

Epidemiology and Mode of Emergency Diversion of Obstructive Renal Failure of Malignant Cause Retrospective Report

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Received: 16 Mar, 2024 | Accepted: 29 Mar, 2024 | Published: 05 Apr, 2024

Citation: Youssef B, Saleh NA, Hissein H, Amine M, Mohamed D, et al. (2024) Epidemiology and Mode of Emergency Diversion of Obstructive Renal Failure of Malignant Cause Retrospective Report. *Int J Nephrol Kidney Fail* 10(1): dx.doi.org/10.16966/2380-5498.246

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Abstract

Objective: Obstructive uropathy and its surgical management.

Methods: Retrospective cross-sectional study carried out in the urology department of Ibn Rochd University Hospital in Casablanca over a 12-month period (April 2019-March 2020). It included 63 cases of patients hospitalized for obstructive renal failure. We included all patients with renal failure due to a documented malignant pathology.

Results: Most of the patients were men (n = 45, 71.4%). The mean age was 60.2 years, with the most affected age group between 51 and 60 years. Forty-three patients (68.3%) were being treated for cancer. The clinical symptoms were diverse, dominated by low back pain. The bladder was the first organ affected by a tumor process. Renal function was impaired in all patients. Twenty patients (31.7%) (n=20) underwent dialysis prior to any bypass. The percutaneous nephrostomy (PCN) was inserted in 56 patients (88.9%) (n=56), the double J catheter in 5 patients (7.9%) (n=5), and 2 patients (3.2%) (n=2) had a percutaneous nephrostomy and a double J catheter inserted contralaterally.

Conclusions: In this cohort, bladder tumor was the main cause of obstructive renal failure. Percutaneous nephrostomy was the main mode of diversion used in our center. This choice was dictated by epidemiology and center experience not having a success rate of double J ureteral catheter placement in obstructive renal failure secondary to bladder tumor.

Keywords: Obstructive renal failure; Cancer, derivation; Percutaneous nephrostomy, Double J ureteral stent

Introduction

Obstruction of the upper urinary tract is common in various cancerous conditions. In some cancers (bladder, prostate, uterus, etc.) obstruction may be secondary to direct compression. In other cancers (testicular cancer, for example), obstruction is due to compression by adenopathies in the retroperitoneal region [1]. This obstruction may be responsible for the onset of life-threatening acute renal failure. Anatomically, it is characterized by dilation of the unilateral or bilateral upper urinary tract. This situation requires emergency urinary drainage. Adequate drainage helps maintain proper urinary flow, allowing systemic therapy in cancer, relieving the patient, and improving his quality of life [2]. Drainage can be achieved by insertion of an endoscopic or percutaneous catheter, i.e. placement of a double J catheter or percutaneous nephrostomy (PCN) [3]. However, there are no clear guidelines on the optimal method of urinary decompression in the context of malignant upper urinary tract obstruction [4]. In the present article, the authors' aim was to determine the etiologies

of malignant obstructive renal failure and to identify the mode of emergency diversion based on data collected in our practice.

Methods

This is a retrospective cross-sectional study carried out in the urology department of Ibn Rochd University Hospital in Casablanca. It took place over a 12-month period (April 2019-March 2020). All cancer patients (irrespective of location) hospitalized for documented malignant obstructive renal failure were included in the study. All patients underwent a biological examination that included blood count, hemostasis, renal function using creatinine clearance, and urinary tract ultrasound.

In practice: once the diagnosis has been made, the shunting is performed as a matter of urgency, regardless of the shunting method chosen. Percutaneous nephrostomy under local anesthesia, with the patient in a prone position with a log under the abdomen. Antibiotic prophylaxis is essential. After PCN, if the conditions are JJ and

clear urine is not present, an antegrade pyelogram is performed systematically to check the passage of contrast medium into the bladder. For patients with bladder or prostate cancer, retrograde placement of JJ is routinely attempted during resection procedures. A saline and methylene blue preparation was introduced through the nephrostomy tube in an attempt to identify the ureteral meatus.

The Student's t test was used and is considered significant if p-value <0.05. Results are expressed as absolute, mean or percentage values.

Results

During our study period, 63 cases were studied, representing a frequency of 5.25 cases/month. Males were predominantly represented, 71.4% (n=45). The mean age was 60.2 years, with extremes of 32 and 80 years. The age group most affected was between 51 and 60 years. More than 50% were being treated for bladder tumors (Table 1).

As part of the treatment of their known cancer pathology, 47 patients underwent a surgical procedure. These included transurethral resection of bladder tumors 51.1% (n=24), pulpectomy/orchidectomy 4.3% (n=2), colonic resection and colostomy 2.1% (n=1), extended hysterectomy 44.7% (n=21) and mastectomy 2.1% (n=1).

At the time of admission, 6 patients received or underwent chemotherapy, 13 underwent radiation therapy, 5 underwent concomitant radiochemotherapy, and 3 underwent hormonal therapy. The clinical symptoms were varied, dominated by low back pain (Table 2).

Depending on the causative pathology, the bladder was the first organ affected by a tumor process 55.8% (n=24).

Renal function was impaired in all patients. The mean creatinine clearance was 5,73 ml/mn/1.73m². Twenty patients (31.7%) underwent dialysis prior to bypass.

PCN was used in 56 patients (88.9%), double J catheters in 5 (7.9%) and 2 patients (3.2%) had both percutaneous nephrostomy and double

Table 1: Distribution of patients according to known cancer pathologies by organ.

Cancer	Number of cases	Percentage (%)
Breast	1	1,5
Kidney	1	1,5
Bladder	32	50,7
Prostate	10	15,8
Uterus (cervix)	14	22,2
Fallopian tube	2	3,1
Rectum	1	1,5
Pelvic mass	2	3,1
Total	63	100

Table 2: Distribution of patients according to symptomatology.

Symptomatology	Number of cases	Percentage (%)
Anuria	1	1,6
Incidental findings	1	1,6
Hematuria	18	28,6
Low back pain	31	49,2
Hematuria + low back pain	12	19,0
Total	63	100

J catheter inserted contralaterally. Table 3 shows the type of bypass according to the organs affected.

Discussion

In a publication on the management of digestive-related ureteral obstructions, De Lorenzis E, et al. [5] noted that 13 patients (25.5%) had received treatment (chemotherapy, radiotherapy, and chemoradiotherapy). This may explain the appearance of ureteral obstructions before, during, or after non-ablative cancer treatment. Furthermore, in our series, we observed the occurrence of ureteral obstruction in patients who had undergone hysterectomy. This could be explained by a possible local recurrence.

The clinical presentation varies from patient to patient; this is due to the diversity of primary etiologies involving several organs. The discovery may be fortuitous or manifest as symptoms (low back pain, fever, diuresis failure, or anuria) or complications (renal failure). The data of our research are similar to those of the report of Yossepowitch O, et al. [6].

Malignant ureteral obstruction is a type of obstructive uropathy caused by intrinsic or extrinsic malignant tumors [7]. They can be caused by a variety of pelvic, retroperitoneal, or metastatic tumors [8]. Urological, gynecological, or gastrointestinal tumors are the main causes [9]. In our series, bladder tumors were the first etiology identified. For De Lorenzis E, et al. [5], colon cancer was the leading etiology, accounting for 54.9%. In their study, only malignant obstructions of digestive origin were investigated. Depending on the type of study and local epidemiology, etiologies may vary.

There is no consensus on diversion options for ureteral obstructions of malignant causes. Retrograde placements of a double J ureteral catheter or an antegrade nephrostomy are the two main bypass modalities. Opinions vary according to specialty: mainly urologists and oncologists or radiologists [3]. Ahmad I, et al. [10] noted a significant incidence of JJ failure in malignant obstructive uropathy. Ku JH, et al. [11] and Kouba E, et al. [12], respectively, reported in two previous series on upper urinary tract diversion in cancer patients a failure rate of 0% for nephrostomy and between 16 and 58% for retrograde JJ placement. Depending on the organs affected, a high failure rate for JJ placement has been observed in bladder and prostate cancer, compared to colon and breast cancer [13]. This may be due to anatomical reasons. In bladder and prostate cancer, the trigonal region can be easily affected, resulting in blindness and obstruction of the ureteral meatus. In cervical or breast cancer, ureteral obstruction is secondary to extrinsic compression due to lymph node castings.

Table 3: Distribution of patients according to organs affected and mode of shunting.

Organ affected	PCN*	DJS**	PCN + DJS	Total
Breast	-	1	-	1
Kidney	-	1	-	1
Bladder	32	-	-	32
Prostate	9	-	1	10
Uterus (cervix)	13	-	1	14
Fallopian tube	-	2	-	2
Rectum	1	-	-	1
Pelvic mass	1	1	-	2
Total	56	5	2	63

*Percutaneous nephrostomy **Double J stent

Some cancer treatments induce retroperitoneal fibrosis, which in turn can be responsible for ureteral stenosis, making retrograde JJ catheterization difficult [14]. In a 1990, Chiou RK, et al. [15] concluded that percutaneous nephrostomy is safe and effective as a means of bypassing upper urinary tract obstructions of malignant cause, mainly of prostatic origin. They also noted a reasonable survival in cancer patients with renal failure. Elshumani W, et al. [16] concluded in a systematic review that both procedures are effective in the treatment of obstructions, but due to the heterogeneity of the included studies, it was not possible to conclude the superiority of one procedure over the other.

Beyond technical success rates, other parameters must be taken into account. These include the rate of complication, conversion to another shunting method, residual dilation, and length of hospital stay, duration of the procedure, financial cost, and also quality of life after the procedure [16]. These parameters are not studied in the present work and can be considered as points that could guide future work.

Strengths and Weaknesses

Strengths of the study

1. Clinical relevance: The study addresses a clinically relevant issue-obstructive renal failure due to malignant causes, which is a common urological emergency.

2. Retrospective design: Although retrospective, the study provides insights into real-world clinical practices and outcomes, reflecting the actual management of patients in the urology department during the specified period.

3. Detailed data collection: The study collects comprehensive data on patient demographics, clinical presentation, oncological history, and types of interventions, providing a thorough understanding of the patient population and their management.

4. Large sample size: With 63 cases included over a 12-month period, the study offers a substantial sample size, enhancing the robustness of the findings.

5. Clear objective and methods: The study clearly defines its objective and methodology, allowing for easy interpretation and replication by other researchers.

Weaknesses of the Study

1. Retrospective nature: The retrospective design limits the ability to control for confounding variables and may introduce biases in data collection and analysis.

2. Single-center study: Being conducted in a single center may limit the generalizability of the findings to other settings with different patient populations and resources.

3. Limited follow-up: The study primarily focuses on the immediate management of obstructive renal failure and lacks long-term follow-up data on patient outcomes and complications post-intervention.

4. Lack of comparison group: The study does not compare the outcomes of different diversion methods or assess the effectiveness of interventions against a control group, which could provide valuable insights into the optimal management approach.

5. Incomplete data on complications and success rates: The study lacks detailed information on complications associated with different diversion methods and the success rates of these interventions, which are crucial for evaluating the efficacy and safety of the procedures.

Overall, while the study provides valuable insights into the epidemiology and management of obstructive renal failure due to malignant causes, its retrospective nature and limitations in data collection and analysis should be considered when interpreting the findings. Future research could address these limitations through prospective, multicenter studies with longer follow-up periods and comprehensive outcome assessments.

Conclusion

Malignant obstructive renal failure is a frequent urological emergency that can be life-threatening. It is managed medically and surgically, requiring urinary diversion, which may be endoscopic (double J catheter) or percutaneous (nephrostomy catheter). In the present cohort, nephrostomy was the main bypass mode, possibly in relation to the main reported etiology (bladder tumor). The choice of shunt may be based on the patient's oncological history, the organ involved and the patient's condition. The choice of shunt mode also depends on the surgeon's habits and the practices of the centers involved.

Conflict of Interest

None.

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