# PERCUTANEUS NEPHROSTOMY IN PATIENTS WITH OBSTRUCTIVE UROPATHY DUE TO MALIGNANCY: A SURVIVAL ANALYSIS

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***ABSTRACT***

***Objective:*** *To find out effectiveness of percutaneous nephrostomy (PCN) and patient survival rate as palliative decompression of the obstructed urinary system due to malignancy (urogenital neoplasias).* ***Materials & Methods:*** *A cohort retrospective study was performed with 76 patients (58 female and 18 male) with malignancy process who were undergoing percutaneous nephrostomy during January 2009 – December 2012, in Sardjito General Hospital Yogyakarta. Survival analysis was done by Kaplan-Meier method and differences were assessed using the log-rank test.* ***Results:*** *There was no procedure-related mortality. The mean of age was 49.14 years. The primary tumoral site was the uterine cervix in 56.6 %, the bladder in 17.1 %, the prostate in 2.6% and other sites (intestinal, ovarium and other malignancies caused obstructive uropathy) in 23.7%. The patients died during the hospitalization period due to advanced neoplasia are 17.1%. The mortality rate was higher in patients with interval between diagnose of obstructive uropathy and nephrostomy > 7 days (HR = 5.7; 95% CI 4.5-6.9; p = 0.001) and in those who required hemodialysis before the procedure (HR = 6.1; 95% CI 4.7-7.4; p = 0.001). The survival rate was 55.2% (42/76) at 6 months and 32.9% (25/76) at 12 months. The percentage of the lifetime spent in hospitalization was 17.1% (13/76). There are no differences on survival rate in that patients based on neoplasias type and age.* ***Conclusion:*** *The urinary obstruction must be immediately relieved. The percutaneous nephrostomy is a safe and effective method for relief the obstruction. Patient with hemodialysis before the procedure had a poor prognosis.*

***Keywords:*** *Nephrostomy, percutaneous, obstructive uropathy, urogenital neoplasias, malignancy.*

***ABSTRAK***

***Tujuan:*** *Untuk mengetahui efektivitas nefrostomi perkutan (PCN) dan angka kesintasan pasien sebagai tindakan dekrompresi paliatif pada saluran kemih yang tersumbat akibat keganasan (neoplasia urogenital).* ***Bahan & cara:*** *Sebuah studi kohort retrospektif pada 76 pasien (58 wanita dan 18 pria) dengan proses keganasan yang menjalani nefrostomi perkutan selama periode Januari 2009 - Desember 2012, di RSUP Sardjito, Yogyakarta. Rerata umur pasien adalah 49.14 tahun. Lokasi tumor primer berasal dari serviks uterin (56.6%), kandung kemih (17.1%), prostat (2.6%), dan lokasi lainnya (23.7%). Analisis kesintasan dengan menggunakan metode Kaplan Meier dan dinilai dengan tes log-rank.* ***Hasil:*** *Tidak ada mortalitas akibat prosedur. Pasien yang meninggal selama perawatan di Rumah Sakit akibat neoplasia lanjut adalah 17.1%. Angka mortalitas lebih tinggi pada pasien dengan interval diantara diagnosis dan nefrostomi > 7 hari (HR = 5.7; 95% CI 4.5-6.9; p = 0.001), dan pada mereka yang membutuhkan hemodialisis sebelum prosedur (HR = 6.1; 95% CI 4.7-7.4; p = 0.001). Angka kesintasan pada 6 bulan adalah 48.7% dan pada 12 bulan adalah 32.9%. Persentase angka lama hidup selama perawatan inap adalah 28.9%. Tidak dijumpai adanya perbedaan pada angka kesintasan pasien berdasarkan pada jenis neoplasia dan umur.* ***Simpulan:*** *Uropati obstruktif harus sesegera mungkin dibebaskan. Nefrostomi perkutan adalah metode yang aman dan efektif untuk membantu membebaskan sumbatan. Pasien dengan hemodialisis sebelum prosedur mempunyai prognosis yang buruk.*

***Kata kunci:*** *Nefrostomi, perkutan, uropati obstruktif, neoplasia urogenital, keganasan.*

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## INTRODUCTION

Percutaneous nephrostomy (PCN) as a direct drainage into the kidney was first reported by Goodwin in 1955.[1-4] This procedure was rarely used until 1976. As a urinary drainage method, some studies explained that percutaneous nephrostomy provide better urine flow compared with an internal stent.[1] Urinary tract obstruction is the most frequent disease in urology. Loss of renal function can be avoided if the obstruction was handled quickly and appropriately. Obstruction may be due to a blockage in intraluminal, intramural and extramural. In young and middle aged patients, kidney stone is a major etiologic factor of obstruction. In gynecology, obstetric surgery and trauma can lead to an obstructive uropathy. In elderly, malignancies are a cause for obstructive uropathy.[5]

Acute obstructive uropathy is the major cause for renal disorder worldwide that leads to end-stage renal failure if leaved untreated. Urinary tract obstruction together with the process of infection is most often consequence for irreversible renal parenchyma damage. Hydronephrosis has been used to describe the distention of the renal pelvis due to obstruction, infection or trauma. This refers to the widening of the renal pelvis and calix resulting progressive atrophy and renal cystic parenchyma enlargement.[6] Changes in morphology and kidney damage in response to obstruction depends on the onset, duration and degree of obstruction.[5,6] The exact period for kidney damage in humans due to obstruction currently unknown. In mice, it takes around 4 months, rabbits 10 months and dogs 18 months or more after the onset of obstruction.[6]

Blood urea nitrogen (BUN) and serum creatinine level are a good index to assess of obstruction. Percutaneous nephrostomy drainage for urinary tract obstruction with local anesthesia has a low morbidity and failure rate, and therefore become the technique of choice.[5]

Although there were currently progress in treatment, radiotherapy and chemotherapy in urogenital surgery, gynecology and gastrointestinal tumors, there was no doubt that neoplasm often caused obstructive uropathy due to local invasion or metastasis. Palliative decompression with nephrostomy is a widely used method to preserve renal function in elective and emergency.[7] Before the advance of endourology techniques, advanced stage patients with local or urogenital system metastatic who were undergoing open nephrostomy had a high morbidity and mortality rate. Even after the advent of percutaneous nephrostomy, morbidity and mortality remain high in this patient group. The main complications of percutaneous nephrostomy are include urinary tract infection, obstruction and detached of nephrostomy catheter.[2]

Neoplasia location is a significant factor that can affect the survival rate of patients. Romero et al mentioned that urinary tract obstruction associated with prostate cancer and uterine cervix cancer usually have better outcomes than other types of neoplasia, with the increase in 1 year or more survival in 60% patients. Cervical carcinoma patients showed a better survival rate than prostate adenocarcinoma and bladder carcinoma. All patients with advanced and aggressive prostate cancer died during hospitalization for percutaneous nephrostomy. This study showed a better prognosis for prostate cancer patients who had not received hormone therapy. Other studies recommend avoid ureteric drainage for obstructive uropathy patients during hormone therapy.[2]

Urinary tract obstruction is a common complication that occurs in malignancy in pelvic region. The obstruction may be due to direct compression or tumor invasion, compression of soft tissue expansion and retroperitoneal lymph node metastasis. Patients with bilateral obstruction can cause a rapid progressive renal failure and lead to death before getting any interventions. Even with intervention, life expectancy can be very short about 3-7 months, although some patients may live longer. Optimal management for patients with worsening renal function in short term remains unclear. Percutaneous nephrostomy (PCN) or retrograde ureteral stent can be used to decompress the urinary tract and save lives. Some studies recommend retrograde ureteric stent insertion in all patients while other studies suggest primary nephrostomy followed by antegrade stent if possible. In these patients, it is important to make appropriate clinical and fluid balance assessment to decide whether the decompression should be done as soon as possible or not.[8]

## OBJECTIVE

In this study, we aim to assess the effectiveness and survival time in obstructive uropathy patients due to malignancy after percutaneous nephrostomy in Sardjito General Hospital Yogyakarta.

## MATERIAL & METHOD

Design of this study is a retrospective cohort study with survival analysis to determine the effectiveness of percutaneous nephrostomy (PCN) and the survival rate of patients with palliative decompression of urinary tract obstruction due to malignancy (urogenital neoplasia) from Dr. Sardjito Hospital medical records from January 1, 2009 until December 31, 2012.

There were 76 patients with obstructive uropathy due to malignancy (urogenital neoplasia) who underwent percutaneous nephrostomy. The inclusion criteria of this study was obstruction uropathy patients who underwent percutaneous nephrostomy that have a complete medical records, obstructive uropathy patients due to malignancy (urogenital neoplasia), and patients who had follow-up more than 1 year after percutaneous nephrostomy. Patients with other causes of obstructive uropathy, escaped follow-up and were not willing to participate in the study were excluded.

This study was using Spearman analysis and survival analysis with Kaplan-Meier method. Differences were assessed using the log-rank test. The entire analysis was done using SPSS version 18.

## RESULTS

Retrospective co-hort study had been conducted in 76 patients (58 women and 18 men) with malignancy who underwent percutaneous nephrostomy during January 2009 - December 2012 at Dr. Sardjito Hospital. No deaths related to the procedure. The mean age was 49.14 years. Malignancy locations were 56.6% in cervix uteri, 17.1% in the bladder, 2.6% in prostate and 23.7% others (bowel, ovarian and other malignancy that caused obstructive uropathy). 17.1% patients died during the hospitalization period. (table.1). From diagram 1 and 2 can be concluded that there was no difference in patients' survival rate after percutaneous nephrostomy based on malignancy type and age.

**Table 1.** Characteristics of the study variables.

| Variabel | | P |
|---|---|---|
| Age | 49.14 ± 11.67 | |
| Length of hospitality | 26.03 ± 17.30 | |
| Blood urea nitrogen (BUN) | | |
| Prior to surgery | 67.46 ± 37.97 | 0.007* |
| After surgery | 35.31 ± 23.02 | |
| Creatinine | | |
| Prior to surgery | 10.45 ± 6.89 | < 0.001* |
| After surgery | 4.40 ± 3.61 | |
| Sex N (%) | | |
| Man | 18 (23.7) | |
| Female | 58 (76.3) | |
| Death during treatment N (%) | | |
| Yes | 13 (17.1) | |
| Not | 63 (82.9) | |
| Dialysis N (%) | | |
| Yes | 42 (55.3) | |
| Not | 34 (44.7) | |

*Spearman

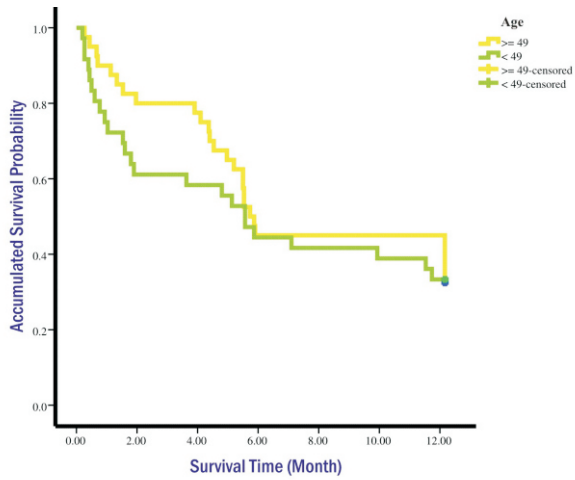


**Diagram 1.** Analysis of survival by age.

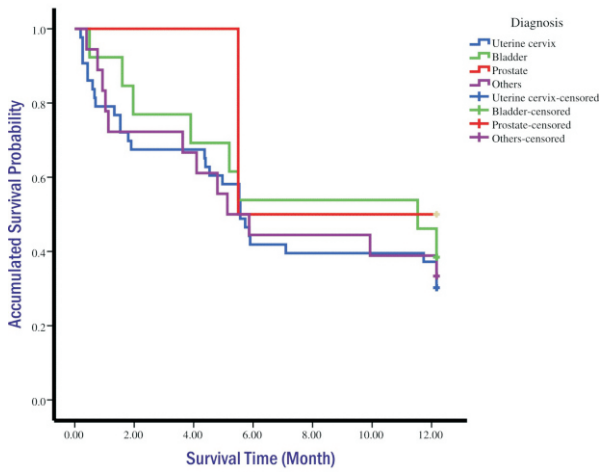


**Diagram 2.** Survival analysis based on the location of the malignancy.

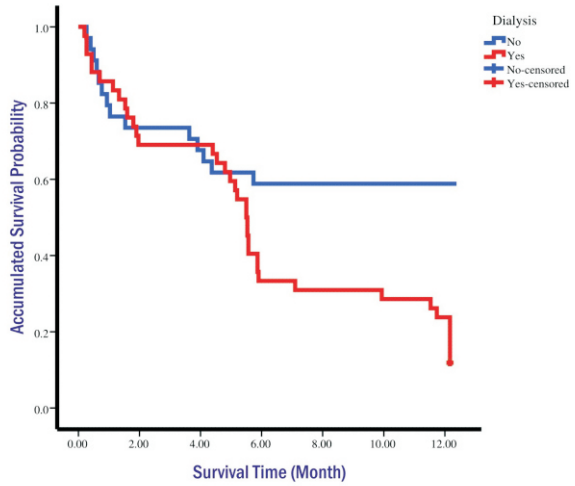


**Diagram 3.** Survival analysis based on dialysis before percutaneous nephrostomy procedures.

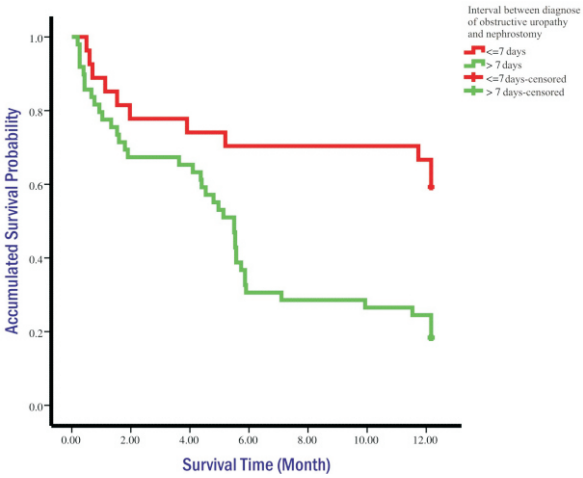


**Diagram 4.** Survival analysis based on interval between diagnosis and percutaneous nephrostomy.

The mortality rate was higher in patients with the interval between diagnosis and nephrostomy more than 7 days (HR = 5.7, 95% CI 4.5 to 6.9, p = 0.001) and patients who undergoing hemodialysis before the procedure (HR = 6.1, 95% CI 4.7 to 7.4, p = 0.001). The survival rate was 48.7% for 6 months and 32.9% for 12 months. Survival rate in hospitality was 28.9% (table 2).

## DISCUSSION

Urinary obstruction is a common complication in urogenital malignancies and cancer metastasis to the pelvic area. Patients with bilateral urinary tract obstruction can develop into renal failure and died before intervention. Life expectation is still low with an average of 3-7 months even after intervention although some patients have a longer survival.[8-10] In this study, 76 patients (58 women and 18 men) had age average of 49.14 years. Locations of the most common malignancy were cervix uteri (56.6%). Romero et al reported that the major cause of obstruction was cervical cancers (53.5%) in 43 patients who underwent percutaneous nephrostomy in Sao Paulo Hospital, Brazil.[2] The same thing was reported by Jalbani et al. which the major cause of obstruction is cervical cancer (37.5%) from 40 patients with obstructive uropathy in Chandka Hospital, Pakistan.[3] However, Misra et al. reported different things that the major cause of obstruction in patients who underwent percutaneous nefrostomy was prostate cancer (55%) in 22 patients at the Royal Sussex Country Hospital, UK.[8]

This study found that there was no difference in patients' survival rate after percutaneous nephrostomy based on the type of malignancy and age. Other studies showed different thing that there were significant differences between tumor location and age.[2] Patients with cervical cancer have higher life expectancy than the bladder and prostate cancer, in which all patients with prostate cancer died during treatment after

**Table 2.** Characteristics of patient survival.

| Diagnosis | n (%) | Death during treatment n (%) | 6 months survival n (%) | 1 year survival n (%) |
|---|---|---|---|---|
| Cervical cancer | 43 (56.6) | 8 (10.5) | 24 (31.5) | 13 (17.1) |
| Bladder cancer | 13 (17.1) | 1 (1.3) | 9 (11.8) | 5 (6.5) |
| Prostate cancer | 2 (2.6) | 0 (0) | 2 (2.6) | 1 (1.3) |
| Others | 18 (23.7) | 4 (5.2) | 7 (9.2) | 6 (7.8) |

percutaneous nephrostomy. Younger patients (< 52 years) relatively have a great immunity, metabolic and response for healing after percutaneous nephrostomy.[2,11] In other studies, patients with age < 55 years old have a better life expectancy than older age. Lee et al. reported a lower mortality rate and a long life expectancy on patients < 52 years old.[3]

Urogenital malignancy patients with early diagnosed may allow to determine the degree of malignancy and appropriate treatment that can reduce the progression of cancer. Therefore urinary obstruction can be slowed.[12] Romero et al. reported that there was no significant difference between patients who had been newly diagnosed or previously diagnosed after percutaneous nephrostomy.[2] However, this study showed different thing, death rate was higher in patients with the interval between diagnosis and nephrostomy > 7 days (HR = 5.7, 95% CI 4.5 to 6.9, p = 0.001).

Patients undergoing hemodialysis before the procedure had a higher mortality rate compared with patients who did not undergo hemodialysis (HR = 6.1, 95% CI 4.7 to 7.4, p = 0.001). It can be caused due to the patients who underwent hemodialysis usually have poor clinical conditions such as uremia. However, another study mentioned that hemodialysis immediately prior to percutaneous nephrostomy increased mortality rate during treatment.

## CONCLUSION

The mortality rate was higher in patients with interval between diagnosis and nephrostomy > 7 days and in patients undergoing hemodialysis before percutaneous nephrostomy. There was no difference in survival rate based on the type of malignancy and age.

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