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ORIGINAL RESEARCH

Pyeloureteral junction syndrome: experience at the Douala General Hospital

FG Epoupa Ngalle,[1,2] O Orok-Tambe,[1,2] LO Mbouché,[2] AQ Essomba,[1,3] JC Fouda,[2] CF Ateaze,[1,2] EH Moby Mpah,[3] FF Angwafo III[2]

[1] *Urology Unit, Department of Surgery, Douala General Hospital, Cameroon*
[2] *Faculty of Medicine and Biomedical Sciences, University of Yaoundé I, Cameroon*
[3] *Faculty of Medicine and Pharmaceutical Sciences, University of Douala, Cameroon*

Corresponding author, email: frantzepoupa@gmail.com

Background: Pyeloureteral junction syndrome (PUJS) is a frequent upper urinary tract malformation. We report the experience at Douala General Hospital (DGH) in diagnosing and managing PUJS.

Methods: This was a retrospective study from January 2015 to June 2025 (10 years) that included all adult and paediatric patients who underwent surgery for PUJS.

Results: During the study period, 18 cases of PUJS underwent surgery, of which 61.1% were men, with an average age of 34.1 years (range 4–72). The main presenting complaints were flank pain (83.34%) and recurrent urinary tract infections (16.67%), all evolving within five years before surgery. Ultrasound, coupled with a computed tomography (CT) scan, was performed to confirm the PUJS diagnosis. Anderson–Hynes open pyeloplasty was performed in all patients, followed by double-J stent placement spanning the anastomosis. In one case, the uncrossing of a lower polar vessel was done, followed by pyeloplasty. For the patient with bilateral PUJS, the most symptomatic side (left) was treated first and the other side was treated six months later. One patient had a nephrectomy for a type IV non-functional kidney. The renal compartment was drained with a negative pressure drain, and all drains were removed within 48–72 hours postoperatively. The average surgery time was 124 minutes (range 97–161), while the average hospital stay was five days. Postoperative outcomes were simple, with resolution of clinical and biological signs at six- and 12-month follow-up visits.

Conclusion: Done properly, Anderson–Hynes open pyeloplasty has a success rate of over 90% and remains the gold standard in settings where laparoscopy and robotics are not readily available.

Keywords: pyeloureteral junction syndrome (PUJS), open surgery, pyeloplasty, double-J stent

Background

PUJS, also known as primary hydronephrosis, is an anatomical malformation in the upper urinary tract. It can be congenital or functional, incomplete and generally progressive, and is characterised by a narrowing of the junction between the renal pelvis and the ureters at their origin.[1-3] Primary hydronephrosis accounts for 40% of malformative uropathies, most often diagnosed in the antenatal period in developed countries.[3] In resource-limited settings, the diagnosis is often carried out during clinical manifestations, sometimes in adulthood. The clinical manifestations are usually unrevealing in the form of chronic flank pain, posterior flank mass, renal colic, haematuria, recurrent infections, septicaemia, hypertension, and acute/chronic kidney injuries.[4,5]

Diagnosis is based on paraclinical workup during the antenatal period or during symptomatic phases. Urinary pathway ultrasounds, endoureteral ultrasounds, urologic CT scans, and magnetic resonance imaging help diagnose morphological abnormalities and inferior polar vessels. Intravenous urography with Lasilix shows pyeloureteric dilatations; scintigraphy with Technetium-99m mercaptoacetyltriglycine (a radioactive tracer) and furosemide confirm the diagnosis and evaluates renal function in cases with silent kidneys.[3-6]

According to Anderson–Hynes, open pyeloplasty has been the gold standard for the surgical treatment of PUJS, with a success rate above 90%.[2,7,8] Today, with the progress of minimally invasive surgery in developed countries, pyeloplasty by laparoscopic or robotic approaches is supplanting open surgery; in fact, the minimally invasive approaches produce the same success rates, with aesthetic advantages, lower morbidity, and shorter convalescence periods.[1,9,10] Delays in diagnosing this pathology can lead to complications, such as infections, urolithiasis, and kidney injury.[3] Here, we report the experience at DGH with reference to demographics, the clinical perspective, and management of PUJS.

Methods

This retrospective study spanned from January 2015 to July 2025 (10 years) at the urology unit of DGH. Patient records, outpatient, and operating room registers were used to collect data. We included all paediatric and adult patients who underwent pyeloplasty for PUJS. Patients who did not undergo surgery or had unusable files were excluded from the study. The following parameters were studied: age, sex, clinical and radiological signs, and operative aspects. Data were collected in Microsoft Excel and analysed in R-Programming.

Surgery was reserved for symptomatic patients. A urinalysis was performed on all patients, and antibiotic treatment was adapted, if necessary, before surgery. The classification of Cendron and Valayer–Mollard was used to group patients based on the degree of pyelocaliceal dilatation:[11]

- Type I, dilatation localised in the renal pelvis.
- Type II, calyceal and pelvic dilatations with normal parenchyma.

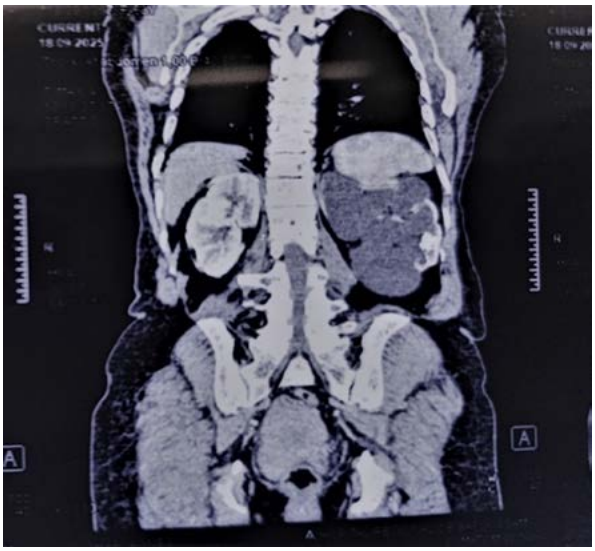

Figure 1: Contrast-enhanced computed tomography scan showing left renal type IV pyeloureteral junction syndrome

- Type III, important pyelocaliceal dilation with fuzzy and incomplete images, varied thinning of the cortex.
- Type IV, non-functional kidney (Figure 1).

The patients were placed in the decubitus lateral position with arm, pubic, and lumbar supports. Surgery was performed under general anaesthesia with endotracheal intubation. The approach was a lumbar incision passing through the 11th or 12th ribs to access the kidneys. The procedure consisted of resection of the narrowed pyeloureteric junction and pyeloplasty using interrupted sutures, according to the Küss–Anderson–Hynes procedure, with placement of a ureteropelvic double-J stent. When a lower compressive polar vessel was present, an uncrossing was performed before pyeloplasty.[7,12-15] A negative pressure drain was left in the renal lodge and removed when it was no longer productive.

Results

Socio-demographic data

During the study period, 18 cases of PUJS underwent surgery. Men accounted for 61.1% (*n* = 11), and women for 38.9% (*n* = 7), with a sex ratio of 1.6:1. The mean age was 33.2 years (range 4.0–72.0), with a median of 32.5 years (range 12.0–49.0). Paediatric patients comprised 27.8% (*n* = 5), while 61.1% (*n* = 11) were adults (Table I).

Clinical and paraclinical data

The clinical picture was dominated by flank pain (83.3%) and recurrent urinary tract infections (16.7%), all evolving within six months to five years before surgery. PUJS diagnosis was confirmed by a combined ultrasound and contrast-enhanced CT scan. Of these cases, 55.6% (*n* = 10) had right-sided dilatation, 38.9% (*n* = 7) were left-sided, and 5.6% (*n* = 1) had bilateral PUJS. According to the classification of Cendron and Valayer–Mollard, 77.8% (*n* = 14) had type II PUJS, 16.7% (*n* = 3) had type III, and 5.6% (*n* = 1) had type IV. All patients in the study group had normal renal function, and three cases (17.3%) had urinary tract infections that were treated before surgery (Table I).

Treatment

The Anderson–Hynes open pyeloplasty technique was performed for all patients using a lumbotomy approach (Figure 2). Uncrossing

Table I: socio-demographic and clinical aspects of pyeloureteral junction syndrome at Douala General Hospital

n	Sex	Age (years)	Signs	Localisation	Classification (Cendron and Valayer–Mollard)	Technique	Drain duration (hours)	Double-J stent duration (weeks)	Hospitalisation duration (days)
1	F	34	Flank pain	Right	II	R. Pyeloplasty	48	6	4
2	M	27	Flank pain	Left	II	L. Pyeloplasty	48	8	3
3	M	34	Flank pain	Right	III	R. Pyeloplasty	72	12	4
4	M	49	Flank pain	Right	II	R. Pyeloplasty	48	8	5
5	M	31	Flank pain	Left	II	L. Pyeloplasty	48	6	3
6	F	28	Flank pain	Left	II	Uncrossing + L. Pyeloplasty	72	6	4
7	M	66	Flank pain	Bilateral	III	L. Pyeloplasty	72	12	5
8	F	72	Flank pain	Right	II	R. Pyeloplasty	48	6	4
9	M	4	Recurrent UTI	Left	II	L. Pyeloplasty	48		3
10	M	11	Flank pain	Right	II	R. Pyeloplasty	48	6	4
11	M	44	Flank pain	Right	III	R. Pyeloplasty	72	12	4
12	F	52	Flank pain	Left	II	L. Pyeloplasty	48	6	3
13	M	4.6	Flank pain	Right	II	R. Pyeloplasty	48	6	3
14	F	12	Recurrent UTI	Right	II	R. Pyeloplasty	48	6	3
15	F	34	Flank pain	Right	II	R. Pyeloplasty	48	8	5
16	M	26	Flank pain	Right	II	R. Pyeloplasty	72	12	4
17	M	5	Recurrent UTI	Left	II	L. Pyeloplasty	48	6	3
18	F	64	Flank pain	Left	IV	L. Nephrectomy	48	-	5

F – female, M – male, R – right, L – left, UTI – urinary tract infection

Figure 2: Lumbotomy approach to the 12th rib and dissection through the latissimus dorsi muscle

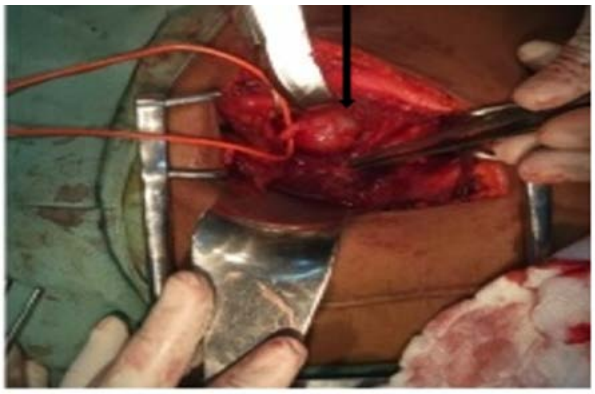

Figure 3: Black arrow showing pyeloureteral dilatation type III

of a lower polar vessel was involved in one case (Figure 3), followed by placement of a double-J stent and pyeloplasty (Figure 4). For the patient with bilateral PUJS, the most symptomatic side (left) was treated first, and the other side was treated six months later. One patient presented with a non-functional kidney, and a nephrectomy was performed, revealing ureteropelvic lithiasis (Figures 5 and 6). The renal compartment was drained using a negative pressure drain.

All drains were removed within 48–72 hours postoperatively, with an average duration of 54.7 hours. The average surgical time was 124 minutes (range 97–161), and all patients were hospitalised for 4–6 days. The double-J stents were left in place for an average of 7.3 weeks (range 6–12). No complications were recorded in the postoperative period, and evolution was simple, with preservation of renal function and resolution of initial symptoms at six-month and one-year follow-up visits. Mortality was recorded at one year in one case (5.87%), unrelated to the surgical procedure. (Table I).

Discussion

PUJS is a condition characterised by a failure of urine to evacuate from the pelvis to the ureter. It is an abnormality of intrinsic or extrinsic origin, with a prevalence of 2–29 cases per 10 000–20 000 live births.[1,2] Among adults, PUJS can develop idiopathically or in response to various traumatic events, and the prevalence is estimated at one case per 1 500 adults.[2,8] To the best of our knowledge, no similar studies have been published in Cameroon, and our small series cannot be explained by a low prevalence, but

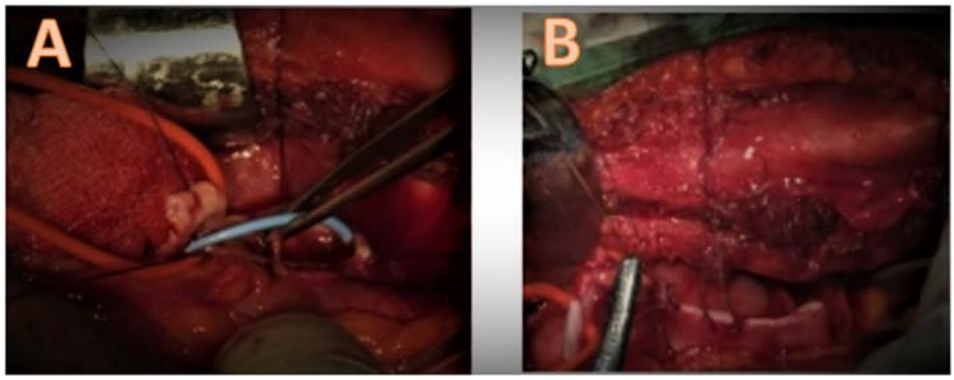

Figure 4: A – placement of double-J stent over anastomosis site, B – anastomosis over double-J stent

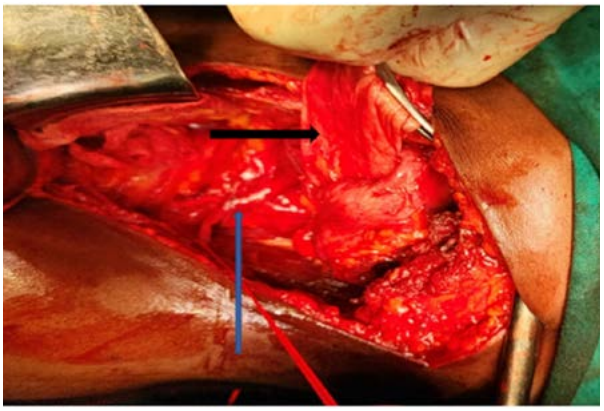

Figure 5: Blue arrow showing normal distal ureter, black arrow showing thin-walled, non-functional kidney

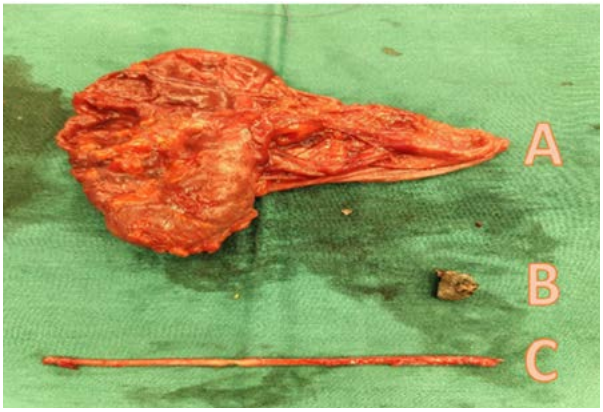

Figure 6: A – total nephrectomy for type IV pyeloureteral junction syndrome, B – kidney stone found in renal pelvis, C – distal ureter

rather by an underreporting of cases due to a lack of diagnostic means. Moreover, our study included only operated patients.

Socio-demographic data

The patients in our study group had an average age of 33.2 years (range 4–72) at diagnosis. Multiple authors reported similar results.[1,3-5] Galifer et al.[9] reported an average age of 4.9 years. This can be explained by the fact that PUJS is diagnosed much earlier in developed countries through frequent ultrasounds, whereas in our context, diagnosis is during symptomatic phases and is often late due to consultation delays. The male predominance in our study was 61.1%, with a sex ratio of 1.5, which corresponds with other authors' results.[1,3-5,10,11]

Clinical and paraclinical data

Flank pain (83.3%) was the most common complaint among the patients, similar to other authors' findings, followed by recurrent urinary tract infections (16.7%).[1,3-5,9,11] Clinical signs depend on age at diagnosis, as PUJS can occur in the perinatal period and adulthood. In developing countries like ours, the diagnosis is often made in adulthood during painful clinical manifestations.[1,3-5,11] The pain associated with PUJS is usually located in the abdomen, flank, or lumbar region, intermittent, dull, associated with nausea/vomiting, and exacerbated by excessive fluid intake. Other authors report cases of flank swelling, pyelonephritis, and urolithiasis revealing PUJS.[1,2,12,13]

PUJS diagnosis is confirmed by a combined ultrasound and contrast-enhanced urologic scan.[1,3-5,11] In our study, imaging was limited to the most diagnostically accurate due to the financial burden of these examinations in developing countries like ours. Antenatal or neonatal PUJS is underreported in our study, contrary to the reports of Galifer et al.[9] This may be explained by the availability of systematic antenatal ultrasound in more developed settings, which is not the case in our resource-limited setting.

In our study, all patients underwent open surgery. Our study sample showed more cases of right PUJS (n = 10, 55.6%), contrary to the literature. Our small sample size could explain this, as our study included only patients who underwent surgery and does not represent the entire population.

Treatment

Pyeloplasty was performed using the Küss–Anderson–Hynes technique, with intraoperative placement of a double-J stent to intubate the anastomosis with drainage from the renal lodge via a negative pressure drain. This is the gold standard for PUJS treatment with excellent results, especially in low-budget settings. The technique has the advantage of performing a physiological pyeloplasty and allows associated manoeuvres, such as uncrossing or calculus ablation.[13-18] Some authors used only open pyeloplasty, according to the Küss–Anderson–Hynes technique, with trans-nephropyeloureteral drainage intubating the anastomosis and drainage from the renal lodge without complications.[1] However, Kirakoya et al.[5] used three pyeloplasty techniques: Küss–Anderson–Hynes pyeloplasty (37%), Benassayag pyeloplasty (40%), and Culp tubular flap (2.9%). Kpatcha et al.[4] performed Y-V plasty (24%) and resection-anastomosis according to the Anderson–Hynes procedure (68%).

The advent of minimally invasive techniques, like the laparoscopic or robotic approach to pyeloplasty, offers aesthetic advantages and reduces postoperative pain and hospitalisation time.[13,15,16] Nonetheless, they are limited in developing countries because they require a specialised technical platform and experienced surgeons. This remains a challenge in sub-Saharan Africa.[4,12] Consequently, surgical management is based on several factors, including success, technique-related morbidity, surgeon experience, cost, and patient choice.[19] The quality of the pyeloureteral sutures determines the results, regardless of the approach used (open or laparoscopic surgery).

The principles of Küss, Anderson, and Hynes anastomosis must be respected. This technique has the advantage of combining excellent exposure of the pyeloureteral junction and performing a tight anastomosis.[20] Uncrossing of an inferior polar vessel was done before pyeloplasty in one case (5.9%) in our study. The number of PUJS cases recorded with a lower vessel as an obstacle to the evacuation of urine from the pelvis to the ureter varies from one series to another.[1,3,13] For Bentani et al.,[21] a lower polar vessel was found and uncrossed in 50% of cases. This uncrossing is also proposed laparoscopically by several authors; however, care should be taken when exploring an inferior polar vessel.[15,22]

Urolithiasis was found in one patient (5.5%) who had type IV PUJS, and a left nephrectomy with open pyelolithotomy was performed. This was consistent with studies by Adamou et al.,[1] Tembely et al.,[3] and Diao et al.,[13] who reported 15%, 17%, and 10% of lithiasis complicating PUJS, respectively. This is consistent with the available literature on PUJS involvement in urolithiasis development.

Our average surgical time was 124 minutes (range 97–161), and the average hospital stay length was five days. The data in our series are consistent with those reported in the PUJS open surgery literature.[1,3,16] Conversely, this operating time is classically higher in laparoscopic or robotic surgery at 175.1 minutes, and a hospital stay length of 3.46 days.[21] In our study, follow-up at six and twelve months was normal, with resolution of presenting symptoms and preservation of renal function. For Elbaset et al.,[23] pyeloplasty has a high rate of functional success, even in patients with severe hydronephrosis and impaired renal function.

Study limitations

Firstly, our study was limited by the small sample size, as only patients who underwent surgery and had complete and usable files were included. Secondly, only symptomatic patients received surgery, which is not an accurate representation of the entire population. The limited access to modern diagnostic tools delays diagnosis, as most patients present during symptomatic phases. Our setting offered only one pyeloplasty technique, "the open Anderson–Hynes procedure," whereas other authors offered multiple techniques, including open and minimally invasive approaches.

Conclusion

PUJS diagnosis is often late in our context. Küss–Anderson–Hynes pyeloplasty for PUJS provides good results and remains the gold standard in settings where laparoscopy and robotic surgery are not available. However, minimally invasive techniques are replacing open surgery in PUJS management, requiring a strengthening of the technical platform for PUJS diagnosis and management in our setting.

Conflict of interest

The authors declare no conflict of interest.

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Ethical approval

Local ethical approval was obtained from the Scientific Council of DGH to access patient and hospital records. Consent to publish was obtained from patients. Participants provided written informed consent for their personal or clinical details, including any identifying images, to be published in this study.

ORCID

FG Epoupa Ngalle https://orcid.org/0000-0003-4669-7555
LO Mbouché https://orcid.org/0000-0002-6838-4106
AQ Essomba https://orcid.org/0009-0002-0281-6671
JC Fouda https://orcid.org/0000-0002-6993-2098
FF Angwafo III https://orcid.org/0000-0003-3237-4237

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