

ORIGINAL PAPER

Extra-anatomical urinary diversion for malignant ureteric obstruction: Our clinical experience

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Summary

Introduction and Objectives: Ureteral stenosis and upper urinary tract obstruction present significant clinical challenges, especially in cases involving complex, long strictures. Traditional management options like ureteral stents and percutaneous nephrostomy tubes often result in complications and diminished quality of life. Extra-anatomical Urinary Diversion (EAUD) offers an alternative approach, particularly for oncologic patients requiring palliative care.

Materials and Methods: From 2015 to 2019, eight patients with cancer-related ureteral strictures underwent EAUD. In all patients cancer-specific prognosis exceeded one year. The procedure was performed using a standard surgical technique.

Results: The mean patient age was 62.5 years, ranging from 22 to 82 years. The mean follow-up duration was 62.8 months.

Improvement in renal function was observed in some patients, while the early complication rate was 62.5%. Notable complications included infections and encrustation of the prosthesis. Two patients experienced multiple infections of the overlying skin and soft tissue necessitated the dislodgement of the prosthesis after 38 and 101 months, respectively.

Conclusions: Extra-anatomical stent placement constitutes a somewhat effective and safe option in the context of complex ureteral obstruction management in oncologic patients. The lack of external devices and its longer duration without the need for substitution compared with conventional double J stents can theoretically assure a better quality of life. However, a careful patient selection is needed in order to maximize the patients' benefit.

KEY WORDS: Ureteric obstruction; Extra-anatomical urinary diversion; Detour bypass.

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INTRODUCTION

Ureteral stenosis and resulting upper urinary tract obstruction can manifest with symptoms such as pain, infections, and diminished kidney function. Managing ureteral stenosis poses a challenge, especially in cases with complex long strictures.

According to EAU Guidelines, endourological treatment, such as dilatation, is safe and effective for small strictures (1). On the other hand, recurrent and long strictures require a more aggressive approach, ranging from end-to-

end anastomosis to reconstruction with intestinal interposition and auto-transplantation (1).

These procedures result in significant morbidity and mortality, especially in patients with major comorbidities or advanced cancer. Traditionally, two primary options exist for managing these cases. Ureteral stents or double-J stents can be inserted retrograde or antegrade. However, inserting a ureteral stent is not always feasible due to complete ureteral lumen occlusion. Furthermore, stents may fail to adequately drain the upper urinary tract in almost half of the cases due to tumor progression, extreme compression, or invasion of the ureter (2). Complications such as pain, lower urinary tract symptoms (LUTS), hematuria, encrustation, urinary tract infections (UTI), and impairment of kidney function are common. Additionally, stents are temporary and require regular replacement in the operating room based on stent type and patient characteristics (3).

An alternative is the placement of a percutaneous nephrostomy tube with an external collection device. While it ensures urinary drainage, it is associated with a significant reduction in quality of life due to discomfort, skin erosion, complex management requirements, limitations on daily and social activities, risk of obstruction and accidental removal, UTIs, and the need for frequent substitutions (4).

In this setting the Extra-anatomical Urinary Diversion (EAUD) with Detour[®] (Coloplast, Humlebaek, Denmark) seems to confer an acceptable approach (5, 6). This involves a specially designed reinforced silicone tube with a 27 Fr (9 mm) external and 17 Fr (5.8 mm) internal diameter, connecting the renal cavities to the bladder. The Detour bypass is inserted into the kidney through a small flank incision, runs subcutaneously, and is connected to the bladder dome through a small hypogastric incision. EAUD is extra-anatomical as it avoids the abdominal cavity and can be placed irrespective of ureter patency. EAUD is primarily indicated for palliative urinary diversion in selected oncologic patients requiring a percutaneous tube. Remarkable are the results of a series of terminally ill patients, where EAUD provided better quality of the patients' life than traditional percutaneous nephrostomy (7). Additionally, it may be considered in cases of stent failure, complications, or intolerance, where external diversion with a percutaneous tube is the only viable

solution. Furthermore, EAUD can serve as a definitive option in selected patients with complex ureteral stenosis of benign origin when stent insertion is not feasible, has failed, or when reconstructive surgery is not indicated or has proven unsuccessful (5). Finally, EAS placement has been reported in patients with ureteric stricture after renal transplantation (8).

We present our series with treatment of ureteral strictures with Detour EAUD.

MATERIALS AND METHODS

Between 2015 and 2019, our experience involved eight cases of *Extra-anatomical Urinary Diversion* (EAUD) with Detour, each performed on a different patient. Patients with ureteral obstruction secondary to advanced abdominal or pelvic malignancy were included. The datasets used and analyzed during the current study are available upon reasonable request from the corresponding author. We decided to include only patients with malignancy-related obstruction due to the ambiguous results regarding EAUD efficiency in ureteral strictures of benign descent deriving from relevant published literature. (9, 10) All the patients were informed about the study and the study was approved by the Scientific and Ethics Committee of our Hospital. The subcutaneous bypass was introduced as an alternative to a permanent percutaneous nephrostomy after either a failed attempt or a patient's denial to undergo double-J stent placement. All patients were discussed in a multidisciplinary tumor board meeting, and cancer-specific survival was evaluated based on the stage of the malignant disease. Only patients with over 1 year cancer-specific survival were included. Also, patients over 70 years old were evaluated using the Geriatric 8 screening tool (11). The follow-up was performed in an outpatient setting once every 6 months, where urine culture was obtained, the functionality of the Detour prosthesis was assessed and the satisfaction of the patients was reported through a non-structured interview. The bypass-related complications' severity was classified using the Clavien Dindo scale of surgical complications (12).

RESULTS

The mean age of the patients in our experience was 62.5 ± 18.4 years, with a range of 22 to 82 years and a median age of 64.5. Among the eight cases, four had colorectal cancer, two had cervical or ovarian cancer, one had retroperitoneal sarcoma and one suffered from cholangiocarcinoma. In all oncologic patients, the prognosis was more than 1 year, as indicated by the GERI-ATRICSCORE. Prior to the EAUD procedure, all patients had a nephrostomy tube, and five of them had previously undergone a failed or intolerable *Double-J* (DJ) stent placement. A list of all cases treated with Detour stent is presented in Table I.

The mean follow-up duration was 62.8 ± 34.8 months, ranging from 13 to 112 months, with a median duration of 65 months. Interestingly, many cases exhibited positive urine cultures, and three of them had symptomatic UTIs before undergoing EAUD. In those cases empiric antibiotic therapy was administered and subsequently was modified based on the antimicrobial susceptibility testing results.

The early complication rate during the first 90 days post-operatively was 62.5%, with 37.5% experiencing no complications, 60% classified as Clavien I, 20% as Clavien II and 20% as Clavien IIIb. No patients reported LUTS during the whole follow-up period. Improvement in renal function was observed in two patients

During their hospital stay the mean decrease in Hb was 1.14 ± 0.576 , while the mean Cr decrease was 0.416 ± 0.79 . Mean length of stay was as high as 4.57 ± 1.72 . However, during follow-up period three patients experienced multiple infections of the overlying skin and soft tissue requiring surgical debridement and dislodgement of the prosthesis in two cases. Also, one of the patients presented with encrustation of the prosthesis' vesical end, which subsequently necessitated endourological management. Additionally, one patient suffered from recurrent UTIs during the 31 month follow-up, which ended due to the patient's cancer related death. On the other hand, it is important to highlight that three of the patients experienced a complication free post-implantation course for 13, 72 and 106 months.

Table 1.
Cases treated with Detour stent.

Patient	Gender	Age	Malignant disease	Hb decrease (24h)	Cr decrease (24h)	Urine Culture	Length of stay (days)	Clavien Dindo (First 90 days)	Follow-up (months)	Complications during follow-up
1	Female	66	Ovarian	0.9	0.2	Positive	3	-	31	Multiple UTIs
2	Male	82	Colorectal	2.0	-0.1	Negative	4	-	72	-
3	Male	63	Colorectal	0.6	1.72	Positive	6	-	38	Multiple skin and soft tissue infections
4	Male	22	Retroperitoneal Sarcoma	0.8	0	Positive	6	I	67	Abscess formation along the course of the ureter
5	Female	57	Cholangiocarcinoma	2.1	0.3	Positive	7	II	13	-
6	Female	75	Cervical	0.8	-0.1	Positive	3	I	112	Prosthesis encrustation
7	Female	75	Colorectal	1.0	1.6	Positive	-	I	106	-
8	Male	60	Colorectal	0.9	-0.29	Positive	3	IIIb	101	Multiple skin and soft tissue infections

Table 2.
Summary of results.

Patient features	
Age (mean ± SD)	62.5±18.4
Gender, n (%)	
Female	4 (50%)
Male	4 (50%)
Complications, n (%)	5 (62.5%)
I	3 (60%)
II	1 (20%)
III	1 (20%)
Hb decrease (mean ± SD)	1.14 ± 0.576
Cr decrease (mean ± SD)	0.416 ± 0.79
LOS in days (mean ± SD)	4.57 ± 1.72
Follow-up in months (mean ± SD)	62.8 ± 34.8

A summary of the results of EAUD in the included patients is provided in Table II.

DISCUSSION

The indication for performing a diversion, such as Detour, is a common consideration in a diverse group of oncologic patients with substantial variations in treatment options and prognosis. Within this population, there is a distinct subset facing untreatable malignancies, characterized by a grim prognosis where ureteral obstruction is just one aspect of a more complex manifestation of metastatic disease. These patients often exhibit poor performance status and immunosuppression. Some studies suggest that urinary diversion in such cases might be considered overtreatment, as there is no clear clinical benefit in terms of survival (13). Moreover, urinary diversion can lead to a significant reduction in quality of life, with many spending a substantial portion of their remaining time post-intervention in the hospital (14).

Conversely, other patients experiencing ureteral obstruction have a more favorable prognosis. In many instances, ureteral stenosis is a consequence of the disease itself, surgical procedures, or systemic radiotherapy or chemotherapy. Those in this latter group who undergo urinary diversion often experience longer lifespans and may even achieve a cancer-free status (15). Recent epidemiological studies highlighting declining mortality rates in colorectal and cervical cancer, frequently associated with ureteral obstruction, contribute to the increasing number of chronic oncologic patients requiring permanent urinary diversion (16, 17).

In cases with a focus on quality of life, particularly in younger patients with a more extended life expectancy, the concept of palliative treatment for ureteral obstruction needs reconsideration. The psychological burden of long-term nephrostomy or ureteral stent use, with associated discomfort, challenging management, potential complications, and frequent substitutions, becomes particularly challenging for patients who have already overcome the adversities of cancer treatments. Additionally, patients often feel a sense of abandonment when told there are no alternatives, and they must continue living with nephrostomies or stents (18, 19).

Within this context, the treatment of ureteral stenosis with a permanent extra-anatomical stent emerges as an option to enhance the quality of life and preserve kidney function (20). However, due to the heterogeneity of these patients, the complexity of their medical history, and the uncertainty of prognosis, the decision is challenging and needs to be personalized. EAUD involves surgical implantation rather than endoscopic stent insertion (1). The first extra-anatomical stent devices developed consisted of a single lumen rigid stent with an internal diameter between 7 and 11 Fr and a length of 50 to 70 centimeters. However, given that the small diameter was a risk factor for stent encrustation a minimum diameter of 17 Fr was proposed (21-24). Despite the wider diameter, there is a risk of encrustation and infection, potentially requiring explantation or substitution through further surgical procedures (25). Although rare, severe complications have been reported (26). Factors such as previous multiple surgeries, especially those associated with radiotherapy, and a history of symptomatic UTIs with sepsis may contribute as potential risk factors. Therefore, patients must be thoroughly informed, prepared, and undergo regular follow-up evaluations. Despite these risks, our experience and that of other groups indicate that, in selected patients, the benefits of extra-anatomical stents in terms of significant improvement in quality of life outweigh the potential risks.

This study has several limitations. First of all, its retrospective nature constitutes a potential source of selection bias. Also, its small sample size cannot allow the extraction of reliable conclusions and restricts the external validity of the results. Moreover, given that only creatinine levels were provided and that chemotherapy can significantly affect creatinine levels in oncological patients, improvement in renal function cannot be accurately evaluated. More on that, the assessment of the device placement in the context of quality of life advancement was not performed through a structured tool potentially leading to reporting bias. Last but not least, the lack of a control group does not allow the provision of some valuable insights on which management option is optimal for patients with chronic upper urinary tract obstruction.

DECLARATIONS

Competing interests: The authors declare that they have no competing interests.

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Authors' contributions: MN: Study concept, data acquisition, contribution to manuscript writing and editing; DK: Ethics committee approval, manuscript original drafting; KK: Data analysis and interpretation, manuscript original drafting; AP: Data extraction, contribution to manuscript writing and editing; LKP: Data acquisition, manuscript reviewing; FE: Data acquisition, manuscript reviewing; AI: Project supervision, manuscript reviewing. All the authors read and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

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CONCLUSIONS

The Detour extra-anatomical stent constitutes a somewhat effective and safe option in the context of complex ureteral obstruction management. The lack of external devices and its longer duration without the need of substitution compared with conventional double J stents can theoretically promise a better quality of life. However, a more careful patient selection is needed in order to maximize the patients' benefit.

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