

ORIGINAL RESEARCH

Impact of percutaneous nephrostomy on clinical outcomes in advanced carcinoma cervix with obstructive uropathy at Kenyatta national hospital

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Abstract

This retrospective study aimed to determine the impact of percutaneous nephrostomy (PCN) on the quality of life (QOL) and kidney function of women with advanced carcinoma of the cervix and obstructive uropathy in Kenyatta National Hospital by utilizing data from 2016 to 2019 and a follow-up patient interview in 2020. Sociodemographic data from patient records was reported as descriptive statistics. Serum urea, hemoglobin and creatinine levels before PCN and 72 hours, 1 month and 3 months after PCN were obtained. The changes were analysed using a paired *t*-test. Quality of life data before and after PCN tube insertion were collected using the structured Functional Assessment of Cancer Therapy and a cervix cancer-specific subscale (FACT-Cx) questionnaire, responses scored and an aggregate tallied. The QOL and kidney function data variables before and after PCN tube insertion were compared with statistical significance set at $p < 0.05$. Fifty eight study participants were enrolled, with an 80% power to detect a 5 fold change in kidney function. Percutaneous nephrostomy had an overall improvement in the quality of life (FACT-Cx total $p = 0.041$) with changes in aspects of physical well-being ($p = 0.018$) and additional concerns sexual function, self-esteem, appearance, urinary function, appetite and gastrointestinal function ($p \leq 0.001$); but none in other aspects of the tool. Improvement was noted 72 hours after PCN tube insertion in 62% of patients' urea ($p = 0.033$) and 64% of creatinine ($p \leq 0.001$) levels but not sustained after 1 month and did not revert to normal levels. Hemoglobin levels did not improve. Percutaneous nephrostomy was found to have a short-term added value in management of women with obstructed uropathy in advanced carcinoma of the cervix as two aspects of their QOL improved while serum urea and creatinine levels improved slightly with no functional recovery.

Keywords

Carcinoma cervix; Percutaneous nephrostomy; Urinary obstruction; Quality of life; Kidney function; FACT-Cx

1. Introduction

Carcinoma of the cervix is the second most frequent cancer in women in Kenya and the most prevalent among women between 15 and 44 years of age [1]. It has a mortality rate of 11.9% in Kenya [2] and 3.2% worldwide [3]. It often causes obstructive uropathy in 11–44% of patients [4] which is often the ultimate cause of demise due to renal failure. The cumulative survival rate is 4–37% in advanced carcinoma of the cervix [5]. A percutaneous nephrostomy tube is inserted to alleviate urinary obstruction. The objective would be to improve the kidney function and quality of life of the patient.

In Sub Saharan Africa, women with advanced carcinoma cervix have a poorer quality of life (QOL) than women with early disease [6]. Some studies have shown a worsening QOL in patients with prostate cancer after percutaneous nephros-

tomy [7] and an increased level of anxiety [8]. Kidney function is found to improve with percutaneous nephrostomy insertion by 50–62% [9, 10] with no evidence of prolonged survival [11].

Although percutaneous nephrostomy is being embraced as a palliative management of advanced carcinoma of the cervix with obstructive uropathy, little is known about its impact on the QOL in these women. This study, therefore assessed the overall benefit of percutaneous nephrostomy by investigating its impact on both the kidney function and QOL in women with advanced carcinoma of the cervix and obstructive uropathy.

2. Methods

2.1 Study design

This retrospective study utilized secondary analysis of routine patient data of women undergoing cervical cancer care in

Kenyatta National Hospital from 2016 to 2019 and a follow-up survey data from the patients conducted in 2020. They had obstructive uropathy managed by a percutaneous nephrostomy tube inserted under ultrasound guidance.

2.2 Study site

The Kenyatta National Hospital (KNH) is a national referral, teaching and research hospital that provides care to women with advanced cases of carcinoma of the cervix.

2.3 Study population

Participants included those with (1) a confirmed histologic diagnosis of advanced carcinoma of the cervix (stage >3B), (2) obstructive uropathy as determined by renal ultrasound findings of hydronephrosis/hydroureter, (3) abnormal kidney function tests (urea >8.3 mmol/L and creatinine >120 μ mol/L), (4) had undergone percutaneous nephrostomy placement and (5) could be reached by phone to answer the questionnaire. The records with incomplete laboratory data were excluded.

2.4 Power calculation

Given the available sample size of 58, we had an 80% power to detect a 5-fold change in kidney function at three time frames: 72 hours (baseline n = 30), 1 month (baseline n = 28), 3 months (baseline n = 24).

2.5 Instruments

The QOL was assessed by use of the Functional Assessment of Cancer Therapy and a cervix cancer-specific subscale (FACT-Cx) tool which is a universally applied measure developed and licensed by FACIT.org (Functional Assessment of Chronic Illness Therapy). It comprises 42 items with a 5-point (0–4: “Not at all” to “very much”) Likert scale and is categorized into 5 domains: physical well-being (PWB), social/family well-being (SWB), emotional well-being (EWB), functional well-being (FWB) and cervical cancer subscales (CxCS). The range of scores for these domains was 0–28, 0–28, 0–24, 0–28 and 0–60, respectively. The range of total score (FACT-Cx total) was 0–168 and a higher score means a higher quality of life.

2.6 Variables

The dependent variables were the recorded changes in the quality of life and kidney function. The independent variables were the factors stemming from the urinary obstruction caused by the advanced carcinoma of the cervix.

2.7 Data collection

The patient records were reviewed to obtain sociodemographic data and co-morbidity parameters like hypertension, human immunodeficiency virus (HIV) infection, deep vein thrombosis (DVT) among others.

Serum urea, hemoglobin and creatinine levels before percutaneous nephrostomy and 72 hours after, 1 month after and 3 months after the procedure were obtained. This data was filled in a data abstraction form.

Data on the quality of life before and after percutaneous

nephrostomy insertion, were collected by use of the structured Functional Assessment of Cancer Therapy and a cervix cancer-specific subscale (FACT-Cx) questionnaire in either Kiswahili or English by phone after obtaining verbal consent from the patient. The responses were then scored, and an aggregate reported for the QOL before and after percutaneous nephrostomy.

2.8 Statistical analysis

All data abstraction forms were checked for completeness prior to entry into an MS Excel database and later analyzed using Statistical Package for Social Scientists (SPSS).

Descriptive statistics was used to report bio-demographic patient characteristics.

The impact on the quality of life was assessed and scored using the Functional Assessment of Cancer Therapy and a cervix cancer-specific subscale (FACT-Cx) tool and presented as frequencies and proportions. The change in kidney function was analysed using a paired *t*-test and presented as a mean with standard deviation. The quality of life and kidney function variables were compared before and after percutaneous nephrostomy insertion by analyzing the data using a paired sample *t*-test. Statistical significance was set at 95% and used to test the strength of association between the two groups with statistical significance set at $p < 0.05$.

3. Results

During the study period, 1365 women had advanced carcinoma of the cervix and obstructive uropathy out of which 371 met the inclusion criteria. Fifty eight study participants were ultimately enrolled into the study, and this represented 76% of the study population (Fig. 1). At the end of the 4-year analysis, it was noteworthy that there was a 43.1% survival rate.

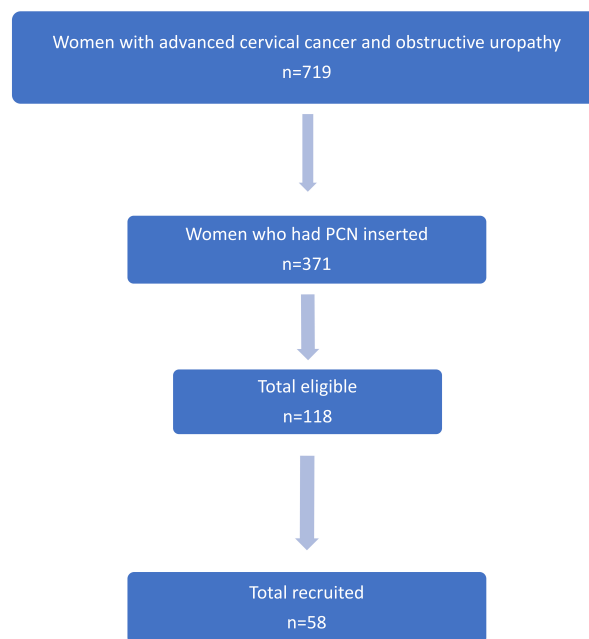


FIGURE 1. Study flow chart. PCN: Percutaneous nephrostomy.

3.1 Characteristics of study population

The mean age was 51.6 years (SD 11.2). Eighty-five of the participants were 30–69 years and 61% were married. Thirty nine women (67.2%) had co-morbidities, 10 (17.2%) being hypertensive and 9 (15%) with Human Immunodeficiency Virus (HIV) infection. Bio-demographic characteristics are listed in Table 1.

TABLE 1. Bio-demographic characteristics of study participants.

Characteristics	Frequency (%)
Age (n = 58)	
<30	2 (3)
30–39	5 (9)
40–49	16 (28)
50–59	19 (33)
60–69	13 (22)
≥70	3 (5)
Marital status	
Single	13 (23)
Married	35 (61)
Separated	2 (4)
Not documented	8 (12)
Comorbidity ¹	
Yes	35 (60)
• Hypertension	10 (17)
• Human Immuno-virus	9 (15)
• Anaemia	8 (14)
• Vesicovaginal fistula	3 (5)
• Deep Vein Thrombosis	3 (5)
• Rectovaginal fistula	1 (2)
• Other	1 (2)
No	23 (40)

¹In co-morbidity, we excluded kidney injury as it was an inclusion criteria to this study.

3.2 Effect on quality of life

Percutaneous nephrostomy had an overall improvement in the quality of life (FACT-Cx total $p = 0.041$) with significant changes reported in aspects of physical well-being ($p = 0.018$) and additional concerns such as sexual function, self-esteem and appearance, urinary function, appetite and gastrointestinal function ($p \leq 0.001$). There was no improvement in the social/family well-being ($p = 0.066$), emotional well-being ($p = 0.454$) and functional well-being ($p = 0.200$) of the patient (Table 2).

3.3 Effect on kidney function

There was significant improvement in serum urea of 62% of the patients ($p = 0.033$) and creatinine of 64% of the patients

($p \leq 0.001$) levels 72 hours after percutaneous nephrostomy placement but not sustained after 1 month for urea levels. Serum urea and creatinine levels did not revert to normal levels of <8.3 mmol/L and <120 μ mol/L respectively. There was no improvement in hemoglobin levels after percutaneous nephrostomy (Table 3).

4. Discussion

Percutaneous nephrostomy in treatment of obstructive uropathy in women with advanced carcinoma of the cervix in KNH was associated with a transient improvement in, but not normalization of, kidney function by 48–64% and a slight improvement in the patient's physical well-being, sexual function, self-esteem, appetite and gastrointestinal function as indicators of QOL.

In regards to the sociodemographic characteristics of the study participants, 15% of the patients were found to have HIV. This was in line with other studies that found 15–27.5% of the patients with cervical cancer had HIV [12, 13]. In this study, 17.2% of the women had hypertension (HTN), similar to other studies quoting the most common co-morbidity as HTN at 21% [14].

Our study found that the improvement in kidney function occurred within 72 hours similar to studies that saw an improvement within the first 7–10 days after the procedure [15]. It was however not sustained one month after the procedure and the serum urea and creatinine levels never regressed to normal levels in line with other studies that showed little to no recovery of kidney function after 12 weeks [16] and necessitating an optimal percutaneous nephrostomy exchange interval of 60 days [17]. The short term improvement could be due to an expected instant functional recovery from the immediate diversion of the obstruction, but failure relief may require dialysis [15]. Improvement in renal function has been shown to not improve survival time in 65.7% of patients [18] possibly due to persistent uremia or disease progression. Studies found that patients with early disease benefited from percutaneous nephrostomy (PCN) while patients with advanced malignancies and non-urogenital malignancies like gynecological, colorectal, gallbladder or breast cancers showed poor response with non-urogenital malignancies having a median survival rate of about 25 days (range 7–80 days) [19].

The improvement of QOL in this study was contrary to other studies that showed no clinical significant difference [20] and no sustained improvement after three months [21]. Two aspects of the QOL were found to have improved and this change could be due to the advanced stage of the disease process as women with earlier disease tend to have a better QOL than late disease [22].

This study had several strengths and limitations. The strength of this study is the assessment of the impact percutaneous nephrostomy has on the kidney function while incorporating the patient's QOL in an already diseased group of women with late stage disease which provides a wholesome assessment of care.

A limitation of this study is possible recall bias from the interviews conducted as well as incomplete patient records from possibly having a study population lost to follow up due

TABLE 2. Change in QOL score pre and post intervention.

QOL Indicator	FACT-Cx score (Mean values \pm SD)		
	Before PCN	After PCN	<i>p</i> -value
Physical well being	13.3 \pm 4.9	18.6 \pm 5.8	0.018
Social/family well being	19.1 \pm 4.1	18.1 \pm 4.0	0.066
Emotional well being	14.9 \pm 4.8	14.4 \pm 4.8	0.454
Functional well being	16.3 \pm 4.3	14.4 \pm 5.5	0.200
CxC ¹	28.0 \pm 8.1	39.4 \pm 9.3	<0.001
FACT-Cx Total	91.5 \pm 19.5	105.0 \pm 23.0	0.041

QOL: Quality of life; FACT-Cx: Functional Assessment of Cancer Therapy and a cervix cancer-specific subscale; PCN: Percutaneous nephrostomy; SD: Standard Deviation; ¹CxC: Additional concerns such as sexual function, self-esteem and appearance, urinary function, appetite and gastrointestinal function.

TABLE 3. Impact of percutaneous nephrostomy on renal function.

	Mean values \pm SD						
	n = 58	n = 30	<i>p</i> -value	n = 28	<i>p</i> -value	n = 24	<i>p</i> -value
Duration	At Admission	72 h		1 mon		3 mon	
Lab indicators							
Urea	17.6 \pm 15.3	13.7 \pm 8.3	0.033	14.1 \pm 13.6	0.163	12.5 \pm 11.3	0.129
Creatinine	656.4 \pm 748.4	366.7 \pm 350.8	<0.001	295.8 \pm 294.8	0.001	280.1 \pm 251.7	0.004
Hemoglobin	9.0 \pm 2.0	8.2 \pm 1.4	0.309	8.9 \pm 1.9	0.555	9.0 \pm 2.2	0.444

to the advanced disease process or the cost of management. This also contributed to the low numbers of study participants. There is therefore a need to encourage early diagnosis and management of carcinoma of the cervix for better survival and outcome. There should also be a standardized protocol in provision of service and care that would enable efficient availability of data.

5. Conclusions

Percutaneous nephrostomy did not bear an overall long-term benefit in women with advanced carcinoma of the cervix with obstructive uropathy. It is worth noting however that percutaneous nephrostomy could provide time to allow for palliative treatment and chemoradiotherapy. We therefore recommend a need for other studies to assess the impact of other treatment modalities so as to provide these women with the best possible option of care taking into consideration the financial burden and length of hospital stay.

AVAILABILITY OF DATA AND MATERIALS

The data presented in this study are available on reasonable request from the corresponding author.

AUTHOR CONTRIBUTIONS

BK—involved in the conception and design of the study, as well data collection, analysis and interpretation of data and drafting the manuscript; KK—involved in the conception and design of the study, as well as drafting and revision of the

manuscript; EC—involved in the analysis and interpretation of data and revision of the manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Kenyatta National Hospital-University of Nairobi Ethics and Research Committee: RH/426/2021. Informed, comprehensive and voluntary consent was obtained from participants. No patient identifiers were used.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

- [1] Catalan Institute of Oncology & International Agency for Research on Cancer. Key data on HPV and HPV-related cancers. Cancer Fact sheets.

- 2017; 1: 1–9.
- [12] International Agency for Research on Cancer. Kenya: Globocan 2020. World Health Organization. 2020. Available at: <https://gco.iarc.fr/today/data/factsheets/populations/404-kenya-fact-sheets.pdf> (Accessed: 2020).
- [13] International Agency for Research on Cancer. Cervix uteri: Globocan 2020. World Health Organization. 2020. Available at: <https://gco.iarc.fr/today/data/factsheets/cancers/23-Cervix-uteri-fact-sheet.pdf> (Accessed: 2020).
- [14] Perri T, Meller E, Ben-Baruch G, Inbar Y, Apter S, Heyman L, *et al.* Palliative urinary diversion in patients with malignant ureteric obstruction due to gynaecological cancer. *BMJ Supportive & Palliative Care*. 2022; 12: e855–e861.
- [15] Hopkins MP, Morley GW. Prognostic factors in advanced stage squamous cell cancer of the cervix. *Cancer*. 1993; 72: 2389–2393.
- [16] Thapa N, Maharjan M, Xiong Y, Jiang D, Nguyen T-P, Petrini MA, *et al.* Impact of cervical cancer on quality of life of women in Hubei, China. *Scientific Reports*. 2018; 8: 11993.
- [17] Francesca N, Sally D, Bhaskar S. Role of percutaneous nephrostomy in end of life prostate cancer patients: a systematic review of literature. *Central European Journal of Urology*. 2018; 71: 404–409.
- [18] Fernández-Cacho LM, Ayesa-Arriola R. Quality of life, pain and anxiety in patients with nephrostomy tubes. *Revista Latino-Americana de Enfermagem*. 2019; 27: e3191.
- [19] Souza ACPD, Souza AN, Kirsztajn R, Kirsztajn GM. Cervical cancer: renal complications and survival after percutaneous nephrostomy. *Revista Da Associação Médica Brasileira*. 2016; 62: 255–261.
- [10] van Aardt MC, van Aardt J, Mouton A. Impact of percutaneous nephrostomy in South African women with advanced cervical cancer and obstructive uropathy. *Southern African Journal of Gynaecological Oncology*. 2017; 9: 6–10.
- [11] Misra S, Coker C, Richenberg J. Percutaneous nephrostomy for ureteric obstruction due to advanced pelvic malignancy: have we got the balance right? *International Urology and Nephrology*. 2013; 45: 627–632.
- [12] Gichangi P, De Vuyst H, Estambale B, Rogo K, Bwayo J, Temmerman M. HIV and cervical cancer in Kenya. *International Journal of Gynecology & Obstetrics*. 2002; 76: 55–63.
- [13] Maranga IO, Hampson L, Oliver AW, Gamal A, Gichangi P, Opiyo A, *et al.* Analysis of factors contributing to the low survival of cervical cancer patients undergoing radiotherapy in Kenya. *PLOS ONE*. 2013; 8: e78411.
- [14] Lapitan MCM, Buckley BS. Impact of palliative urinary diversion by percutaneous nephrostomy drainage and ureteral stenting among patients with advanced cervical cancer and obstructive uropathy: a prospective cohort. *Journal of Obstetrics and Gynaecology Research*. 2011; 37: 1061–1070.
- [15] Better OS, Arieff AI, Massry SG, Kleeman CR, Maxwell MH. Studies on renal function after relief of complete unilateral ureteral obstruction of three months' duration in man. *The American Journal of Medicine*. 1973; 54: 234–240.
- [16] Young M, Leslie S. *Percutaneous Nephrostomy*. StatPearls Publishing: Treasure Island, FL. 2022.
- [17] McDevitt JL, Acosta-Torres S, Zhang N, Hu T, Odu A, Wang J, *et al.* Long-term percutaneous nephrostomy management of malignant urinary obstruction: estimation of optimal exchange frequency and estimation of the financial impact of patient compliance. *Journal of Vascular and Interventional Radiology*. 2017; 28: 1036–1042.e8.
- [18] Folkard SS, Banerjee S, Menzies-Wilson R, Reason J, Psallidas E, Clissold E, *et al.* Percutaneous nephrostomy in obstructing pelvic malignancy does not facilitate further oncological treatment. *International Urology and Nephrology*. 2020; 52: 1625–1628.
- [19] Jalbani MH, Deenari RA, Dholia KR, Oad AK, Arbani IA. Role of percutaneous nephrostomy (PCN) in malignant ureteral obstruction. *Journal of Pakistan Medical Association*. 2010; 60: 280–3.
- [20] Shoshany O, Erlich T, Golan S, Kleinmann N, Baniel J, Rosenzweig B, *et al.* Ureteric stent versus percutaneous nephrostomy for acute ureteral obstruction—clinical outcome and quality of life: a bi-center prospective study. *BMC Urology*. 2019; 19: 79.
- [21] Teixeira L, Pai BS, Dsouza N. Role of percutaneous nephrostomy in improving quality of life in advanced carcinoma cervix presenting with obstructive uropathy. *Journal of South Asian Federation of Obstetrics and Gynaecology*. 2019; 11: 107–109.
- [22] Qureshi S, Rahman Z, Singh U, Nisha, Srivastav K, Nishchal A. Assessment of quality of life in treated patients of cancer cervix. *Journal of Mid-Life Health*. 2017; 8: 183.

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