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PERCUTANEOUS NEPHROSTOMY FOR OBSTRUCTIVE UROPATHY MANAGEMENT IN CERVICAL CARCINOMA

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ABSTRACT

Objective: This study aims to evaluate the role of percutaneous nephrostomy (PCN) in treating patients with hydronephrosis due to complications of cervical cancer. **Material & Methods:** This research was a retrospective analytical cohort study. All medical record data of patients with a diagnosis of cervical carcinoma and undergoing percutaneous nephrostomy at Soetomo General Hospital in 2017–2020 were collected and analyzed. **Results:** A total of 45 subjects were included in this research. The mean age of the subjects was 55.07, with the youngest being 34 years old and the oldest being 75 years old. Most of the subjects were stage IIIB cervical carcinoma (95.56%), and the rest were stage IIB. Contralateral PCN was required in 75.56% of subjects, and the rest only required unilateral PCN. Before being PCN performed, some patients had moderate HN (64.4%), and after the patients underwent PCN procedure, the majority of patients had the HN resolved (48.89%) ($p < 0.05$). There was also an improvement in the laboratory parameter of urea and creatinine serum before and after PCN ($p < 0.05$). **Conclusion:** PCN improves the laboratory and radiologic parameters of cervical cancer patients with hydronephrosis.

Keywords: Cervix cancer; percutaneous nephrostomy; hydronephrosis; survival; mortality.

ABSTRAK

Tujuan: Penelitian ini bertujuan untuk mengevaluasi peran nefrostomi perkutan (PCN) dalam mengobati pasien dengan hidronefrosis akibat komplikasi kanker serviks. **Bahan & Cara:** Penelitian ini merupakan penelitian kohort analitik retrospektif. Semua data rekam medis pasien dengan diagnosis karsinoma serviks dan menjalani PCN di RSUD Dr. Soetomo tahun 2017 – 2020 dikumpulkan dan dianalisis. **Hasil:** Sebanyak 45 subjek dilibatkan dalam penelitian ini. Rerata usia subjek adalah 55.07, dengan usia termuda 34 tahun dan tertua 75 tahun. Subjek terbanyak adalah karsinoma serviks stadium IIIB (95.56%), dan sisanya stadium IIB. PCN kontralateral diperlukan pada 75.56% subjek, dan sisanya hanya membutuhkan PCN unilateral. Sebelum dilakukan PCN, beberapa pasien memiliki derajat HN sedang (64.4%), dan setelah pasien menjalani prosedur PCN, sebagian besar pasien mengalami perbaikan HN (48.89%) ($p < 0.05$). Terdapat juga peningkatan parameter laboratorium serum ureum dan kreatinin sebelum dan sesudah PCN ($p < 0.05$). **Simpulan:** Prosedur PCN memperbaiki parameter laboratorium dan radiologis pasien kanker serviks dengan hidronefrosis.

Kata Kunci: Kanker serviks, perkutaneus nefrostomi, hidronefrosis, kelangsungan hidup, kematian.

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INTRODUCTION

Cervical cancer is one of the most common cancers in women globally. According to the latest data from Global Cancer Observatory (GLOBOCAN), there was a total of 604,000 new cases of cervical cancer in 2020. This malignancy is also regarded as one of the leading causes of cancer death in various countries.¹ Several complications can occur as a result of this cancer, such as pain, lymphedema, bleeding disorders, fistulas, and

hydronephrosis. Hydronephrosis is a common complication that arises in patients with cervical cancer, especially in patients who have had advanced cervical cancer.²

The underlying mechanism of hydronephrosis in advanced cervical cancer patients is due to lymph node involvement, inflammation, infiltration, or scarring in the urogenital system. If the hydronephrosis is left untreated, it could damage the kidney and cause renal failure. Renal failure in cervical cancer, which is preceded by

hydronephrosis, is regarded as one of the most common causes of death from cervical cancer.³ Therefore, cervical cancer patients sometimes require stent placement or urinary diversion procedures such as Percutaneous Nephrostomy (PCN) to alleviate obstructive symptoms and improve clinical outcomes.⁴ There are currently no definitive guidelines for performing PCN in patients with advanced cervical cancer. Several studies from various countries showed that PCN is a safe and effective method for urinary diversion in patients with advanced cervical cancer.⁵⁻⁷ However, there is still a lack of data on the outcome of cervical carcinoma patients undergoing PCN in Indonesia.

OBJECTIVE

In this study, we aim to evaluate the clinical outcomes of cervical cancer patients undergoing PCN in Indonesia.

MATERIAL & METHODS

This research was a retrospective analytical cohort study. All data were collected from outpatient clinic patient's records by searching the unique patient's identification number from the electronic medical record in a tertiary hospital in Indonesia. The inclusion criteria consist of patients diagnosed with cervical cancer who had a complication of hydronephrosis and underwent PCN procedure during 2017 - 2020. The data were collected using the total sampling technique. In this research, we collected various clinical characteristics data of the patients such as patients age, diagnosis, cervical cancer stage, preoperative and postoperative data of laboratory and radiologic examination.

The collected data are grouped and will be displayed descriptively in the form of tables and narratives. Cancer staging was classified using the Tumor, Node, and metastasis (TNM) and The International Federation of Gynecology and Obstetrics (FIGO) classification. The degree of hydronephrosis was classified according to the Society of Fetal Urology (SFU) grading. All data were extracted using Microsoft Excel 2020 software (Microsoft, USA). Before analyzing the outcome of the patients, we evaluate the distribution of the collected data using Shapiro-wilk methods.

The Wilcoxon rank-sum test was used to analyze continuous data comparing two groups with an abnormal distribution. Otherwise, the data were

analyzed using Independent T-Test.⁸ If the p-value is less than 0.05, we considered the data to be statistically significant. Data were analyzed using statistical software SPSS version 25 (IBM, Microsoft, USA). The research related to humans has been conducted in accordance with all relevant national regulations, institutional policies, and the tenets of the Helsinki Declaration, and has been ethically approved by The Hospital's Institutional Review Boards (Ethical No. 0080/129/4/VI/2020).

RESULTS

A total of 45 data of cervical cancer patients who undergoing PCN were collected and analyzed. Table 1 shows the baseline characteristics of the patients. Cervical cancer patients who underwent PCN had an average age of 55.07 years with the range of 34 years to 75 years. Forty-three patients (95.5%) had a Stage IIIB cervical cancer, and 2 patients (4.4%) had a stage IIB cervical cancer.

Table 1. Baseline characteristics of the participants.

Variable	n (%)
Age group	
<40 years	3 (6.7%)
41-50 years	12 (26.7%)
51-60 years	15 (33.3%)
>60 years	15 (33.3%)
Cancer Stage	
IIB	2 (4.4%)
IIIB	43 (95.6%)
Comorbidity	
Hypertension	5 (13.2%)
Diabetes Mellitus	24 (63.2%)
Chronic Kidney Disease	9 (23.7%)
Side of PCN	
Left	3 (6.7%)
Right	8 (17.8%)
Bilateral	34 (75.6%)
Outcome	
Live	19 (42.2%)
Deceased	26 (57.8%)

There were 24 patients (63.2%) who had diabetes mellitus, nine patients (23.7%) had chronic kidney disease (CKD), and five patients (13.2%) had hypertension comorbidity. Bilateral PCN were

Table 2. Outcome of the participants after PCN.

Variable	Before PCN (%)	After PCN (%)	p value
Ultrasonography			
No	0 (0%)	22 (48.9%)	<0.001
Hydronephrosis			
Mild	1 (2.2%)	4 (8.9%)	
Moderate	28 (64.4%)	10 (20%)	
Severe	16 (33.3%)	9 (22.2%)	
Laboratory Examination			
BUN (mg/dL)	64	42.6	<0.001
SCr (mg/dL)	10	4	<0.001

performed in 34 patients (75.6%) and unilateral PCN were performed in 11 patients (24.4%). The majority of patients who undergo PCN procedure had moderate to severe hydronephrosis (64.4% and 33.3%). The patients had a significant reduction of Blood Urea Nitrogen (BUN) (64 mg/dL vs. 42.6 mg/dL, $p<0.001$) and Serum Creatinine (sCr) (10 mg/dL vs 4 mg/dL, $p<0.001$) after the PCN placement. Result from our analysis also showed that there was a significant reduction of severe and moderate hydronephrosis after the patients had a urinary diversion using PCN ($p<0.001$). There was a total of 26 patients (57.8%) died during the study follow-up as shown in Table 2.

DISCUSSION

Persistent obstruction in the urogenital system resulting from cancer infiltration could increase the intraluminal hydrostatic pressure and cause a dilatation in the kidney, which is commonly regarded as Hydronephrosis. This dilatation disrupts not only the anatomy of the organ but also the function of the organ. The prolonged increase of the intraluminal hydrostatic pressure might lead to damage in the nephron cells and ultimately result in the reduction of nephron filtration capacity and renal failure.⁹⁻¹⁰ Previous studies by Pergialiotis et al. suggested that patients with cervical cancer had a predisposition of hydronephrosis and acute kidney injury (AKI) due to the cancer infiltration, which is associated with a low survival rate.^{4,11}

Most of the patients with advanced-stage cervical cancer had an involvement in the surrounding organs, including the urogenital system.¹¹ The previous study showed that hydronephrosis complications with varying degrees

are found in 43.7% of patients with cervical cancer.¹² In this research, we retrospectively reviewed four years of data of cervical cancer patients with hydronephrosis with varying degrees in a tertiary hospital in Indonesia. A total of 45 patients were included in the data analysis with an average of 55.07 years old. This result is consistent with the finding of a previous study by White et al., which reported that cervical cancer most commonly affects elderly women.

The incidence of hydronephrosis complications is strongly correlated with the cancer stage as the patients with higher cancer stage would theoretically have a higher degree of cancer cell infiltration.¹¹ Currently, there was no definitive guidelines for the treatment of hydronephrosis in patients with advanced cervical cancer. The evidence on the best choice of urinary diversion methods in cervical cancer with hydronephrosis is still lacking. Patients with advanced cervical cancer mostly undergo surgical procedures such as DJ-stent placement or PCN placement for urinary diversion.¹¹ However, a previous study by Ku et al. reported that treatment success rate was significantly lower in patients undergoing stent procedure compared to the PCN.¹³

All cervical cancer patients included in this research underwent PCN procedure as the method of urinary diversion for alleviating the damage caused by the hydronephrosis. Before receiving the intervention, the majority of patients reported to have a moderate to severe degree of hydronephrosis (64.4%, 33.3%, respectively). After the placement of PCN, the patients showed a significant reduction in the degree of hydronephrosis, in which 48.9% of them no longer had hydronephrosis ($p<0.05$). In addition, the analysis on the laboratory examination

revealed that patients who underwent PCN had a significant reduction of the average BUN level from 64 mg/dL to 42.6 mg/dL ($p < 0.05$).

Furthermore, the average serum Creatinine level was reduced from 10mg/dL to 4mg/dL after the patients had the PCN placed for urinary diversion ($p < 0.05$). PCN would provide the passage for urinary output and therefore reducing the intraluminal hydrostatic pressure in the urogenital system.¹⁴ These results imply that the PCN procedure had an important role in improving the clinical outcomes of cervical cancer patients with hydronephrosis. Even though this procedure has shown to improve the patient's clinical, laboratory, and radiology parameters, the mortality rate is still high among the patients (57.8%). This high mortality rate might not only be associated with the occurrence of hydronephrosis and renal failure but also associated with other factors and the nature of the advanced cancer disease, which is associated with high mortality.¹⁹ This research has several limitations. The number of subjects is limited which makes this research is difficult to be generalized to larger population. Furthermore, this research has not been able to determine the other factors that were associated with mortality. Future multicenter studies with a larger population and longer duration of follow-up are required to get a more objective assessment.

CONCLUSION

PCN procedure significantly improves the laboratory and radiologic parameters of cervical cancer patients with hydronephrosis.

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