by reviewing the case notes of those patients in whom PCNs had been initially sited for malignant ureteric obstruction. We were particularly interested in any survival advantage according to the underlying primary site of malignancy, duration of the time spent in hospital following decompression of the obstructed urinary system and rate of complications arising as a result of such drainage. No prospective data were available on quality of life issues.

The aims of the study were to assess whether PCN placement in malignant ureteric obstruction provided any additional survival benefit or patient morbidity.

Patients and Methods

Patients who had had percutaneous nephrostomies sited by the radiology department in York District Hospital over a 5-year period (1 December 1996 to 31 December 2001) were identified from radiology department records using the search criteria 'nephrostomy'. All case notes were reviewed and those patients having PCNs sited for benign clinical reasons (e.g. obstructing ureteric calculi) were excluded from further analysis. Data collected for analysis included demographic data, primary malignancy, biochemical parameters and post-nephrostomy complications.

Percutaneous nephrostomies were sited in the X-ray department in the hospital by one of two consultant interventional uro-radiologists or by a radiology specialist registrar under direct supervision. All PCNs were sited under local anaesthetic/intravenous sedation using ultra-

Table 1 Sites of primary malignancies

Site of malignancy	Number
Prostate	9
Bladder	8
Colorectal	7 ^a
Gynaecological	7 ^b
Breast	1
Total	32

^aComprises 5 rectum and 2 sigmoid colon.

^bComprises 5 cervix and 2 uterus.

sound guidance whereby a standard 6-Fr pigtail nephrostomy catheter was positioned within the obstructed renal pelvis. Final position was confirmed fluoroscopically.

Statistical analysis was provided using chi-squared methods.

Results

A total of 33 patients fulfilled the criteria of initial PCN placement in the management of their malignant ureteric obstruction. Of these, the case notes of 32 were available for analysis, comprising 16 male and 16 female patients. The study population had a mean age of 68.1 years (range, 42–84 years). The sites of the primary malignancies are shown in Table 1.

Of the 32 patients, 28 (87.5%) presented to their attending physicians with symptoms of uraemia with associated deranged serum urea/creatinine levels and bilateral upper tract dilatation on radiological imaging. The remaining 4 patients (12.5%, 3 gynaecological and 1 rectal primary malignancies) had been discovered during the course of their routine post-cancer treatment follow-up to have developed upper tract dilatation (2 bilateral, 2 unilateral) and locally recurrent malignancy or pelvic/retroperitoneal lymphadenopathy in the absence of deranged serum urea and creatinine levels. After discussion with the patients concerned, PCNs were similarly sited.

Table 2 Mean serum potassium, urea and creatinine levels pre- and post-PCN insertion for malignant ureteric obstruction according to site of primary malignancy

	Potassium (mmol/l)		Urea (mmol/l)		Creatinine (μmol/l)	
	Pre	Post	Pre	Post	Pre	Post
Bladder	5.7	4.2	34.2	20.1	770.4	292.1
Prostate	5.9	4.3	36.1	20.2	708.8	244.8
Gynaecological*	5.3	4.5	29.8	12.2	707.5	184.5
Colorectal*	5.3	4.5	39.9	15.2	763.2	254.7
Breast	6.4	5.0	50.8	10.8	1784	200
Overall	5.7	4.5	38.2	15.7	946.8	235.2

Post-PCN insertion biochemistry values represent nadir levels achieved.

*Excludes values from patients where no biochemical renal failure was evident.

Table 3 Median survival of patients following insertion of PCNs for malignant ureteric obstruction

Primary malignancy	Median survival (days)	Range (days)
Bladder*	54.5	17–232
Prostate*	87	12–493
Gynaecological	208	15–303
Colorectal*	128.1	14–711
Breast*	814	N/A

*Includes patients still alive at end of study period.

N/A, not applicable (as only 1 patient).

Nine patients (28.1%) presented acutely with an obstructive uropathy *de novo* secondary to an undiagnosed pelvic malignancy. The remaining 23 (71.9%) had had their diagnosis of (predominantly) pelvic malignancy made earlier, with a median of 23 months prior to the placement of a PCN (range, 0.25–432 months).

The *de novo* presentation in renal failure of advanced pelvic malignancy made no statistically significant difference to the overall survival of patients when compared to those patients in whom the diagnosis had been made earlier ($P > 0.05$; data not shown). Of the 23 patients diagnosed earlier with predominantly pelvic malignancy, 20 had undergone radical surgery, external beam radiotherapy, systemic chemotherapy (in varying combinations) or systemic hormonal manipulation prior to the placement of a PCN for uraemia. Of the remaining three, two were patients with bladder cancer (one deemed unfit for surgical intervention and one subsequently sent for radiotherapy) and one with prostatic carcinoma who was subsequently managed with hormonal manipulation.

The improvement in serum biochemistry following PCN insertion was also analysed (Table 2). It took a mean of 16.8 days (range, 1–76 days) for serum biochemical values to reach their nadir levels following PCN insertion.

Of the 32 patients, 12 had unilateral PCN placement, and 20 bilateral, making a total of 52 PCN placements. Of these, 32 placements were successfully converted to internal ureteric stents. However, 12 PCNs were left *in situ* due to deteriorating renal function when the PCN was clamped. Of the remaining 20 PCNs initially sited, 3 could not be converted to internal ureteric stents and 17 did not have ureteric stent placement attempted. This was due to the anticipation of significant lower urinary tract symptoms with ureteric stenting, which were usually present before PCN placement. These 32 PCNs were present in 21 patients, indicating that only 11 patients (34.4%) were subsequently rendered totally PCN-free by internal stent placement.

Five patients were still alive at the end of the study period (2 with underlying bladder cancer, 1 prostate cancer, 1 colorectal malignancy and 1 metastatic breast cancer). The

Table 4 Median patient survival following PCN placement according to primary site of malignancy and occurrence/non-occurrence or preceding cancer treatment

Primary malignancy	Median survival (days) following PCN placement		P-value
	Cancer treatment prior to PCN placement	No cancer treatment prior to PCN placement	
Bladder	19	137	< 0.05
Prostate	88.5	87	NS
Gynaecological	144	280	NS
Colorectal	64	33	NS
Breast	814	–	NS

NS, not significant.

overall median survival from PCN insertion until death was 87 days (range, 12–814 days). The median survival was still 87 days if those still alive at the end of the study period were excluded. Seven of the 32 patients (21.9%) died during the same hospital admission as when the PCN was sited.

When these data are broken down for each group of malignancies (Table 3), we observed that the median survival for those with primary gynaecological malignancies is almost 4 times that of those with bladder cancer ($P < 0.05$). The absence of biochemical renal failure (in the presence of bilateral upper tract dilatation) did not appear to confer any additional survival benefit.

Patients who had undergone treatment for bladder cancer prior to PCN insertion survived for statistically shorter periods than those presenting with uraemia due to bladder cancer *de novo*. This was not seen with other malignancies (Table 4).

Overall, each patient spent a mean of 29 days (range, 1–82 days) in hospital from the time of PCN placement until death or the end of the study period (33.3%). Each patient was on average re-admitted to hospital 1.6 times (range, 0–6 times) until death, with 0.8 re-admissions per patient being directly related to the PCN or ureteric stent. Of 26 re-admissions, 14 (53.8%) arose due to elective nephrostomy replacement and 12 (46.2%) were due to non-elective procedures (*e.g.* dislodgement, blockage).

If the four criteria defining 'useful quality of life' as suggested by Grabstald and McPhee⁴ were applied to this cohort of 32 patients, 53.1% (17 of 32) would not fulfil such criteria.

Twelve patients died in hospital, 4 in hospice care and 11 at home, with 5 patients still alive at the end of the study period.

Discussion

This retrospective study revealed that in this cohort of patients, predominantly locally advancing pelvic malignancies gave

rise to bilateral ureteric obstruction. The overall median survival following placement of PCNs for malignant ureteric obstruction was 87 days. Those with underlying gynaecological malignancies survived approximately 4 times as long as those with underlying bladder cancer. It is not clear, however, whether this represents an effect of the underlying tumour biology or is indeed a real effect of survival enhancement by upper tract decompression. It would appear from these data that malignant ureteric obstruction arising as a result of primary bladder cancer carries an extremely poor prognosis. However, patients presenting *de novo* with ureteric obstruction as a result of bladder cancer survived statistically longer than those in whom the diagnosis was already known and treatment already administered. This effect was not seen in the other malignancy cohorts analysed.

Other published series have reported median survivals ranging from four⁵ to six^{6,7} months. These series, however, included patients with benign ureteric obstruction⁶ and gynaecological malignancy,^{5,7} which we suggest perform more favourably than other pelvic malignancies.

Following PCN placement, only 34.4% of patients were able to have their PCNs completely converted to internal ureteric stents. The remaining patients were left with at least one PCN *in situ*. This figure is similar to the 58% of patients quoted by Feng *et al.*⁸ On average, up to one-third of patients' subsequent life following PCN placement was spent as a hospital in-patient.

The issue, therefore, of decompression of an obstructed urinary tract in a patient with advancing pelvic malignancy still remains a difficult clinical situation. The decision should

be made by the patient and his/her family based on information from the supervising clinician regarding potential treatment options still available and general prognosis. Even with urinary tract decompression however, the prognosis remains generally poor.

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