

# Diversion of the Upper Urinary Tract by A Double J Catheter: Indications and Results in A Retrospective Study from the Sino-Guinean Friendship Hospital in Conakry (Guinea): About 45 Cases

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## Abstract

**Introduction:** In the presence of renal cavities dilatation with or without renal insufficiency, or in the presence of a risk of extrinsic or intrinsic occlusion of the ureteral lumen, the JJ catheter constitutes a minimally invasive alternative for the diversion of the upper urinary tract. The aim of this work was to report the indications and results of the diversion of the upper urinary tract by JJ catheter in our department. **Materials and Methods:** Retrospective descriptive study with analytical and monocentric aim concerning the diversion of the upper urinary tract by a JJ catheter from the hospitalization records of our department from January 1, 2022 to December 31, 2023 at the Sino-Guinean Friendship Hospital. **Results:** We identified 45 cases of obstructive renal failure. The incidence of obstructive renal failure was 22.5 cases/year. The most common reason for consultation was lower back pain. Physical examination was normal in all patients. Preoperative creatinine was high in all our patients. Ultrasound revealed dilatation of the upper urinary tract in all patients. The surgical indications were dominated by obstructive ureteral stones in 24% of cases, followed by ureteropelvic junction syndrome in 22% of cases. Management consisted of drainage of the upper urinary tract by endoscopic insertion

of a JJ catheter. The etiologies were dominated by ureteral stenosis (64.29%), followed by compression of the ureter by the pregnant uterus (14.29%). The evolution was favorable in all our patients with a normalization of creatinine level on post-operative day 2. **Conclusion:** The placement of ureteral stents has become a common procedure in the management of various obstructive pathological processes of the urinary tract.

## Keywords

JJ Probe, Ureteral Endoprotheses, Obstructive Renal Failure, Lithiasis, SJPU

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## 1. Introduction

The JJ probe was first used in 1978 by the teams of Finney and Hepperlen [1]. Since then, it has been modified several times, both in terms of its form and the nature of the materials used, in order to improve its effectiveness and tolerance [2].

Currently, in the presence of dilation of the renal cavities with or without renal insufficiency or the existence of a risk of extrinsic or intrinsic occlusion of the ureteral lumen, the JJ probe represents a minimally invasive alternative for diversion of the upper urinary tract [3]. As such, the insertion of the JJ probe has become a frequent procedure in urology [4].

Although the indications for the JJ catheter are frequent in Guinea and in our department in particular, studies relating to this subject in our department are not available. It is in view of this fact that we undertook this work, the objective of which was to report the indications and results of the diversion of the upper urinary tract by JJ catheter in the urology department at the Sino-Guinean Friendship Hospital in Conakry.

## 2. Materials and Methods

This was a retrospective, single-center, descriptive study including all patients who underwent endoscopic JJ catheter insertion as a first-line type of upper urinary tract diversion during the period from January 1, 2022 to December 31, 2023 at the Urology Department of the Sino-Guinean Friendship Hospital in Conakry, Guinea. The parameters studied were:

Physical examination, indication for JJ tube insertion, etiological diagnosis, pre- and post-operative creatinine level, post-operative plain abdominal X-ray (PAP).

## 3. Results

### 3.1. Frequency

During the study period, we used 45 patient files followed for obstructive renal failure. The incidence in the urology department is 22.5 cases/year.

### 3.2. The Clinic

The most common reason for consultation was low back pain in the majority of patients. Physical examination was normal in all patients.

### 3.3. Biology

Preoperative creatinine was elevated in all patients.

### 3.4. The Imagery

An ultrasound was performed on all patients revealing dilation of the upper urinary tract in some cases.

### 3.5. The Treatment

The operative indications for drainage of the upper urinary tract were dominated by obstructive ureteral stones in 24% of cases, followed by ureteropelvic junction syndrome in 22% of cases and obstructive renal stones in 20% of cases; the other obstructive causes are presented in **Table 1**. The management consisted of drainage of the upper urinary tract by endoscopic insertion of a JJ catheter.

### 3.6. Etiologies

The etiologies were dominated by ureteral strictures in 64.29% of cases, followed by compression of the ureter by the pregnant uterus in 14.29% of cases. Other obstructive causes are presented in **Table 2**.

**Table 1.** Indications for JJ probe placement.

| Indications                      | Staff     | Percentages |
|----------------------------------|-----------|-------------|
| Obstructive ureteral lithiasis   | 11        | 24          |
| SJPU                             | 10        | 22          |
| Obstructive renal lithiasis      | 9         | 20          |
| Acute obstructive pyelonephritis | 8         | 17          |
| Ureteral stricture               | 6         | 13          |
| Retroperitoneal fibrosis         | 2         | 4           |
| <b>Total</b>                     | <b>45</b> | <b>100</b>  |

**Table 2.** Other obstructive etiologies.

| Etiologies                              | Staff     | Percentages |
|---|-----------|-------------|
| Ureteral stenosis                       | 9         | 64.29       |
| Pregnancy (21 weeks of amenorrhea)      | 2         | 14.29       |
| Insurmountable retroperitoneal fibrosis | 1         | 7.14        |
| Left ureteral meatus not visualized     | 1         | 7.14        |
| Post-pyeloplasty PUJ stenosis           | 1         | 7.14        |
| <b>Total</b>                            | <b>14</b> | <b>100</b>  |

### 3.7. Evolution

In our series, all patients had a favorable outcome after drainage with normalization of creatinine levels on post-operative day 2.

An ASP was performed on post-operative day 1 in all patients with successful surgery.

The main complications were: per-operative bleeding in 4% of cases (n = 2) and post-operative fever after 24 and 48 hours in 13% of cases (n = 6).

## 4. Discussion

In the event of acute complicated renal colic, it is recommended to divert urine by inserting a JJ, ureteral or nephrostomy catheter [5]. The main indication for the JJ catheter is to maintain the patency of the upper urinary tract in cases of acute or chronic, intrinsic or extrinsic obstruction [6]. In our study, ureterohydronephrosis represented the primary indication with 100% of cases. These results were similar to those obtained by Zakou ARH *et al.*, who found that ureterohydronephrosis was the primary indication, observed in 95.5% of their patients [2]. However, these results were different from those obtained by Ndiath *et al.*, who found that the indications for the insertion of the JJ tube were obstructive renal colic, ureterocutaneous fistula and ureterohydronephrosis, objectified respectively in 62.1% (46), 2.7% (2) and 35.1% (26) of patients [7].

In the Zakou ARH study, the etiologies were dominated by urinary lithiasis, found in 29.6% of cases. Tumor etiology was in second position (27.3% of cases), with a prevalence of cervical tumor in 18.18% of cases and prostate tumor in 4.55% [2]. In the study by Ndiath *et al.*, urinary lithiasis was also predominant, observed in 39.1% (29) of patients [7]. In the literature, the failure of JJ probe insertion for tumor obstruction varies from 37% to 51% [8], or even 79% [9].

The failure rate is even higher in patients with prostate or bladder tumors (55%) [10]. Additionally, operative success for percutaneous nephrostomy in these patients varies between 96% and 100% [2].

In contrast, in our study, the etiologies were dominated by ureteral stenosis, found in 64.29% of cases, followed by compression of the ureter by the pregnant uterus in 14.29% of cases. Other obstructive causes were: impassable retroperitoneal fibrosis, unvisualized ureteral meatus, and post-pyeloplasty PUJ stenosis, each observed in one patient.

JJ tube insertion should preferably be performed under spinal or general anesthesia, but it can also be performed under local anesthesia [11]. Sivalingam *et al.* demonstrated that JJ catheter placement under local anesthesia with 2% lidocaine urethral gel was tolerable and as successful as general anesthesia [12].

The feasibility of JJ probe insertion without fluoroscopic guidance should be a feasible option in our structures often faced with amplifier unavailability. Thus, in all patients in our series, the technique was performed blindly with a 100% success rate.

Anesthesia was in the form of spinal anesthesia in all patients. During the

operation, the image intensifier was not used due to the lack of equipment. Overall, the success rate was 100% (45 patients). This technique, without an amplifier, is interesting in pregnant women where fluoroscopy is contraindicated. In the series of Ndiath *et al.*, the operative success rate, all indications combined, was 86.5%. Lih-Ming Wong *et al.*, for their part, found an operative success rate of 84% in their patients [13].

However, in the literature, infection, encrustation and obstruction are the main complications related to the implantation of ureteral stents. Known risk factors for encrustations are urinary sepsis, lithiasis pathology, congenital or acquired metabolic abnormalities, pregnancy, chemotherapy [14].

However, optimized stent selection, as described by Leslie and Shenot, will reduce complications such as encrustations and patient discomfort, while maintaining safe access and maximum patient comfort [15].

In our series, the complications observed were: per operatively bleeding in 4% of cases (n = 2) and postoperatively after 24- and 48-hours fever in 13% of cases (n = 6). As for Zakou *et al.* [2], they reported a post-operative complication rate of 2.33% and of the type of calcification of the two ends of the JJ probe in the sixth post-operative month.

Postoperatively, an ASP (abdomen without preparation) was performed the next day in all patients to check the location of the probe, which was in place in each of them.

## 5. Conclusions

The JJ catheter is an effective, non-invasive option for upper urinary tract drainage with the goal of preserving renal function.

At the end of our study, it appears that the ascent of the JJ probe without fluoroscopic guidance is feasible, but it requires careful selection of patients. Finally, we also noted that ureteral strictures were the dominant etiology in our study, unlike other studies where stone-related causes were more common.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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