Obstructive Neoplastic Anuria Overview at Ibn Rochd University Hospital—A Retrospective Study

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Abstract— Introduction : Obstructive anuria due to pelvic cancers is the most common obstructive anuria in our context, its diagnosis is easy, but it causes a lot of morbidity with often heavy and long management.

Materials and methods : This is a retrospective study containing 40 cases of confirmed neoplastic anuria treated in the urology department at the Ibn Rochd University Hospital in Casablanca Morocco between January 2016 and October 2018.

Purpose : The aim of our study was to establish the epidemiological, clinical, therapeutic and natural history in patients with neoplastic obstructive anuria.

Results : The mean age was 56 years old with a notable female predominance. The male to female ratio was 0.6. Sixty percent (60%) of our patients were consulted within 24 hours after the onset of anuria, the main symptoms preceding or accompanying anuria were lower back pain (75%) and hematuria (37.5%).

Criteria for a positive diagnosis included urinary retention with complete absence of diuresis, the anuria was confirmed by probing or ultrasound, dilation of the urinary excretory system on ultrasound and acute impairment of renal function.

To prevent patient from going into metabolic disorders, hemodialysis was performed in 27 patients (67.5%). Internal diversion of urine by mounting a JJ catheter was initially attempted in 40% of the cases. In case of attempt failure, or in case of locally advanced pelvic tumors, percutaneous nephrostomy was performed with a success rate of 100%.

Upon follow up for 30 months, mortality rate was 5% (n=2), 95% of the patients benefited from a specialized follow-up for their etiological neoplasm.

Conclusion : The management of neoplastic obstructive anuria must be rapid, the type of urinary diversion is chosen according to the clinical presentation and the technical platform available.

Index Terms—Anuria; Obstructive; Tumor.

I. INTRODUCTION

In this study, obstructive anuria of the urinary excretory pathway is defined as a complete or near complete cessation of diuresis (less than 200cc or 400cc/24h) which is due to an obstruction located at any level of the upper excretory pathway. Anuria is caused majorly by an obstruction to the excretory system or rarely due to reflex anuria. Obstruction can be bilateral, or unilateral in case of a single functional or anatomical kidney. Whereas, reflex anuria on unilateral obstacle is rare which represents 2 to 10% of the causes of acute renal failure and its presence requires emergency care. [1]

The aim of this study is to evaluate the diagnostic, etiological and therapeutic aspects of anuria secondary to a

neoplastic obstacle via a retrospective collection of cases at the urology department of the IBN ROCHD university hospital in Casablanca.

II. METHODS

This study is a retrospective study carried out in the urology department of the Ibn Rochd University Hospital in Casablanca from January 2017 to October 2019. The total number of cases which were included in the study is 40, all patients were hospitalized due to obstructive anuria caused by a confirmed neoplastic pathology histologically. A literature review was conducted to compare management in literature with our current practice.

III. RESULTS

The age of our patients varied between 35 and 77 years old, with an average of 56 years. This particular disease was found to be more prevalent amongst patient in their forties, fifties. Female predominance was observed with 24 women presented with this disease compared to 16 men (ratio of 1.5:1). The most common presenting complaint was inability to empty the bladder in 66% of cases (n=27), followed by lower back pain and hematuria in 40% of cases (n=16). Pyuria was found in 3 cases and pyelonephritis in 4 cases. The diagnostic delay varied between 12h and 36h with an average of 24h. Oligo-anuria onset was progressive over an average of 6 days in 37 cases and was brutal in 3 cases. The symptoms accompanying anuria were: bilateral low back pain in 75% of cases, pelvic pain in 80% of cases in different aspects, ranging from simple discomfort to acute paroxysmal pain, digestive signs such as vomiting and transit disorders in 30% of cases. 10% of the cases had edema of the lower limbs. We have also observed a case of pulmonary overload, and bilateral fluid effusion syndrome, and a case of acute pulmonary edema. Fifteen per cent (15%) of the cases were febrile. A deterioration of the general state was marked in 45% of the cases. Pelvic digital examination showed a pelvic induration in 16 cases (15 cases of cervical cancer and one case of prostate cancer), induration of the base of the bladder in two cases, and a suspicious prostate in digital rectal examination in 11 cases. The level of urea varied from 0.88 to 4 g/l with an average of 2.12 g/l, creatinine level varied from 36 to 260 mg/l, with an average of 121.88 mg/l. The serum concentration varied from 126 to 140mEq/l with an average of 135mEq/l. The potassium concentration ranged from 3.6 to 87mEq/l, (with an average of 5.7mEq/l). The alkaline reserve varied between 9.1 and 31 mEq/l with an average of 20.1 mEq/l. Eighteen patients had anemia with a hemoglobin level varying from 4 to 10g/dl. Four patients had a urinary tract infection before

anuria. The most common isolated organisms included *E. coli* in 3 cases and one case of *Klebsiella*. The Ultrasound found 37 cases of bilateral uretero-hydronephrosis, one case of unilateral uretero-hydronephrosis and two cases of bladder tumors without dilation. Only two non-contrast computed tomography (CT) exams were performed in immediate emergency. Descending pyelography was performed in all patients derived by nephrostomy in order to verify the location of the probe and to evaluate the option of internal bypass by JJ probe later. Cystoscopy was performed as part of an assessment of cervical cancer extension in two cases and one case of prostate cancer. Four cases of bladder tumor were objectified. The etiologies of obstructive anuria was dominated by cervical cancer, found in 20 cases, whose age was between 36 and 60 years old with stage IIb cervical cancer found in one case, IIIa in two cases, IIIb in 16 cases and IV in one case. Five patients underwent a colpo-hysterectomy with radiotherapy. Radiotherapy with chemotherapy was done in 3 cases. Radiotherapy alone was done in 3 cases. Bladder cancer was diagnosed in 12 cases. 6 cases of prostate cancer and 2 cases of rectal ADK were identified. The treatment aimed at correcting metabolic disorders, removal of the obstacle and treat the etiology.

The short-term primary outcome aimed at improvement of the renal function in all the patients. Whereas in this study, normalization of renal function was obtained in 60% of patients, while 40% progressed to chronic renal failure of which 10% progressed to end-stage chronic renal failure. One patient died in the department following a massive pulmonary embolism. The 39 patients were referred to the various departments for etiological management of their neoplasms. 75% of the cases regularly followed their etiological treatment, 10% of which died for reasons other than renal failure. 25% of the cases are lost during our follow-up.

TABLE I: TYPE OF EMERGENCY DERIVATION

Therapeutic attitude	Number of cases	Etiologies
Initial single probe +/- JJ probe	16 (40%)	Cervical cancer (11 cases)/ prostate cancer (3 cases)/rectal cancer (2 cases)
Initial percutaneous nephrostomy	24 (60%)	Bladder cancer (12 cases)/cervical cancer (9 cases)/prostate cancer (3cases)
Nephrostomy after failed endoscopy	5 (12,5%)	Prostate cancer (1case)/ Cervical cancer (4cases)
JJ probe after descending pyelography by nephrostomies and resection of the meatus	8 (20%)	Cervical cancer (6 cases)/ Prostate cancer (2 cases)

IV. DISCUSSION

Obstructive anuria of the excretory pathway is defined as the cessation of diuresis (200 or 400ml), along with an empty bladder on urinary system, with the cause being located at a supra-vesical level including the urethral vessels. Anuria is secondary to complete obstruction bilaterally in the presence of two kidneys or unilateral in cases with a single kidney [1]. Anuria causes post-renal

kidney failure because the obstacle is located downstream of the kidneys (2). One of the leading causes of obstructive anuria is pelvic cancer. Few studies are available on the distribution of the organs involved. Colombeau et al. have noted the following etiologies: genital cancers (35%), prostate cancers (25%), bladder cancers (23%) and digestive cancers (15%). [3]

Rakatotiana et al report that 38.09% of the causes of obstructive anuria were pelvic in a series of 42 cases [4]. In a Moroccan series of 30 cases (1995), anuria was due to pelvic cancers in 26.6% of the cases [5]. The neoplastic obstacle on the excretory pathway leads to a cessation of diuresis then an increase in the upstream pressure in the renal tubules and a blockage of glomerular filtration. The immediate consequence is the appearance of water, nitrogen, potassium, phosphorus and uric retention, which can be life-threatening in the short term. Two mechanisms can be involved in the pathophysiology of neoplastic obstructive anuria:

- The tumor carries out a direct invasion by contiguity to the ureter or the ureteral meatus or it is about an extrinsic compression.
- A metastasis (by lymph node or retroperitoneal invasion) of a distant primary tumor.

A tumoral ureteric invasion is a factor of poor prognosis. The diagnosis is made in a patient who has not urinated spontaneously for a few hours and whose bladder is empty or contains only a few drops of urine on catheterization or bladder ultrasound. They may be also associated later signs of an acute kidney failure, such as nausea or vomiting associated with headache, diarrhea and visual disturbances, or obstructive signs such as back pain [6][1][3]. The clinical examination seeks symptoms related to the cause of the obstruction of the excretory pathway such as hematuria, urinary disorders related to an adenocarcinoma of the prostate or a bladder tumor, metrorrhagia or leucorrhea evoking cervix cancer, rectorrhagia or dysenteric syndrome related to a rectal tumor. The clinical examination should look for a bladder distension and neoplastic pelvic infiltration using rectal and vaginal digital examinations. The biological assessment must essentially include a blood ionogram to assess the degree of renal insufficiency and thus provide the indication for an emergency extra renal purification. Kidney and urinary tract ultrasound is an inexpensive and emergency procedure. Bilateral or unilateral pyelocalic cavities dilation on a unique kidney is almost pathognomonic of obstruction of the excretory pathway. However, there are between 5 and 20% of false positives related to an intra sinus fluid image due to a parapyelic cyst, and around 10% of false negatives when the excretory tract is not dilated [1]. Kidney ultrasound should also analyze kidney size and cortical index, the presence of stones, retroperitoneal organs and the search for a pelvic tumor. The non-contrast CT scan is not a systematic examination during the emergency management of malignant obstructive anuria. It is essential to use it in case of diagnostic doubt or in clinical situations where the ultrasound examination is not conclusive. MRI can be performed regardless of kidney function. It gives the same type of information as the CT scan. It can be performed without injection or be performed with gadolinium injection:

injected MRI (sequence T1), reproducing an intravenous urography. [1]

Kidney scintigraphy is used outside the emergency situation to assess residual kidney function. Young people with an early diagnosis will have a better renal prognosis [7]. In our center, access to ultrasound and CT scan in emergency is easy, however the MRI is not available in an emergency situation. The principles of emergency treatment are similar for all obstructive anuria. Hospitalization in a specialized environment is required with close supervision. Cessation of nephrotoxic drugs is essential. The dosages of those with renal elimination must be adapted. Emergency situations are: Acute pulmonary edema, hypernatremia, hyperkalemia, high blood pressure and metabolic acidosis, which are an indication for a nephrological opinion for dialysis [2]. Calorie and nitrogen intake should be increased as acute renal failure generates hypercatabolism. Finally, prevention of stress ulcer must be ensured by prescribing a proton pump inhibitor [1]. After the diversion, the early detection of post-obstructive diuresis is important. It is defined by a diuresis greater than 3000ml /24h [8]. Screening is based on hourly monitoring of diuresis after removal of the obstacle and the blood ionogram. [2], it is a complex phenomenon that involves physiological, biochemical, hormonal and immunological mechanisms [8].

TABLE I: TECHNIQUES AND INDICATIONS FOR EMERGENCY URINARY DIVERSION

Derivation Type	JJ Probe	Ureteral Catheter	Nephrostomy
Advantages	No external drainage Better tolerance Possible Extended drainage	External monitoring, Reduces the risk of prolonged blockage	Most often under local anesthesia External monitoring Reduces the risk of prolonged blockage (in particular in the event of associated infection) Success rate: 90%
Inconvenients	Difficult monitoring the efficiency of drainage in the acute phase	Temporary drainage External drainage pocket Uncomfortable	Most often temporary drainage External drainage pocket Contraindicated if bleeding disorders
Complications	Obstruction Rare mild hematuria	Secondary displacement	Hemorrhagic risk Secondary displacement
Indications	First intention in some centers if no associated infection	First intention in some centers especially if associated infection	Retrograde drainage failure or first intention in some centers

Percutaneous nephrostomy is an excellent initial procedure to relieve malignant ureteric obstruction with minimal complications. Patients treated for primary neoplasia and who may still be offered other therapeutic modalities, particularly radiotherapy, chemotherapy and hormone therapy may benefit from the procedure. However, the main factor that should guide the management of the urologist is the desire of the patient. Some patients may refuse nephrostomy although they are good candidates, others may wish to prolong life even for a short time for emotional, legal or financial reasons and this wish must be respected.

All gynecological cancers (endometrial cancer, ovarian cancers, uterine sarcomas) can cause obstructive anuria in their advanced stages [9]. In our series, 20 cases (50%) of cervical cancer were identified, 11 cases had a urinary derivation with a JJ probe and 9 cases by nephrostomy, after descending pyelography and verification of the passage of the contrast product, six cases were re-derived by JJ probe. Coulibaly et al reports 60% cases of cervical cancer in his series. Other series reports a frequency of cervical cancer of two out of 75 cases; all causes combined and constitute 16% in a Cameroonian series [6][10][11]. The management of these advanced gynecological cancers most often consists of a therapeutic combination comprising external radiotherapy, utero-vaginal brachytherapy, chemotherapy and generally secondary surgery. A cystoscopy with possible bladder biopsies is generally performed as an extension assessment. A maximal nephronic capital is recommended in case of chemotherapy with platinum salts, hence the advantage of early derivation. The mode of urinary diversion is to be reviewed secondarily according to the carcinological results and the gynecological surgical attitude sometimes going as far as the achievement of a Bricker-type supra-vesical diversion during a possible pelvic exenteration [1].

Anuria is an often-progressive accident of prostate cancer. It revealing locally advanced forms and revealing cancer three times out of ten, fifteen years ago has become exceptional in the countries practicing screening [1]. Patient monitoring makes it possible to derive the upper urinary system by JJ probe from the start of repercussions on the upper excretory tract. Depending on the context, the bypass is made either by endoprosthesis or by nephrostomy initially. Pyelography helps to clarify the level of obstruction (Figure 1).

Continuation of treatment involves corticosteroid therapy associated with androgen blockade for 6 to 8 weeks and an attempted drainage by JJ probe after endoscopic resection of the trigone, which is most often invaded [1].

The ureteral obstacle may also be related to an extra-prostatic extension at the level of the seminal gland or even to a lymph node mass. In our series, we had six cases of prostate cancer: 3 cases were initially derived by a JJ probe, three cases by nephrostomy after verification of the passage of the contrast medium in pyelography. Only one case was rederived by JJ probe. Our choice was dependent on the patient's condition, the technical platform and the availability of equipment. Coulibaly et al in its series of 65 cases reported 14% cases of the acute obstructive renal failure as being secondary to prostate cancer.

The diversion was dictated by the technical platform and

the equipment availability. Nephrostomies were performed blindly, a methodology to be avoided [6]. Prostate cancer in the study by Halle et al was implicated in 12% of cases of neoplastic or non-neoplastic obstruction etiologies, with high mortality in prostate cancer [10]. Prostate cancer represented 4.38% of the total etiologies of obstructive uropathies in a series in Sudan [12]. The series reports derivations either by nephrostomies initially or after failure of diversion by JJ probe, or immediately by a JJ probe.

Fig. 1. Descending pyelography performed immediately after bypass in a 68-year-old anuric man followed for Gleason 9(4 + 5) prostate adenocarcinoma.

In the bladder cancer anuria is generally secondary to an invasion of the bladder trigone. When a bladder tumor is suspected to be the cause of obstructive anuria on imaging or on the clinical presentation, [1] drainage of the upper urinary tract is most often performed urgently by nephrostomy. Indeed, re-sealing of the urethral meatus during endoscopic resection can be difficult. It is easier secondarily with a nephrostomy in place. Once the extension assessment has been carried out, a cystectomy with a bladder replacement, a Bricker type bypass, or a palliative supra-vesical bypass can be considered. Coulibaly et al reported 9 cases (22%) of bladder tumors as etiologies of obstruction of the upper urinary tract. El Imam et al reports 28 cases (5.38%) caused by a bladder tumor. Ten cases of bladder tumors were found in a Benin series out of 75 cases. Studies in underdeveloped countries often show a long diagnostic delay, which may be due to a low level of education, the low socio-economic level of the patients, and the lack of social security [6][11][21].

Anuria is not a frequent complication of the evolution of recto-sigmoid cancers: only 5% of cancers are complicated by anuria. Urinary diversions are similar to genital cancers [1]. In our series, two cases of rectal cancer were reported, derived by endoprosthesis initially and then sent to the visceral surgery department for appropriate management.

V. CONCLUSION

The diagnosis of obstructive anuria is focused primarily on the clinical examination and then confirmed by ultrasound. The etiologies were dominated by cervical cancer. The inadequacy of technical platforms, the unavailability of equipment and the delay in consultation are the cause of a poor prognosis.

But despite this, our urology department helps its patients, who are often destitute, to pass this phase and continue cancer care as soon as possible.

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