



ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
DEPARTMENT OF SURGERY, UROLOGY DIVISION

Assessment of quality of life of patients on long term diversion (Percutaneous nephrostomy versus ureteral stent)

Cross-sectional comparative study

Getu Andarge Mekonnen, Abeselom Lemma G/Amlak, Habtamu Aderaw Zeru
Department of surgery urology division, Tikur Anbessa Specialized Hospital,
Addis Ababa, Ethiopia
December 2025

Declaration

I hereby declare that the thesis is my original work and has not been presented for a degree in any other university. All sources of material used in the document have been duly acknowledged and is properly cited

Name: Dr. Getu Andarge Signature _____ Date: 09/03/2026

Email: getuandarge@gmail.com

Telephone: +251919338056

Department of Surgery, Urology Division

Approval

The undersigned have examined the thesis report entitled "Assessment of quality of life patients on long term diversion (Percutaneous nephrostomy versus ureteral stent) :Cross-sectional comparative study" presented by Dr. Getu Andarge with registration number GSR/ 7099/13, a candidate for Speciality certificate in urology and hereby certify that it is worthy of acceptance.

Advisor:

Dr Abeselom Lemma Signature: _____ Date: 09/03/2026

Dr. Habtamu Aderaw Signature: _____ Date: 09/03/2026

External Evaluators:

Signature:

Dr Messay Mekonnen Signature: _____ Date: 09/03/2026

Dr Fitsum Solomon signature: _____ Date: 09/03/2026

Acknowledgement

First, I would like to express my deepest gratitude to my advisors, for their valuable guidance and suggestions throughout this research. My gratitude also extends to Addis Ababa University, staff members and junior residents who shared their knowledge and support in data collection and performance of the research work.

Table of Contents

Assessment of quality of life of patients on long term diversion (Percutaneous nephrostomy versus ureteral stent)	i
Cross-sectional comparative study	i
Declaration	ii
Acknowledgement.....	iii
Table of Contents.....	iv
List of tables	vi
Abstract	viii
Introduction	1
Literature review	2
Objectives of the research	7
General objectives	7
Specific objectives	7
Research questions.....	7
Description of the procedure.....	7
Research methodology.....	7
Study area and period	7
Study design	7
Target population.....	7
Source population-.....	8
Study population.....	8
Study units	8
Sample size calculation-	8
Operational definitions.....	8
Sampling.....	8
Inclusion criteria –	8
Exclusion criteria	9
Study Variables.....	9
Data collection.....	9
Data analysis.....	9
Ethical clearance.....	10
Result	10

<i>Details of demographic characteristics of the two diversion groups</i>	10
Price.....	11
Clinical profile	12
Initial Indication.....	12
Etiology	12
Duration of diversion	14
Hemoglobin and creatinine	14
Comorbidity.....	15
Self reported symptoms of PCN/Stent.....	15
1. Symptoms of UTI(dysuria ,hematuria, urgency, frequency ,fever or felling unwell) by Diversion method	15
2. Antibiotics Usage by Diversion Mode	15
3. Need for Health Professional by Diversion Mode.....	16
4. Painkiller Usage by Diversion Mode	16
Patient reported symptoms related to PCN only	16
Pain perception	17
1. Pain Location by Diversion Mode.....	17
2. Pain Frequency by Diversion Mode.....	17
3. Pain Relation to Posture.....	18
Elements of Euro qol (EQ-5D-5L).....	18
1. Dichotomized QoL Prevalence and Significance	19
Overall Quality of Life Assessment	19
EQ visual analogue scale (EQ VAS).	20
1. VAS	20
Bivariate Analysis: (Spearman's ρ correlation).....	20
Multiple Regression Analysis: Predictors of Overall QoL Index	20
Discussion: Ureteric Stent versus Percutaneous Nephrostomy	21
1. Clinical Profile	21
2. Comparative Assessment of tube related Symptoms.....	21
3. Comparison of Quality of Life (QoL) Domains	22
4. Independent Predictors of Poor QoL	23
Conclusion and Recommendation	24
Conclusion	24
Recommendations.....	24
Reference	27
Annex.....	29

List of tables

Table 1 details of demography	10
Table 2socioeconomic factors.....	10
Table 3 price of stent	11
Table 4indcation	12
Table 5etiology	13
Table 6 malignant vs nonmalignant	13
Table 7Stage difference for malignant cause	14
Table 8Mean duration of diversion	14
Table 9 hg, intial creatinine and latest creatinine	14
Table 10 urinary symptoms(<i>dysuria,hematuria,urgency,frequency,fever or felling unwell</i>)	15
Table 11Antibiotics Usage by Diversion Mode	15
Table 12Need for Health Professional by Diversion Mode.....	16
Table 13Frequency of usage of painkiller in a day	16
Table 14PCN tube related symptoms.....	16
Table 15 pain location	17
Table 16pain frequency	17
Table 17 Pain Relation to Posture.....	18
Table 18mean rank PCN vs Stent	19
Table 19 euro qol domains.....	19
Table 20Final QoL Index Comparison by Diversion Mode	19
Table 21 VAS comparison.....	20

List of abbreviations

DJ/JJ stent –double J stents

PCN-percutaneous nephrostomy

QoL-quality of life

Euro-Qol 5D 5L—euro qol 5 dimension and 5 levels

AKI-acute kidney injury

CKD –chronic kidney injury

TASH-Tikur Anbessa specialized hospital

Abstract

Background:

Obstructive uropathy from ureteral obstruction often requires urinary diversion when definitive treatment cannot be performed promptly or is not planned at all when patient is a terminal. Two common long-term diversion options are percutaneous nephrostomy (PCN) and ureteric stenting (double-J stent). Understanding how these modalities affect patients' quality of life (QoL) and clinical profile is essential for informed, patient-centered decision-making. This study attempted to fill that gap by evaluating QoL and patient reported symptoms in adults managed with PCN versus ureteric stents for prolonged ureteral obstruction.

Methods: This cross-sectional comparative study was conducted at AAU TASH hospital. Eligible participants are adults who have undergone urinary diversion for ureteral obstruction and have maintained their device (PCN or ureteric stent) for at least 90 days. Data collection includes combined in-person interviews and medical records review. QoL was assessed using validated instruments (including EuroQol EQ-5D-5L) and a tube-related symptom questionnaire. Demographic and clinical were recorded. Descriptive statistics was used to summarize groups, and inferential analyses (e.g. bivariate and multivariable regression) were used to identify factors associated with QoL differences between PCN and stent groups, controlling for potential confounders. Ethical approval was obtained, and oral informed consent was secured from all participants

Results

The PCN group mainly included patients with advanced malignancy while the stent group includes patient with benign diseases and prophylactic before major complication. Analysis showed the Stent group had a significantly higher overall health state (VAS mean 59.7 vs. 43.0, $p < 0.001$) and better overall quality of life in most domains of Euro QoL 5D 5L :

The bivariate analysis demonstrated that Mode of Diversion, malignancy status, duration and Purpose of Diversion were both highly significant predictors of Quality of Life (QOL), and the subsequent multiple regression confirmed that these only mode of diversion and purpose of diversion factors were the strongest independent variables, together explaining 22.2% of the QOL variance, while other clinical variables were not significant

Conclusion-For long-term diversion in this cohort, the Double-J Ureteral Stent is associated with a superior quality of life compared to the Percutaneous Nephrostomy. The external nature of the PCN tube imposes an overwhelming, independent burden on patient self-care and mobility. Clinical decision-making must prioritize internal drainage whenever clinically feasible.

Introduction

Background of the study

Obstructive uropathy is a relatively common condition in which an anatomic or functional problem causes obstruction to normal urinary flow (Tseng and Stoller 2009) and cause of these obstruction can be upper urinary tract and lower urinary tract obstruction. Obstruction can also be either bilateral or unilateral depending on each etiology or patients individual anatomy. Another classification is acute and chronic obstruction for which there are different forms of emergency and delayed management options.

The obstruction may be due to intraluminal, intramural and extramural causes. In young and middle age patients' renal calculi are the main etiological factors of obstruction.² In female, Gynecological tract obstruction and obstetrical trauma while in old people, malignancy contributes to upper obstructive uropathy. (Ahmad I 2013)

Obstructive uropathy is a potentially life threatening condition and if the obstruction is present bilaterally, then immediate measures are required to decompress the kidney, otherwise the patient's clinical conditions will deteriorate at a fast pace through uremia, water-electrolyte abnormalities and urinary infections with a consequent reduction of alertness and subsequent death (Ahmad I 2013)

Urinary diversion(especially in case of upper urinary tract obstruction) is one of the ways to manage ureteral obstructions and is commonly performed in our daily practice especially when the underlying pathology of ureteral obstruction cannot be eliminated in a short period or patient have underlying pathologies that requires management .Upper urinary tract obstruction is often relieved by either a percutaneous nephrostomy tube (PCN) or a ureteric stent (Joshi, Adams et al. 2001) and both can cause considerable morbidity and reduce patient's health-related quality of life (QoL)(Joshi, Adams et al. 2001).

Statement of the problem

Percutaneous nephrostomy and stenting is a common modes of diversion used for patient with obstructive uropathy in our setting. Clinicians should consider quality of life among other clinical factors when choosing the modes of diversion to use for patient. Despite being one important factor studies in our setting on the topic are scare and tend to be ignored during decision making. This is study is significant because it can provide local data regarding impact of PCN/Double J stent on patients and assist in decision making .

Justification of this study

Decision by urologist to place patient on long term diversion is a day to day activities and this decisions when considering quality of life tend to depend on either on global data and common assumptions on the impact of these diversion modalities on quality of life .This study tries to provide a much needed information on impact of percutaneous nephrostomy and double j stents on quality of life . It will help generate recommendations and help in decision making regarding current practice long term diversion of among urologists in our country Findings from this report will also be used as a reference for future researcher on the topic.

Literature review

Obstructive uropathy is a relatively common condition in which an anatomic or functional problem causes obstruction to normal urinary flow. Urinary tract obstruction can occur at any point in the urinary tract to the urinary tract. It can be classified as acute or chronic, unilateral or bilateral, upper tract or lower tract obstruction, partial or complete, and intrinsic or extrinsic.

The clinical manifestations of obstructive uropathy range from little or no symptoms to acute renal failure.(Tseng and Stoller 2009). It accounts for approximately 10% of all cases of both acute and chronic kidney disease(Yaxley and Yaxley 2023). Obstructive uropathy was one of the major causes of AKI (10%) according to (Gebrezgabiher 2022) in prospective cross-sectional study at single institution. The major causes of obstructive uropathy were women with cervical cancer. In this same study there was a slight predominance of male, 79 (54.9%) and the rest were female. The mean age of the patients was 46.6 ± 16.6 and around 40% of the patients are found in the age group between 30-50 years.

Many studies indicate that more than 70% of obstructive uropathy cases in adults are caused by benign and malignant pelvic pathologies in both men and women. On the other hand, children with obstructive uropathy commonly have congenital urinary tract pathology(Gebreselassie KH 2021)

Worldwide common causes of obstruction include urolithiasis, ureteropelvic junction stenosis, strictures of the ureter or urethra, benign prostatic hyperplasia and urinary tract trauma. (Mourmouris, Chiras and Papatsoris 2014).The single most common cause of obstructive uropathy is benign prostatic hyperplasia, probably followed by neurogenic bladder.In women the most frequent aetiology is a pelvic mass, while ureteric calculi are the major contributor in middle-aged adults and patients with a solitary kidney(Tseng and Stoller 2009, Yaxley and Yaxley 2023)

Regionally a five-year retrospective study of the patients managed for obstructive nephropathy at Usmanu Danfodiyo University Teaching Hospital, Sokoto,Nigeria from January 2011-December 2015 showed common causes of obstructive nephropathy were bladder carcinoma (49.1%), benign prostatic hyperplasia (BPH) (22.6%), ureteric stone (5.8%), and schistosomiasis bilateral lower ureteric obstruction (4.8%). (Muhammad, Abdulwahab-Ahmed et al. 2018)

(Gebreselassie KH 2021) also showed a similar finding in which more than 80% of the obstructive pathologies were caused by pelvic malignancies and the ureter was essentially the commonest part of urinary tract involved (77%).

Obstructive uropathy is a potentially life threatening condition and if the obstruction is present bilaterally, then immediate measures are required to decompress the kidney, (Ahmad I 2013).Urinary diversion(especially in case of upper urinary tract obstruction) is one of the ways to manage ureteral obstructions and is commonly performed in our daily practice especially when the underlying pathology of ureteral obstruction cannot be eliminated in a short period, when patients are not stable enough to undergo immediate management or patient have underlying pathologies that requires initial management as in the case of pelvic malignancies. The various methods of urinary diversions are retrograde double J ureteral stenting, percutaneous nephrostomy and open drainage of kidney.

Indication for diversion

Indication for diversion vary depending on instruction and country as is the same for the etiologies that causes them. According to (Gebreselassie KH 2021) who studied disease pattern and outcome of percutaneous nephrostomy for obstructive uropathy malignancy were diagnosed in >80% of patients among which cervical cancer was the commonest (37.3%) followed by bladder cancer (17.3%) and rectal cancer (10.9 %). Acute kidney injury (AKI) accounted for 70% of the presenting indications for PCN followed by infection 16.4% and flank pain 13.6%.

Based on the retrospective single institution study by (Gebreselassie, Adamu and Beyene 2024) regarding the indication for intervention (stenting) in patient with advanced cervical cancer, decompression of obstructive uropathy was the most common reason. About 135 patients had ureteral obstruction of variable degree and 49.7 % of them had bilateral obstruction with hydronephrosis while 27.4 % had unilateral hydronephrosis. On the other hand, 40 (22.9 %) patients underwent prophylactic stenting for imminent ureteral involvement on imaging without established hydronephrosis

Patient reported symptoms and Quality of life

Physician involved in the management of patients with obstructive uropathy take in to account various factors when choosing different modes of diversion which includes stage of illness, level of hydronephrosis, ureteric invasion, access to each modalities ,quality of life etc.

Various PCN and DJ stent related symptoms and quality of life have the subjects of interest form researchers

Urinary symptoms

Patients having indwelling stents experiencing more urinary symptoms(haematuria, dysuria, urgency and urinary frequency)(Joshi, Adams et al. 2001, Shoshany, Erlich et al. 2019) .these symptoms also tend to persist or worsen though time . (Shoshany, Erlich et al. 2019) showed when patient are reevaluated when patient presented for definitive procedure after initially being managed with PCN/DJS , pronounced urinary discomfort persisted in the DJS group, remaining significantly higher than the PCN group(Shoshany, Erlich et al. 2019)

On the other hand, PCN patients had worse symptoms relating to mobility and personal hygiene.(Shoshany, Erlich et al. 2019) However, the severity of these symptoms decreased over time, and there were no significant differences between the groups in these domains in the end

Pain

It is expected that both procedures(DJ stent and PCN) caused pain or discomfort to a large portion of patients in both groups at time of insertion and when patients are reevaluated at second time when patient presented for definitive treatment (47.6% vs. 53.6% at time0 and 67.7% vs. 42.9% at time1, respectively.(Shoshany, Erlich et al. 2019)

Patients with ‘JJ’ stents felt more frequently and at more sites, required analgesics (paracetamol with or without codeine, diclofenac) more frequently ($p = 0.036$) than the PCN group (Joshi, Adams et al. 2001) while (Shoshany, Erlich et al. 2019) reported both patient groups reported similar pain and analgesics usage . Women reported using pain killers more frequently at initially in both groups ($p = 0.022$ and $p = 0.04$ for DJS & PCN respectively), but not before the definitive procedure(Shoshany, Erlich et al. 2019)

Infection

Although more patients with the stents experienced symptoms of urinary tract infections, the difference was not significant ($p = 0.0609$). There was also no difference in the need of antibiotics for the 2 groups ($p = 0.3$)(Joshi, Adams et al. 2001)

Daily care

More patients (41%) with PCN required help in daily care than those with the stents (10%) although the difference did not reach statistical significance.(Joshi, Adams et al. 2001).large percentage(62%) of patients with PCN had problems due to bag leak or slippage and 33% experienced difficulty with daily care (Joshi, Adams et al. 2001)

Quality of life

Studies used variety of quality of life assessment tools to compare PCN and Double J stents. Among the tools that are used are WHO guidelines and EuroQol EQ-5D .EuroQol EQ-5D(Joshi, Adams et al. 2001) (de Sousa Morais, Pereira et al. 2019, Shoshany, Erlich et al. 2019)incorporates a system with 5 attributes (mobility, usual activities, pain/discomfort and anxiety/depression) with each attribute having three levels and overall health state assessment using a thermometer-like rating scale. Analysis of the EuroQol self-reported health status revealed, for both the groups, a high percentage of patients reporting problems with pain/discomfort and usual activities (95 and 91% with stents and 85 and 77% with PCN, respectively;(Joshi, Adams et al. 2001).(de Sousa Morais, Pereira et al. 2019)

(Joshi, Adams et al. 2001) revealed that there was no significant difference in the EuroQol utility score for PCN (median 0.68, range 0.16–0.85) and ‘JJ’ stent (median 0.66, range –0.24 to 100) groups with a p value of 0.199(Joshi, Adams et al. 2001).

The EuroQol analysis in the study suggest that while patients in both groups experience significant impact on their QoL, no patient preference could be observed for either modality of the treatment when these 2 groups are compared(Joshi, Adams et al. 2001)

According to (Mokhmalji, Braun et al. 2001)who did prospective randomized trial to assess Qol at two points in time using WHO Qol assessment tool , revealed that the quality of life index after percutaneous nephrostomy was about 7% higher than after stent insertion(even though not clinically not significant) and difference was more in young age <40 and in males.

Assessment of the quality of life at the second point of time(when patient are admitted for definitive treatment) showed an increase in about 3% of the quality at the second point in patients who underwent primary percutaneous nephrostomy. In contrast, the patients with stents had a 5% decrease in the index. This decrease was especially distinct (about 10%) in patients younger than 40 years(Mokhmalji, Braun et al. 2001)

A clinical outcome and quality of life: a bi-center prospective study by(Shoshany, Erlich et al. 2019) using EuroQol EQ-5D and ‘Tube symptoms’ questionnaire .The length of time between the urgent drainage procedure and the definitive procedure was significantly higher in the DJS group compared to the PCN group (median 47 vs. 20 days respectively, $p < 0.001$).

At time0, PCN patients demonstrated more difficulties to self-care and resume usual activities ($p < 0.05$). Twice as many PCN patients reported difficulties in mobility compared to DJS patients, which was in accordance with the ‘Tube symptoms’ questionnaire results, but this did not reach statistical significance

(16.6% vs. 34.5% for the DJS and PCN groups respectively, $p > 0.05$). (Shoshany, Erlich et al. 2019) however symptoms which were higher in PCN patients decreased over time, and at time1 no significant difference was observed in patients' estimation of their ability to self-care or perform usual activities. (Shoshany, Erlich et al. 2019) more DJS patients reported anxiety or depressed mood compared to PCN patients (19.4% vs. 0%, $p < 0.05$) (Shoshany, Erlich et al. 2019)

On comparison of the thermometer rating, representing overall health state as assessed subjectively by the patients, scores were similar in both groups at time0 (72.6 ± 22 vs. 68.6 ± 20 , $p > 0.05$). In line with other reported QoL assessments, DJS patients score deteriorated over time, and they had a significant lower score compared to PCN patients at time1 (68.6 ± 25 vs. 83.2 ± 12.1 respectively, $p < 0.05$). (Shoshany, Erlich et al. 2019)

(de Sousa Morais, Pereira et al. 2019) revealed an increase, for all five dimensions of EuroQol EQ-5D, of the proportion of patient reporting problems in the DJ stent group, fact that was not found in the PCN group. Anxiety/depression was the only dimension with a larger proportion of patient after intervention in PCN group. Pre intervention EQ VAS score (thermometer) were comparable but it deteriorated in the DJ stent group post intervention

QOL in malignant and palliative settings

In patients with malignancy-related urinary tract obstruction, relief of obstruction is usually achieved by placement of a percutaneous nephrostomy tube, an internalized double J nephroureteral stent (double J), or an internal/external nephroureteral stent (NUS). These approaches provide immediate treatment for obstruction with palliation of flank pain, deteriorating renal function, aversion of risk of infection, and rupture of calyces (Monsky, Molloy et al. 2013) When choosing which of these approaches to use, factors including underlying ability to cross the obstruction with a wire for stent placement, urinary continence, and preference of the referring clinician and patient are considered. However, each intervention may cause untoward symptoms and may positively or negatively affect patient quality of life (QoL) (Monsky, Molloy et al. 2013)

QoL using previously validated survey tools, including the Functional Assessment of Cancer Therapy–General and Bladder (FACT-BL) tool, which includes survey questions initially developed to evaluate urinary assessing urinary symptoms including; dysuria, urgency and frequency, pain and additional problems encountered in day-to-day life such as tube leakage and dislodgment

There were no statistically significant differences in responses to QoL survey questions evaluating physical well-being, social and family well-being, emotional well-being, functional well-being at 7, 30, or 90 days

Patients who had double J stents reported significantly more urinary symptoms, including dysuria and urinary frequency, compared with those with nephrostomy tubes and NUS (Monsky, Molloy et al. 2013) and patients with double J stents had significantly greater use of pain medications at 30 and 90 days after placement (Monsky, Molloy et al. 2013)

On the other hand Patients with nephrostomy tubes had greater rates of complications, requiring additional tube changes, compared with those having NUS or double J stent (Monsky, Molloy et al. 2013) Surprisingly, there was no statistically significant correlation of symptoms with QoL unlike the expectation that quality of life will be reduced by the external drainage of PCN. (Monsky, Molloy et al. 2013)

(Aravantinos, Anagnostou et al. 2007) evaluated effect of PCN on QoL by using the EORTC QLC-C30 (version 2.0) questionnaire on patient with pelvic and non pelvic malignancy. The overall group QoL score improved slightly within 1 month after the procedure.(statistically not significant)

(Lapitan and Buckley 2011)also evaluated impact of palliative urinary diversion by percutaneous nephrostomy drainage and ureteral stenting among patients with advanced cervical cancer and obstructive uropathy. This study did not directly compare double j stents and percutaneous nephrostomy with regards to any outcome espicifically QOL but overall low FACT-G scores may signify that these patients are quite simply very sick and so affected by their disease that any treatment or palliation of the urinary tract obstruction does not significantly affect quality of life.(Lapitan and Buckley 2011)

(Shvero, Haifler et al. 2022) compared QoL of tandem ureteral stent to percutaneous nephrostomy for malignant ureteral obstruction using European Quality of Life Five Dimension Five Level Scale (EQ-5D-5L) and a general health assessment EQ-Vas. No significant difference was found between the two groups in any EQ-5D-5L domain.(Shvero, Haifler et al. 2022) There was no difference in any of the specific quality of life measures between patients with PCN vs. TUS, and not in the summary of all QoL measures(Shvero, Haifler et al. 2022) Although the quantitative comparison of QoL between TUS and PCN did not yield a statistically significant difference, the great majority of patients who had the two types of drains at some point during their treatment preferred having TUS over PCN(Shvero, Haifler et al. 2022)

Other than the studies mentioned above studies comparing quality of life of cancer patient with DJS and PCN . however studies conduted on quality of life patients with either form diversion have shown significant effect on Quality of life .QoL have significantly decreased after nephrostomy (Fernández-Cacho LM 2019) (FALLON, OLNEY and CULP 1980) / did not improve significantly after nephrostomy(Teixeira L 2019). (Shekarritz, Shekarritz et al. 1999)suggest that the majority of patients with bilateral ureteral obstruction secondary to malignancy had a poor performance status for the remainder of their life after diversion.

Perception of urologists/interventional radiologists about impact of DJ stent /PCN on QoL

A survey among urologists and radiologists(Pietropaolo, Seoane et al. 2022) found that there was not an agreement as to which drainage method most affects patients' QOL. Of the 310 respondent urologists, only 219 (70.6%) believe that the DJS offered a better QOL. On the contrary, of the 56 responding radiologists, 52 (93%) stated the same (significant difference ($p = 0.006$)). Larger percentage(53% and 57.1% of urologist and radiologist respectively) consider DJS placement more expensive. 28.4%urologists believe that PN is more expensive compared 8.9% radiologists who believe the same . 18.7% and 34% urologists and radiologist consider that the two methods cost the same

Objectives of the research

General objectives

To assess quality of life of patient on long term percutaneous nephrostomy and ureteral stenting

Specific objectives

To assess clinical profile patients on long term PCN versus stenting

To compare the impact of PCN and ureteral stents on different QoL domains such as physical functioning, psychological well-being, and social activities.

To identify clinical or demographic factors that influence quality of life outcomes in patients receiving PCN versus ureteral stents.

To assess procedure specific patient reported symptoms of patients on long term PCN versus stenting including pain, urinary discomfort, mobility limitations, and hygiene difficulties

Research questions

How does the overall quality of life of patients on PCN and double j stent differ when studied at more than 3 month post procedure?

Description of the procedure

Stent-Patient for stent are put on lithotomy position and under local anesthesia/spinal anesthesia/GA cystoscopy is done and ureteric orifice is identified ,guidewire inserted and 6fr stent is inserted over guidewire

PCN –patient are taken to procedure room/major OR put on prone/lateral position local anesthesia is infiltrated .ultrasound guided pelvicalyceal system puncture is done. and guidewire will be inserted and serial dilation done upto 12fr and 10 fr nephrostomy will be inserted over guide wire

Patient will be put on stent/PCN exchange or definitive procedure are done and removed according to the specific pathology involved.exchange is usually done every 03 month based on the institution practice hence that is why we selected 90 day/3 months to define long term diversion as 03 months

Research methodology

Study area and period

This study was conducted in Tikur Anbessa Specialized Hospital in Addis Ababa, Ethiopia from September 2025 to December 2025

Study design -A cross sectional comparative study design a single institution study

Target population -all patient who are on percutaneous nephrostomy or stent

Source population-All patients from AAU black lion hospital(TASH) who are on percutaneous nephrostomy or stent

Study population - All patients who are on percutaneous nephrostomy or stent for at least 90 days and fulfil the inclusion criteria and able to give informed decision

Study units- minor OR and procedure room

Sample size calculation-

$$n = \frac{2\sigma^2(Z_{1-\alpha/2} + Z_{1-\beta})^2}{(M_1 - M_2)^2}$$

$$(M_1 - M_2)^2$$

Where:

- σ^2 = Estimated variance (often average of the variances in the two groups)
- M_1, M_2 = Expected means of each group
 - $Z_{1-\alpha/2}$ = Z-value for desired confidence (1.96 for 95%)
 - $Z_{1-\beta}$ = Z-value for desired power (0.84 for 80% power)
- From (Joshi, Adams et al. 2001) (Monsky, Molloy et al. 2013) and other studies in the literature review
 - Mean QoL(overall health) in nephrostomy group: 60
 - Mean QoL(overall health) in stent group: 70
 - SD in both groups: 15
 - Desired power: 80%
 - $\alpha = 0.05$
 - Plugging into the formula:
 -

$$n = \frac{2 \times 15^2 \times (1.96 + 0.84)^2}{(70 - 60)^2}$$

35.3 So about 35 from each group was selected making a total of 70 patients

Operational definitions

Long term diversion-patient who were on nephrostomy/ stent for at least the previous 90 days and did not undergo any form other endourologic procedures(PCNL/URS)

3 month duration was arbitrarily used because patient on either PCN/DJ get their tubes exchanged every 03 month(institutional practice of TASH)

Sampling –convenience non probability sampling(including all patient until the sample size is achieved)

Inclusion criteria –all patients who are on percutaneous nephrostomy or double j stent for minimum of 03 months

Patient who are clinically stable

Patient who are able to give informed consent

Exclusion criteria-all patient who are admitted and waiting for PCNL/URS or open procedure or patient post PCNL/URS/open surgical procedure waiting for stent /PCN removal and expected to have their stent/PCN removed with before 90 days are excluded

Patient under the age of 18

Patient who are clinically unstable and unable to give informed consent (patient who have cognitive impairment)

Patient on both stent and PCN

Study Variables

Dependent variable •

Quality of life and patient reported symptoms

Independent variable

Age and Sex

Social factors/economic factors

Presence /absence of malignant disease

Stage of disease (for malignant disease)

Duration of diversion

Comorbidity(the no of comorbidities and type)

Data collection

– We prepared a questionnaire developed using the standard validated Amharic and English versions of EQ-5D-5L (see questionnaire annex) which includes demographic, clinical data, patient reported symptoms and EQoL -5D- 5L . the questionnaire includes initially patient demography, clinical data followed by patient reported symptoms((Joshi, Adams et al. 2001).The final part of the questionnaire is E QoL 5D-5L (which is a validated questionnaire assessing quality of life and overall health state).{Welie, 2020 #32}

Date of the demography, clinical data and patient reported symptoms will be acquired through in person interview and from IWKET care system. Questions of the quality of life and overall health state will be administered through in person interview (either the Amharic version or the English version will be used). Both version are validated and available at euroqol.org

Data was collected using Google form and paper. Data was collected by principal investigator and by trained personnel's(fellow junior residents)

Data analysis

– The data was analyzed using SPSS version 27 software.

– The descriptive statistics will be presented with frequency table.

Skewed data analysis done using non parametric tests (Mann-Whitney U test)

Bivariate analysis done using Spearman correlation

– Multivariable binary logistic regression model assess the association

between independent variables and the dependent variables and develop a model

Ethical clearance

Ethical approval was granted from the institutional review board of the department of surgery.

Result

A total of 70 patients were included in the study and included in the final analysis. The mean age was 49.79 $\pm$ 13.84 years (Median: 48.50 years). The majority were female, with 56 patients (80.0%) female and 14 patients (20.0%) male.

Details of demographic characteristics of the two diversion groups

Table 1 details of demography

Characteristic	PCN Group (n = 35)	Stent Group (n = 35)	p-value	Statistical Test
Age, years (Mean $\pm$ SD)	51.89 $\pm$ 14.64	47.69 $\pm$ 12.85	0.206	Independent t-test
Sex, n (%)			0.550	chi2 Test
- Female	29 (82.9%)	27 (77.1%)		
- Male	6 (17.1%)	8 (22.9%)		

The mean age in the PCN group was 51.89 $\pm$ 14.64 years, which was not significantly different from the Stent group's mean age of 47.69 $\pm$ 12.85 years (Independent-Samples t-test, $p = 0.206$). The distribution of sex was also comparable between the two groups (PCN: 82.9% female; Stent: 77.1% female; Pearson chi-square = 0.357, $p = 0.550$).

Socioeconomic factors

Table 2 socioeconomic factors

Characteristic	PCN Group (n = 35)	Stent Group (n = 35)	p-value	Statistical Test
Educational Status, n (%)			0.286	Chi-squared test
- Illiterate	14 (40.0%)	7 (20.0%)		

- Primary	11 (31.4%)	17 (48.6%)		
- Secondary	8 (22.9%)	9 (25.7%)		
- University degree and above	2 (5.7%)	1 (2.9%)		
Marital Status, n (%)			0.286	Chi-squared test
- Married	24 (68.6%)	29 (82.9%)		
- Widowed	7 (20.0%)	2 (5.7%)		
- Divorced	2 (5.7%)	1 (2.9%)		
- Single	2 (5.7%)	3 (8.6%)		
Medical Cost/Insurance, n (%)			0.338	Chi-squared test
- CBHI	23 (65.7%)	22 (62.9%)		
- Out of Pocket	11 (31.4%)	13 (37.1%)		
- Social Worker	1 (2.9%)	0 (0.0%)		

Characteristic	PCN Group (n = 35)	Stent Group (n = 35)	p-value	Statistical Test
Occupation, n (%)			0.233	Chi-squared
-Government Worker	3 (8.6%)	1 (2.9%)		
- Private	6 (17.1%)	9 (25.7%)		
- Merchant	2 (5.7%)	1 (2.9%)		
- Farmer	0 (0.0%)	2 (5.7%)		
- House Wife	7 (20.0%)	7 (17.1%)		
- Unemployed	16 (45.7%)	14 (40.0%)		
- Retired	1 (2.9%)	0 (0.0%)		
- Student	0 (0.0%)	1 (2.9%)		
Religion, n (%)			0.521	Chi-squared
- Orthodox	20 (57.1%)	22 (62.9%)		
- Muslim	9 (25.7%)	8 (22.9%)		
- Protestant	5 (14.3%)	5 (14.3%)		
-	1 (2.9%)	0 (0.0%)		
Other/Unspecified Locality, n (%)			0.333	Chi-squared
- Urban	25 (71.4%)	28 (80.0%)		
- Rural	10 (28.6%)	1 (30%)		

The socioeconomic status of the two treatment groups was assessed and found to be comparable (well matched). No statistically significant differences were detected in educational status (Chi-squared $p = 0.286$), marital status (Chi-squared $p = 0.286$), or medical cost/insurance coverage (Chi-squared $p = 0.338$). The two groups were found also found to be comparable regarding occupation (Chi-squared $p = 0.233$), religion Chi-squared $p = 0.521$, and locality (Urban vs. Rural, Chi-squared)

Price

Table 3 price of stent

Characteristic	PCN Group (n = 35)	Stent Group (n = 35)	p-value	Statistical Test
Total Price(ETB)				

Mean +/- SD	2388.57 +/- 138.31	1542.86 +/- 296.34	<.001	Independent t-test
Median [IQR]	2400.00 [2350.00- 2450.00]	1600.00 [1300.00- 1900.00]		

The price was significantly higher statistically significant ($t(48.14) = 15.30, p < .001$) for patients treated with Percutaneous Nephrostomy (PCN) compared to Ureteral Stent . Since both groups of patients incurred costs which were not accounted in CBHI/insurance and not studied by this research it's difficult to compare total cost of the procedure between the two groups.

Clinical profile

Initial Indication

The initial conditions that prompted the diversion were also studied

Table 4indcation

	PCN Group (n = 35)	Stent Group (n = 35)	Total (N=70)
AKI	24 (68.6%)	2 (5.7%)	26 (37.1%)
AKI on CKD	0 (0.0%)	1 (2.9%)	1 (1.4%)
AKI+pyelonephritis/ Pyonephrosis	3 (8.6%)	1 (2.9%)	4 (5.7%)
Prophylactic	6 (17.1%)	27 (77.1%)	33 (47.1%)
Prophylactic/solitary kidney	0 (0.0%)	1 (2.9%)	1 (1.4%)
Pyelonephritis	0 (0.0%)	1 (2.9%)	1 (1.4%)
Pyonephrosis	2 (5.7%)	2 (5.7%)	4 (5.7%)

The two groups are not comparable regarding the clinical indication for the drainage procedure. The initial indication for the PCN Group was dominated by Acute Kidney Injury (AKI) cases (68.6%), while the Stent Group was overwhelmingly dominated by Prophylactic (77.1%) where by it was done before the development of emergency complications like AKI, pyelonephritis or pyonephrosis and in anticipation of worsening of bilateral or unilateral obstruction.

Etiology

Underlying etiology of the obstructive uropathy was also investigated. The majority of obstructions were due to malignancy, accounting for 61.4 % of all cases .Cervical Cancer was the single most prevalent cause, responsible for 45.7 % of all diversions while benign etiologies accounted for 38.6 % of cases, primarily PUJO/PUJ/ureteric stricture (10.0%) , Stone Disease and GUTB

PCN was the dominant diversion method for several conditions often those related to malignancies while Stent placement was the strong preference for many non-malignant causes like PUJO/PUJ/ureteric stricture or stone diseases.

There is a statistically significant association between the patient's specific diagnosis and the chosen mode of treatment (PCN or Stent).

Table 5

*Etiologies**Table 5etiology*

		mode				Total	
		PCN		Stent			
		N	%	N	%	N	%
Etiology	Bladder tumor	4	11.4%	0	0.0%	4	5.7%
	Cervical cancer	23	62.9%	10	28.6%	32	45.7%
	Endometrial cancer	0	0.0%	4	11.4%	4	5.7%
	Failed bladder repair/vcf	1	2.9%	0	0.0%	1	1.4%
	GUTB+solitary kidney/on anti TB	3	8.6%	3	8.6%	6	8.6%
	Horseshoe kidney	0	0.0%	1	2.9%	1	1.4%
	Vertebral mass	0	0.0%	1	2.9%	1	1.4%
	multiple vascular aneurysms	0	0.0%	1	2.9%	1	1.4%
	Prostate cancer	1	2.9%	0	0.0%	1	1.4%
	PUJO/PUJ/ureteric stricture+/-solitary kidney/Bil	1	2.9%	6	17.1%	7	10.0%
	Rectal ca	1	2.9%	1	2.9%	2	2.9%
	retroperitoneal fibrosis	0	0.0%	1	2.9%	1	1.4%
	Retroperitoneal mass	0	0.0%	1	2.9%	1	1.4%
	Solitary kidney with nephrolthiasis/Bilateral nephrolthiasis	0	0.0%	6	17.1%	7	10.0%
	Spinal cord injury and Neurogenic bladder	1	2.9%	0	0.0%	1	1.4%
Total		35	100.0%	35	100.0%	70	100.0%

Table 6
malignant vs nonmalignant

t

Malignancy Status	PCN Group (N)	PCN Group (%)	Stent Group (N)	Stent Group (%)	Total (N=70)
Malignancy Cause	26	74.3%	16	45.7%	42
Non-Malignant Cause	9	25.7%	19	54.3%	28

Table 7

Table 7 Stage difference for malignant cause

Stage	PCN Group (N=26)	PCN Group (%)	Stent Group (N=16)	Stent Group (%)	Total (N=42)
Stage 2	0	0.0%	1	6.3%	1
Stage 3	2	7.7%	6	37.5%	8
Stage 4	24	92.3%	9	56.3%	33
Total	26	100.0%	16	100.0%	42

Out of the 42 patients identified with a malignant cause of obstruction the vast majority of malignancy cases in both groups were Stage 4 (78.6 % of all malignancy cases).

Majority of patient with malignancy on PCN were Stage 4 disease (92.3%, or 24 out of 26 malignancy cases) There is a statistically significant association between the mode of diversion (PCN or Stent) and cancer stage. i.e that PCN was strongly selected for patients with advanced stage malignancy.

Duration of diversion

Table 8 Mean duration of diversion

Metric	PCN Group (N=35)	Stent Group (N=35)	Overall Cohort (N=70)
Mean Duration (Months)	6.51	20.94	13.73
Median Duration (Months)	6.00	12.00	6.50

The typical (median) duration of diversion in the Stent Group is 12 months, which is double the 6 months observed in the PCN Group. There is a statistically significant difference in the duration of diversion between the PCN and Stent groups.

The PCN Group was primarily selected for palliative intent (74.3%) whereas the stent was primarily selected for temporary diversion (71.4%) with since the p-value (<.001).

Hemoglobin and creatinine

Table 9

Hemoglobin, intial creatinine and latest creatinine

Table 9 hg, intial creatinine and latest creatinine

Characteristic	PCN Group (n=35)	Stent Group (n=35)	Statistical Comparison (p-value)	Conclusion on Difference
Mean Hb (g/dL)	10.28	12.47	<.001 (t-test)	Significantly Different (PCN lower)
Median Initial Cr (mg/dL)	3.90	1.20	<.001 (Mann-Whitney U)	Significantly Different (PCN higher)
Median Latest Cr (mg/dL)	1.30	1.20	0.368 (Mann-Whitney U)	Not Statistically Different

PCN group was significantly more anemic (Mean 10.28 g/dL) compared to the Stent group (Mean 12.47 g/dL) on top of that their median initial Cr was over three times higher than their stent counterpart while latest median cr was comparable (PCN: 1.30 mg/dL, Stent: 1.20 mg/dL)

Comorbidity

·Over half the cohort (54.3%) had no major listed comorbidity; however, the remaining patients had (RVI, 12.8%), hypertension (15.7% total), and pre-existing Chronic Kidney Disease (CKD, 12.8%). A higher proportion of patients in the PCN Group (68.6 %) had no listed comorbidities compared to the Stent Group (40.0%).

Self reported symptoms of PCN/Stent

1. Symptoms of UTI(dysuria ,hematuria, urgency, frequency ,fever or felling unwell) by Diversion method Table 12

Table 10 urinary symptoms(*dysuria,hematuria,urgency,frequency,fever or felling unwell*)

Urinary symptoms	PCN Group (N=35)	Stent Group (N=35)	Total (N=70)
Nil	7 (20.0%)	11 (31.4%)	18
Occasionally	16 (45.7%)	6 (17.1%)	22
Frequent	12 (34.3%)	16 (45.7%)	28
(Aggregated)	28 (80.0%)	23 (65.7%%)	51

The PCN group reported a higher proportion of patients experiencing some level of Urinary symptoms (80.0%) compared to the Stent group (65.7%).

- The Stent group had a higher proportion of patients reporting *no* symptoms 31.4% compared to the PCN group (20.0%).

However, despite the numerical difference, the association between the mode of diversion and the frequency of UTI symptoms did not reach statistical significance ($p=0.091$).

2. Antibiotics Usage by Diversion Mode

Table 11Antibiotics Usage by Diversion Mode

Antibiotics Use	PCN Group (N)	PCN Group (%)	Stent Group (N)	Stent Group (%)
Nil	8	22.9%	19	54.3%
Occasionally	15	42.9%	6	17.1%
Frequent/Always	12	34.3%	10	28.6%
Pearson Chi-Square	chi-square(9.386) (df =3)		Asymp. Sig. chi-square0.025	

The PCN group reported a significantly higher frequency of antibiotic use which is statistically significant ($p = 0.025$) with 77.2 % (Occasionally/Frequent/Always) compared to 45.7% of the Stent group.

3. Need for Health Professional by Diversion Mode

Table 12 Need for Health Professional by Diversion Mode

Need for Professional	PCN Group (N)	PCN Group (%)	Stent Group (N)	Stent Group (%)
Nil	4	11.4%	19	54.3%
Occasionally	13	37.1%	6	17.1%
Frequent/Always	18	51.4%	10	28.6%
Pearson Chi-Square	chi-square 15.746 (df = 3)		Asymp. Sig. chi-square 0.001	

- The PCN group required contact (highly statistically significant $p = 0.001$) with a health professional significantly more often, with 88.6% reporting a need (Occasionally/Frequent/Always).

4. Painkiller Usage by Diversion Mode

Table 13 Frequency of usage of painkiller in a day

Painkiller Use	PCN Group (N)	PCN Group (%)	Stent Group (N)	Stent Group (%)
Nil	3	8.6%	8	22.9%
Occasionally	7	20.0%	8	22.9%
Frequent/Always	25	71.4%	19	54.3%
Pearson Chi-Square	chi-square 3.597 (df = 3)		Asymp. Sig. chi-square 0.308	

While the PCN group had a numerically higher proportion of patients reporting Frequent/Always use of painkillers (71.4% vs. 54.3%), there was no statistically significant ($p=0.08$) difference in the use of painkillers

Patient reported symptoms related to PCN only

Table 14 PCN tube related symptoms

Complication/Problem	Category	Frequency (N)	Percent (%)
1. Bag Leakage/Slippage	Nil	6	17.1
	Occasionally	15	42.9
	Frequent	14	40.0
	Total	35	100.0
2. Bag Management Problem	Occasionally	14	40.0
	Frequent	13	37.1
	Always	8	22.9
	Total	35	100.0
3. Wound Infection	Nil	5	14.3
	Occasionally	19	54.3
	Frequent	8	22.9
	Always	3	8.6
	Total	35	100.0

4. Smell	Nil	6	17.1
	Occasionally/Unknown	13	37.2
	Frequent	12	34.3
	Always	4	11.4
	Total	35	100.0

- A large majority (82.9%) of PCN patients experienced bag leakage or slippage at least occasionally during the diversion period.
- All 35 patients reported having management problems with their nephrostomy bag, with a combined 60.0% reporting issues frequently or always (Frequent 37.1% + Always 22.9%).
- 85.7% of PCN patients experienced wound infection at least occasionally

Pain perception

1. Pain Location by Diversion Mode

The crosstabulation shows the distribution of the primary site of reported pain:

Table 15 pain location

Pain Location	PCN Group (N=35)	Stent Group (N=35)	Total (N=70)
Loin, Bladder (Suprapubic)	20 (57.1)	17 (48.6%)	37
Loin only	14 (40.0%)	12 (34.3%)	26
Bladder (Suprapubic) only	1 (2.9%)	3 (8.6%)	4
None	0 (0.0%)	3 (8.6%)	3
Total reporting Pain	35 (100%)	32 (91.4%)	67

- The primary pain pattern for the PCN group was Loin, Bladder (Suprapubic) combined (57.1%) while Dominant Pattern for the stent group aslo was Loin, Bladder combined (48.6%), the next largest single group was Loin only (34.3%).
- The relationship between the mode of diversion and the reported pain location is not statistically significant (p=0.222).

2. Pain Frequency by Diversion Mode

Table 16pain frequency

Pain Frequency	PCN Group (N)	PCN Group (%)	Stent Group (N)	Stent Group (%)
----------------	---------------	---------------	-----------------	-----------------

Continuous	7	20.0%	2	5.7%
Frequent	24	68.6%	20	57.1%
Infrequent	4	11.4%	10	28.6%
None	0	0.0%	3	8.6%

- A majority of patients in both groups experienced pain frequently or continuously (PCN: 88.6%; Stent: 62.8%).
- The PCN group had a substantially higher proportion of patients reporting Continuous pain (20.0%) compared to the Stent group (5.7%).
- The Stent group had a higher proportion of patients reporting Infrequent pain (28.6%) compared to the PCN group (11.4%).

3. Pain Relation to Posture

Table 17 Pain Relation to Posture

Posture Effect	PCN Group (N)	PCN Group (%)	Stent Group (N)	Stent Group (%)
All body postures	25	71.4%	24	68.6%
Few postures	8	22.9%	4	11.4%
Single posture	2	5.7%	4	11.4%
None	0	0.0%	3	8.6%

- The majority of patients in both groups reported that pain was associated with all body postures (PCN: 71.4%; Stent: 68.6%)
-

Elements of Euro qol (EQ-5D-5L)

Analysis of individual components of EQ-5D-5L have shown that that the QoL variables were not normally distributed, the Mann-Whitney U Test non-parametric method to compare the two independent groups (PCN vs. Stent).

The Mean Rank indicates which group has higher (worse) scores

Table 18 mean rank PCN vs Stent

QoL Domain	PCN (Mode 1) Mean Rank	Stent (Mode 2) Mean Rank
Usual Activities	48.33	22.67
Mobility	43.63	27.37
Self-Care	43.83	27.17
Pain/Discomfort	40.33	30.67
Anxiety/Depression	39.80	31.20

The analysis confirms that the PCN Group reported a significantly worse Quality of Life than the Stent Group across major functional domains of Usual Activities ($p < .001$), Self-Care ($p < .001$), Mobility ($p = .001$) and pain/discomfort ($p = .031$) whereas there was no statistically significant difference ($p = 0.067$), in terms of anxiety/depression

1. Dichotomized QoL Prevalence and Significance

The table summarizes the percentage of patients reporting Any Problem (1.00) in each domain and the statistical significance of the difference between the two groups.

Table 19 euro qol domains

QoL Domain	PCN Group (reported Problem %)	Stent Group (reported Problem %)	Chi-Square p-value	Statistical Conclusion
Self-Care	94.3% (33/35)	31.4% (11/35)	<.001	Highly Significant Difference
Mobility	85.7% (30/35)	48.6% (17/35)	.001	Highly Significant Difference
Usual Activities	94.3% (33/35)	71.4% (25/35)	.011	Significant Difference
Anxiety/Depression	100.0% (35/35)	88.6% (31/35)	.039	Significant Difference
Pain/Discomfort	100.0% (35/35)	94.3% (33/35)	.151	Not Significant

Overall Quality of Life Assessment

Table 20 Final QoL Index Comparison by Diversion Mode

Diversion Mode	Median QOL Index Score
----------------	------------------------

Diversion Mode	Median QOL Index Score
PCN Group	0.303
Stent Group	0.783

Based on non parametric mann whitney test the Stent Group (Mean Rank 44.27) has a significantly($P < 0.001$) higher overall health utility (better QoL) than the PCN Group (Mean Rank 26.73).

EQ visual analogue scale (EQ VAS).

1. VAS

The table compares the patient's self-rating of overall health (where 100 is best imaginable health) for PCN and Stent

Table 21 VAS comparison

Group	N	Mean Health Rating	Standard Deviation
PCN	35	43.00	25.356
Stent	35	59.71	24.910

- The Stent Group rated their overall health significantly higher 59.71 than the PCN Group

Bivariate Analysis: (Spearman's ρ correlation)

- Mode of Diversion, Malignancy Status, Purpose(whether its palliative or temporary diversion) and Duration of Diversion showed statistically significant correlations
- Age , Sex , Hgb, Cr ,no comorbidities ,RVI status, DM,HTN,CKD status showed no significant correlation with QoL

Since Mode of Diversion ($\rho = 0.434$, $p < .001$),Malignancy Status ($\rho = -0.381$, $p = .001$) and Duration of Diversion ($\rho = 0.347$, $p = .003$) and purpose(intent of diversion) of diversion($\rho = 0.475$, $p < 0.001$) showed correlation further analysis is done with multiple regression . variable that showed negligible correlation with QoL ($p > 0.4$), they are excluded .

Multiple Regression Analysis: Predictors of Overall QoL Index

- Overall Model Fit:** The model significantly predicted QOL ($p=0.002$), explaining 22.2% $R^2=0.222$ of the variance in patient QOL.
- Diversion Mode (PCN vs. Stent):**
 - Showed a strong, independent positive trend $p=0.078$ that is Stent was associated with a 0.221 unit increase in the QOL score compared to the PCN
- Purpose of Diversion (Palliative versus temporary diversion)**
 - Showed the strongest independent trend in the model $p=0.077$ the intent of diversion (Palliative vs. Curative Intent) is the largest driver of QOL variability, even when controlling for the specific tube used.
- Malignancy Status:**
 - Not Significant:** Was not an independent predictor of QOL $p=0.570$ indicating that diagnosis itself does not add significant predictive power.
- Duration of Diversion:**

- **Not Significant:** Was not an independent predictor of QOL $p=0.903$

Discussion: Ureteric Stent versus Percutaneous Nephrostomy

1. Clinical Profile

A. Initial Clinical Status and Indication

The results clearly indicate that PCN was initially used for emergency complication. The Acute Kidney Injury (AKI) (68.6%) was the predominant indication for PCN insertion and subsequently presented with significantly worse baseline renal function (Median Initial Cr: 3.90 mg/dL)

PCN group has higher rates of anemia (Mean Hb: 10.28 g/dL) compared to the Stent group which might have impact on the QoL of the patient as anemic patients tend to be weaker patients with decreased QoL

Conversely, the Stent group was dominated by prophylactic diversion (77.1%) for anticipated worsening of obstruction or complication.

B. Etiology

The association between diversion modality and disease profile was highly significant, reflecting global urological practice and in agreement with local epidemiology of specific malignancies.

- The PCN Group was highly associated with malignancy (74.3%), particularly Stage 4 disease (92.3%). Cervical cancer was the single most prevalent cause overall (45.7%), a finding consistent with other Ethiopian data cervical cancer as a major cause of obstructive uropathy (Gebreselassie KH et al. 2021; Gebreselassie, Adamu and Beyene 2024).
- The Stent Group was associated with non-malignant causes (54.3%) such as PUJO/strictures and stone disease.
- The finding that PCN is strongly selected for advanced stage malignancy (Stage 4) mainly to serve as a palliative and permanent intention used emergency setup where bladder or ureteral anatomy may not allow stent insertion or may be difficult as well as when the expected life expectancy is shorter (Monsky, Molloy et al. 2013). This is further supported by the shorter median duration of diversion in the PCN group (6 months) compared to the Stent group (12 months).

2. Comparative Assessment of tube related Symptoms

The study demonstrated significant differences in patient-reported symptoms between the two long-term diversion methods, providing valuable local data that generally aligns and some conflicting international findings particularly concerning the burden of an external tube

A. Tube -Related symptoms , Infection and antibiotics usage

The PCN group reported a significantly higher frequency of antibiotic use ($p=0.025$) and a higher frequency of Urinary symptoms (dysuria, hematuria, feeling unwell or fever) ($p=0.091$) compared to the Stent group even though it was not statistically significant. Literature (Joshi, Adams et al. 2001) (Shoshany, Erlich et al. 2019) (Monsky, Molloy et al. 2013) reported patients having indwelling stents experiencing more urinary symptoms (hematuria, dysuria, urgency, urinary frequency) compared to the PCN counterparts.

the relationship between the mode of diversion and the reported pain location was also not statistically significant possibly as shows the pain characteristics are highly similar and with almost every patient some level of pain

Our result maybe as a result of patient having PCN requiring frequent visit to Health care professional as a consequence of frequent bag leaks and frequent dislodgment(discussed below)

More frequent Antibiotics usage was also reported in patient with PCN but literatures reported no difference in the need of antibiotics for the 2 groups ($p = 0.3$)(Joshi, Adams et al. 2001)

- On the other hand the PCN group reported universal problems related to the having external tube . 82.9% of patient reported bag leakage/slippage, 100% reported bag management problems and 85.7% reported PCN wound site infection and associated smell .They also reported significantly more need with a health professional ($p=0.001$) for the PCN group. This finding strongly supports the literature emphasizing that PCN patients struggle with daily care, mobility, and hygiene due to the external tube (Joshi, Adams et al. 2001; Shoshany, Erlich et al. 2019).(Monsky, Molloy et al. 2013)
-

B. Pain and Painkiller Usage

The study found no statistically significant difference in painkiller usage ($p=0.308$), a finding consistent with other studies (Shoshany, Erlich et al. 2019). However, a numerically higher proportion of PCN patients reported frequent/always use (71.4% vs. 54.3%) of analgesics.

When analyzing pain location, the groups differ as the Stent Group Predominantly complained of Loin pain only (45.7%) and PCN Group Predominantly reported Combined Loin and Bladder pain (60.0%). Studies of patient with obstructive uropathy due to stone disease on impact of stent/PCN on pain showed conflicting result . While (Joshi, Adams et al. 2001) Patients with 'JJ' stents felt more frequently and at more sites, required analgesics (paracetamol with or without codeine, diclofenac) more frequently ($p = 0.036$) than the PCN group (Joshi, Adams et al. 2001) while (Shoshany, Erlich et al. 2019) reported both patient groups reported similar pain and analgesics usage .As there are no patients with stone disease having with PCN no comparison was made

The high incidence of combined loin and bladder pain in the PCN group is likely multifactorial,due from both the tube site discomfort , UTI symptoms and underlying etiology like malignant cause .

3. Comparison of Quality of Life (QoL) Domains

In direct contrast to several historical studies (Joshi, Adams et al. 2001; Shvero, Haifler et al. 2022) which suggested no significant QoL difference or patient preference, this study found that the Stent Group reported a significantly better QoL across nearly all domains.

A. 5 euro qol domains

Our studies similar to others studies demonstrated a high percentage of patients reporting problems with pain/discomfort and usual activities (95 and 91% with stents and 85 and 77% with PCN, respectively;(Joshi, Adams et al. 2001).(de Sousa Morais, Pereira et al. 2019)

The PCN Group reported significantly worse QoL in the highly functional domains (Mann-Whitney U Test) Usual Activities ($p<.001$),Self-Care ($p<.001$),Mobility ($p=0.001$).

Anxiety/Depression

Although the Mann-Whitney U Test for Anxiety/Depression was trending significant ($p=0.067$), the study showed a significant difference ($p=0.039$). The universal reporting of 100% of PCN patients reporting an having some level of anxiety in this domain is a powerful indicator of the psychological toll of a PCN, as opposed to stent-related urinary symptoms causing more anxiety (Shoshany, Erlich et al. 2019)

B. Overall QoL score and VAS

Our study showed the Stent Group has a significantly ($P<0.001$) higher overall health utility (better QoL) than the PCN Group. Stent Group VAS is significantly higher VAS (59.71) versus PCN Group (43.00). This highly significant difference, which contrasts with some studies (Joshi, Adams et al. 2001)(Monsky, Molloy et al. 2013) that found no QoL utility difference, and (Mokhmalji, Braun et al. 2001) (Shvero, Haifler et al. 2022) who found higher qol index(WHO index) in the PCN even though not clinically significant. In addition

Change of quality of life over time

Finding from Mokhmalji et al. (2001) and Shoshany et al. (2019) showed QoL of stent patients tended to deteriorate over time, but PCN patients often maintained or improved their score due to relief of acute obstruction, though Shoshany et al. still found DJS patients had a significantly lower score at time second time of evaluation. Our study showed as duration of diversion increase quality of life improves but after assessing using multiple regression it was found to be statistically not significant after controlling for different variables.

4. Independent Predictors of Poor QoL

The bivariate analysis identified strong correlations between QOL and the Diversion Mode ($\rho=0.434$), Purpose/Intent ($\rho=0.475$), and Malignancy Status ($\rho=-0.381$). Controlling for these inter-related prognostic factors, the overall model was highly significant $p=0.002$ and accounted for 22.2% of the QOL variance.

While the effect of both the Diversion Mode $p=0.078$ and the Intent of Diversion $p=0.077$ were slightly below the $\alpha=0.05$ threshold, they exhibited the strongest independent trends. This suggests that the QOL benefit of the Stent is maintained (associated with a 0.221 unit QOL increase) even whether its done for palliative or temporary purpose.

Crucially, the regression demonstrated that the negative impact of Malignancy Status and the potential for QOL adaptation over the Duration of the tube were not independent predictors (p -values of 0.570 and 0.903, respectively). This strongly implies that the QOL deficit observed in the PCN group is attributable to the inherent, tube-specific impact on QoL rather than the patient's underlying oncologic

- Duration of Diversion and Initial Severity (Age/Sex) did not independently predict QoL.

Conclusion and Recommendation

Conclusion

Our findings demonstrate a profound difference in patient-reported symptoms and quality between patient on PCN and stent even after controlling for significant confounding factors.

- Indication : PCN is selected for advanced malignancy while the Stent group was dominated by prophylactic diversion and non-malignant etiologies.
- Domain of QOL-Our studies analysis showed that the PCN Group reported a significantly worse than the Stent Group across major functional domains of Usual Activities, Self-Care ,Mobility and pain/discomfort whereas there was no statistically significant difference in terms of anxiety/depression
- Overall QoL : The Stent Group reported a significantly better qol and higher overall health stent .
- The bivariate analysis demonstrated that Mode of Diversion, malignancy status, duration and Purpose of Diversion were both highly significant predictors of Quality of Life (QOL), and the subsequent multiple regression confirmed that these only mode of diversion and purpose of diversion factors were the strongest independent variables, together explaining 22.2% of the QOL variance, while other clinical variables were not significant.

Strength

- High Clinical Relevance in assessing - much-needed local study, directly addressing a gap in Ethiopian data regarding Qol long-term urinary diversion
- Use of Validated and translated QoL Instrument- EuroQol EQ-5D- 5L
- Comparative study –comparing Qol between the groups which can be used in clinical decision making

Weakness

- Cross-Sectional Design- cannot establish causation (only association) and cannot track the change in QoL over time
- Single-Center Study
- Potential for Recall Bias
- Non-Probability Sampling (Convenience)-Using convenience sampling introduces the risk of selection bias for some patient with better QoL or better tube related symptoms maynot come for exchange or some be sick enough maynot be able to come for exchange or even after dislodgement
- Comparing of patient with different underlying pathology for Qol requiring complex statistical adjustment.
- Tube related symptoms were not validated for Ethiopia

Recommendations

Based findings of this study, the following recommendations

Clinical Practice

- Always consider quality of life during decision making of deciding between PCN and stent

- For patients requiring long-term urinary diversion , the Double-J Stent should be the preferred method whenever anatomically feasible, given its association with a significantly higher overall QoL and comparable tube related symptoms
- 3. Future Research
- Prospective Studies: Future research should involve a prospective study design to assess QoL at time of insertion and over time to assess early and prolonged change in quality of life of patient with stent/PCN.
- Qol studies on each specific pathology(patient with stone disease and palliative intervention)
- Other research area involving Qol ileal conduit,SPC,clean intermittent catheterization ,

Reference

Ahmad I, S. P. M., Tariq M, Shahzad Saleem M, Ali Tabassum S, Hussain A (2013). " Comparison between Double J (DJ) Ureteral Stenting and Percutaneous Nephrostomy (PCN) in Obstructive Uropathy " Pak J Med Sci. 2013 May;29(3):725-9.

Aravantinos, E., et al. (2007). "Percutaneous nephrostomy in patients with tumors of advanced stage: treatment dilemmas and impact on clinical course and quality of life." J Endourol **21**(11): 1297-1302.

de Sousa Morais, N., et al. (2019). "Percutaneous nephrostomy vs ureteral stent for hydronephrosis secondary to ureteric calculi: impact on spontaneous stone passage and health-related quality of life—a prospective study." Urolithiasis **47**(6): 567-573.

FALLON, B., et al. (1980). "Nephrostomy in Cancer Patients: To Do or Not To Do?" British Journal of Urology **52**(4): 237-242.

Fernández-Cacho LM, A.-A. R. (2019). "Quality of life, pain and anxiety in patients with nephrostomy tubes "

Gebreselassie, K. H., et al. (2024). "Ureteral stenting in patients with locally advanced cervical cancer: Predictors of low success rate." Gynecologic Oncology Reports **55**: 101491.

Gebreselassie KH, G. F., Hailu HE, Beyene AD, Hassen SM, Mummed FO, Issack FH. (2021). " Emergency Decompression of Obstructive Uropathy Using Percutaneous Nephrostomy: Disease Pattern and Treatment Outcome at Two Urology Centers in Ethiopia. ." Open Access Emerg Med. 2022;14:15-24

Gebrezgabiher, S., Kefyalew Merahi, Admasu Tesfaye Nigussie, and Kiros Solomon Gebregiworgis, et al. (2022). " "Clinical Profile and Outcome of Acute Kidney Injury in Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia." " Nephrology and therapeutics **12**(6).

Joshi, H. B., et al. (2001). "Nephrostomy Tube or ‘JJ’ Ureteric Stent in Ureteric Obstruction: Assessment of Patient Perspectives Using Quality-of-Life Survey and Utility Analysis." European Urology **39**(6): 695-701.

Lapitan, M. C. M. and B. S. Buckley (2011). "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 **37**(8): 1061-1070.

Mokhmalji, H., et al. (2001). "Percutaneous nephrostomy versus ureteral stents for diversion of hydronephrosis caused by stones: a prospective, randomized clinical trial." J Urol **165**(4): 1088-1092.

Monsky, W. L., et al. (2013). "Quality-of-life assessment after palliative interventions to manage malignant ureteral obstruction." Cardiovasc Intervent Radiol **36**(5): 1355-1363.

Mourmouris, P. I., et al. (2014). Obstructive Uropathy: From Etiopathology to Therapy.

Muhammad, A. S., et al. (2018). "Management of obstructive nephropathy in a tertiary hospital in North West Nigeria: A five-year review." East and Central African Journal of Surgery **Vol. 22 No. 3 (2017)v**.

Pietropaolo, A., et al. (2022). "Emergency upper urinary tract decompression: double-J stent or nephrostomy? A European YAU/ESUT/EULIS/BSIR survey among urologists and radiologists." World Journal of Urology **40(7)**: 1629-1636.

Shekarriz, B., et al. (1999). "Outcome of palliative urinary diversion in the treatment of advanced malignancies." Cancer **85(4)**: 998-1003.

Shoshany, O., et al. (2019). "Ureteric stent versus percutaneous nephrostomy for acute ureteral obstruction - clinical outcome and quality of life: a bi-center prospective study." BMC Urology **19(1)**: 79.

Shvero, A., et al. (2022). "Quality of life with tandem ureteral stents compared to percutaneous nephrostomy for malignant ureteral obstruction." Supportive Care in Cancer **30(11)**: 9541-9548.

Texeira L, P. B. (2019). "Role of Percutaneous Nephrostomy in Improving Quality of Life in Advanced Carcinoma Cervix Presenting with Obstructive Uropathy. ." J South Asian Feder Obs Gynae **2019; 11(2)**:107-109.

.

Tseng, T. Y. and M. L. Stoller (2009). "Obstructive uropathy." Clinics in geriatric medicine **25(3)**: 437-443.

Yaxley, J. and W. Yaxley (2023). "Obstructive uropathy - acute and chronic medical management." World J Nephrol **12(1)**: 1-9.

(Shoshany, Erlich et al. 2019)

euroqol.org, <https://euroqol.org/information-and-support/resources/value-sets/>

Annex

Questionnaire

Ureteric stent versus percutaneous nephrostomy for long term ureteral obstruction –
assessment of clinical profile and quality of life

Cross-sectional comparative study

Demographics data	MRN	Phone number
-------------------	-----	--------------

Age

Sex

occupation	1 government worker
------------	---------------------

2 private

3 merchant

4 farmer

5 house wife

6 daily labourer

7-unemployed

8 others specify

Religion	1 orthodox
----------	------------

2 muslim

3 protestant

4 catholic

5 others specify

Education	1 Illiterate
-----------	--------------

2 Primary

3 Secondary

4 University degree and above

Address	Region
---------	--------

City

	Urban /rural
Marital status	Single
	Married
	Divorced
	Widowed
Medical cost coverage	1 CBHI
	2 out of pocket
	3 employee insurance
	4 social worker
Clinical profile	
Indication	
diagnosis	
Hgb	
Cr baseline	
Recent	
Stage of disease (for malignant disease)	Stage1
	Stage 2
	Stage 3
	Stage 4
comorbidity	1 DM
	2 hypertension
	3 Asthma
	4 cardiac illness
	5 others specify
Purpose of diversion	1 palliative intent
	2-temporary diversion

Common to both groups	Nil	occasionally	Frequent	Always
-----------------------	-----	--------------	----------	--------

Urinary infections
(How often do you experience running temperature, feeling unwell and pain while passing urine?)

Need of pain killers
(How often do you need pain killers every day?)

Need of antibiotics
(How often do you need antibiotics?)

Need of help in daily care (How often do you need the help of a nurse, GP or other health professional?)

Specific to stent group

Problem of slipped stent (How often have you felt that the stent may have slipped?)

Specific to PCN group

Bag leak/slippage
(How often do you experience the problem of bag leak?)

Own bag management (How often do you experience difficulty

in the management
of your own bag?)

Stoma wound
infections (How
often have you felt
that the PCN site is
infected?)

Any smell
associated with the
bag (How often have
you experienced
troublesome smell
associated with the
bag?)

Questions Common to Both Groups If you have pain or discomfort in relation to the
stent/nephrostomy tube (no pain or discomfort please go to questions on the urinary
symptoms)

Which area is it Loin
present in (You can
choose both boxes)

Bladder(suprapubic region)

The duration of pain as experienced every day is

Infrequent

Frequent

Continuous

Is the pain present in(choose one)

Single posture only

Few postures

All body postures

An English and Amharic version of EQ-5D-5L

Under each heading, please tick the ONE box that best describes your health TODAY.

MOBILITY

- I have no problems in walking about ☐
- I have slight problems in walking about ☐
- I have moderate problems in walking about ☐
- I have severe problems in walking about ☐
- I am unable to walk about ☐

SELF-CARE

- I have no problems washing or dressing myself ☐
- I have slight problems washing or dressing myself ☐
- I have moderate problems washing or dressing myself ☐
- I have severe problems washing or dressing myself ☐
- I am unable to wash or dress myself ☐

USUAL ACTIVITIES (e.g. work, study, housework, family or leisure activities)

- I have no problems doing my usual activities ☐
- I have slight problems doing my usual activities ☐
- I have moderate problems doing my usual activities ☐
- I have severe problems doing my usual activities ☐
- I am unable to do my usual activities ☐

PAIN / DISCOMFORT

- I have no pain or discomfort ☐
- I have slight pain or discomfort ☐
- I have moderate pain or discomfort ☐
- I have severe pain or discomfort ☐

I have extreme pain or discomfort

☐

ANXIETY / DEPRESSION

I am not anxious or depressed

☐

I am slightly anxious or depressed

☐

I am moderately anxious or depressed

☐

I am severely anxious or depressed

☐

I am extremely anxious or depressed

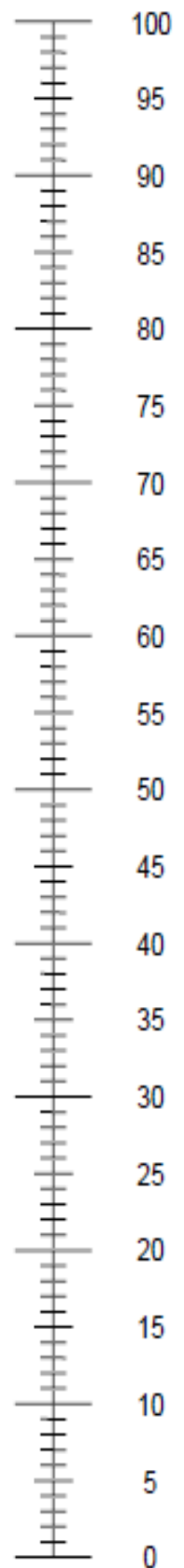
☐

Part- II

- We would like to know how good or bad your health is TODAY.
- This scale is numbered from 0 to 100.
- 100 answer the best health you can imagine.
- 0 means the worst health you can imagine.
- Mark an X on the scale to indicate how your health is TODAY.
- Now, please write the number you marked on the scale in the box below

YOUR HEALTH TODAY =

The best health
you can imagine



The worst health
you can imagine

የአማርኛ ትርጉም

ለኢትዮጵያ በእያንዳንዱ ርዕስ ስር ፣እባክዎ ዛሬ ያለዎትን ጤንነት በተሻለ ሁኔታ የሚገልጸው አንድ ሳጥን ላይ ምልክት ያድርጉ።

እንቅስቃሴ

- የመራመድ ችግር የለብኝም ☐
- አነስተኛ የሆነ የመራመድ ችግር አለብኝ ☐
- መጠነኛ የሆነ የመራመድ ችግር አለብኝ ☐
- ከባድ የሆነ የመራመድ ችግር አለብኝ ☐
- ምንም መራመድ አልቻልኩም ☐

ራስን መንከባከብ

- ለመታጠብም ሆነ ለመልበስ ምንም ችግር የለብኝም ☐
- ለመታጠብም ሆነ ለመልበስ አነስተኛ የሆነ ችግር አለብኝ ☐
- ለመታጠብም ሆነ ለመልበስ መጠነኛ ችግር አለብኝ ☐
- ለመታጠብም ሆነ ለመልበስ ከፍተኛ የሆነ ችግር አለብኝ ☐
- ራሴ ልታጠብም ሆነ ልለብስ አልቻልኩም ☐

መደበኛ ተግባራት (ለምሳሌ፡-ስራ፣ትምህርት፣የቤት ውስጥ ስራ፣ቤተሰባዊ ወይ ምዩኒቨርሲቲዎችተግባራት)

- መደበኛ ተግባራቶቼን ያለ ምንም ችግር አከናውናለሁ ☐
- መደበኛ ተግባራቶቼን ለማከናወን አነስተኛ ችግር አለብኝ ☐
- መደበኛ ተግባራቶቼን ለማከናወን መጠነኛ ችግር አለብኝ ☐
- መደበኛ ተግባራቶቼን ለማከናወን ከፍተኛ ችግር አለብኝ ☐
- መደበኛተግባራቶቼን ለማከናወን አልቻልኩም ☐

የሕመም ስሜት/ምቹት ማጣት

- የሕመም ስሜትም ሆነ የምቹት ማጣት ስሜት የለኝም ☐
- አነስተኛ የሕመም ስሜት ወይም የምቹት ማጣት ስሜት አለኝ ☐

መጠነኛ የሕመም ስሜት ወይም የምቸትማጣት ስሜት አለኝ ☐

ከባድ የሕመም ስሜት ወይም የምቸት ማጣት ስሜት አለኝ ☐

የከፋ የሕመም ስሜት ወይም የምቸት ማጣት ስሜት አለኝ ☐

ጭንቀት/ድብርት

ጭንቀትም ሆነ ድብርት የለብኝም ☐

አነስተኛ ጭንቀት ወይም ድብርት አለብኝ ☐

መጠነኛ ጭንቀት ወይም ድብርት አለብኝ ☐

ከባድ ጭንቀት ወይም ድብርት አለብኝ ☐

እጅግ ከባድ ጭንቀት ወይም ድብርት አለብኝ ☐

ክፍል II

- ዛሬ የጤናዎ ሁኔታ ምን ያህል ጥሩ ወይም መጥፎ መሆኑን ለማወቅ እንፈልጋለን።
- ይህ መለኪያ ከ 0 እስከ 100 ድረስ ቁጥሮች አሉት።
- 100 ማለት እርስዎ ሊኖርዎ የሚችለው በጣም ጥሩ የጤና ሁኔታ ነው።
- 0 ማለት እርስዎ ሊኖርዎ የሚችለው በጣም መጥፎ የጤና ሁኔታ ነው።
- በመለኪያው ላይ ዛሬ ጤንነትዎ ያለበትን ሁኔታ ለማሳየት የ X ምልክት ያድርጉ።
- አሁን እባክዎን ከታች ባለው ሳጥን ውስጥ በመለኪያው ላይ ምልክት ያደረጉበትን ቁጥር ይፃፉ።
-

ሊኖርዎ የሚችለው በጣም
ጥሩው የጤና ሁኔታ 100

95

90

85

80

75

70

65

60

