

**PELVI-URETERIC JUNCTION OBSTRUCTION - A TEN YEAR SINGLE CENTER
REVIEW IN NORTH CENTRAL NIGERIA.**

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Abstract:

Background: PUJ obstruction (PUJO) is a functional or anatomic obstruction to urine flow from the renal pelvis to the proximal ureter. Late presentation is common in our environment. It is a common cause of neonatal and prenatal hydronephrosis, occurring in one per 1500 live births. It is less common in adults than in children but it is not rare in either population. Congenital causes of PUJO is more in males than females, 2-4:1 with left sided obstruction being commoner than the right. Most common etiology of PUJO is congenital obstruction (narrowing, crossing vessels). Acquired causes include calculi and stricture.

Objectives: We reviewed the outcome of our management of congenital and acquired PUJ obstruction over a 10-year period at University of Abuja Teaching Hospital Nigeria.

Methodology: This study was retrospective in nature, from January 2006 to December 2015. All patients who presented with clinical and radiological features of PUJO at any age of life were included in the study. Information obtained included age, sex, presenting symptoms, duration of symptoms, side of obstruction, the nature of the intervention performed, as well as whether a ureteric stent was used or not and if yes what type. The results of relevant clinical, laboratory and radiological investigations were noted. The data obtained was tabulated and analysed in the form of mean, median, mode, and percentages using Microsoft Excel and SPSS version 16.

Results: Forty-one patients with PUJO were seen, 18 with congenital PUJO, 21 with renal calculi and 2 with strictures. The age range was 3 to 67 years, and mean age of 33.1 +/-15.7 years. The range of symptom duration was between 1 month to 180 months (15years), mean duration of 17.6 +/- 30.3 months. Anderson hynes pyeloplasty was done in 16 patients (14 patients with congenital PUJO and 2 with strictures). One patient with congenital PUJO had foley YV pyeloplasty. Three patients with congenital PUJO had simple nephrectomies for non-functional kidneys with severe flank pains. The 21 patients with calculi all had open pyelolithotomy. Twenty-two patients had ureteric stents inserted either using double J or

improving with small size feeding tubes intraoperatively. All patients had remarkable improvements in symptoms during follow up.

Conclusion: PUJ obstruction is a common abnormality of the upper urinary tract. Presentation in later life is common in our environment even for congenital pathology. Renal pelvic stones were the most common aetiological cause of PUJ obstruction in our centre (51%), followed closely by congenital causes (39%).

Introduction

Pelvi-ureteric junction obstruction (PUJO) may be defined as a functional or anatomic obstruction to urine flow from the renal pelvis to the proximal ureter that results in symptoms or renal damage¹. The resultant back pressure within the renal pelvis may lead to progressive renal damage and deterioration. The condition is encountered by both adult and pediatric urologists. Congenital obstruction seems to be the most common aetiology^{2,3}. These congenital abnormalities may be seen in both adults and children, but adults may also come with PUJ obstruction following previous surgery or other conditions that can cause inflammation of the upper urinary tract. Defining the pertinent anatomy, the degree of obstruction, and differential renal function is key to determining whether and when intervention is necessary⁴.

PUJ obstruction is the most common cause of neonatal and prenatal hydronephrosis, occurring in one per 1500 live births⁵. In children, the male-to-female ratio of PUJ obstruction is 3-4:1⁵. However, recent studies have shown that adult females have it more than the males⁶. Generally, the left is more commonly affected than the right kidney in unilateral cases (5:2)⁷. PUJ obstruction is bilateral in 10% of cases⁵ or even in up to 20-25% of cases in some literatures⁸. Bilateral cases are commoner in infants⁷. The diagnosis is suggested often by ultrasound scan⁷. Intravenous urography (IVU) is helpful in the presence of hematuria, also to identify some acquired causes like calculi. IVU may also show delay in excretion in the side with pelvi caliceal dilatation suggesting, impairment of function⁹. Interventions are surgical, which could be categorized as 1) open surgery 2)

endoscopic approaches 3) laparoscopic procedures¹.

We reviewed PUJO presenting to UATH over a 10-year period and reported outcomes of their management.

Methodology

This study was retrospective in nature and covered the period from January 2006-december 2015. All patients who presented with features of PUJO at any age of life were included in the study. Other inclusion criteria included, an ultrasound or an intravenous urogram (IVU) diagnosis of PUJO. Information obtained included age, sex, presenting symptoms, duration of symptoms, side of obstruction, the nature of the intervention performed, as well as the placement of double J stents or improvised ureteric stents using small size feeding tubes intraoperatively. The results of relevant clinical, laboratory and radiological investigations were noted. The data obtained was tabulated and analyzed in the form of mean, median, mode, and percentages using Microsoft Excel and SPSS version 16.

Results

Forty-one patients were seen, 18 (44%) with congenital PUJO (17 congenital narrowing and 1 crossing vessel), 21 (51%) with renal pelvis calculi and 2 (5%) with strictures as shown in fig 1. The number of males were 25 (61%) and number of females were 16 (39%), with a male to female ratio of 1.56:1 (fig 2.). Additionally, the sex distribution for those with renal pelvis stones and congenital PUJO showed a male preponderance, with 13 (62%) males, 8 (38%) females and 10 (56%) males, 8 (44%) females and a male to female ratio of 1.6:1 and 1.2:1 respectively (figs 3 and 4 respectively).

Age range of 3 to 67 years, and mean age of 33.1 +/-15.7 years. Age range was 9-

67years, mean of 38.8 +/-15.4years for PUJO due to calculi and 3-58years, mean of 30.6 +/-14years for congenital PUJO. The two patients with strictures were 22 years and 16 years and both had a history of previous abdominal surgeries. Only three cases presented with congenital PUJO in childhood. Overall, right sided PUJO was recorded in 24 (59%) patients, while 16 (39%) had left sided PUJO, and only 1 (2%) case of bilateral PUJO, with a right to left ratio of 1.5:1, fig 5. Furthermore, amongst the 18 patients with congenital PUJO, left sided lesion was found in 9 (50%) patients and right sided lesion in 8 (44%) patients, with the one case (6%) of bilateral congenital PUJO being in a 9-year-old female with and a left to right sided ratio of 1.13:1, fig 6. On the other hand, those with renal pelvis calculus had more right sided lesion, 14 (67%) than left sided lesion 7 (33%) and a left to right ratio of 2:1, fig 7. The most common presentation was loin pain, which was seen in all (98%) but one patient. Other symptoms are as in table 1. The range of symptom duration was between 1 month to 180 months (15years), mean duration of 17.6 +/- 30.3 months. The

symptom duration for congenital PUJO was one month to 180 months, mean of 22months +/-42.6 months. The symptom duration for PUJO from calculi was 2months to 84months, 15.3 months +/-17.2 months. Imaging studies revealed mainly hydronephrosis on the affected side, while 3 (7%) of the patients additionally had a unilateral non-functioning kidney on intravenous urogram (IVU), fig 8. Anderson hynes pyeloplasty was done in 16 (39%) patients (14 with congenital PUJO and the 2 patients with strictures). One (2%) patient with congenital PUJO had foley YV pyeloplasty. Three (7%) patients with congenital PUJO had simple nephrectomies for non-functional kidneys causing severe pains, fig 9. The 21(51%) patients with renal pelvis calculi all had open pyelolithotomy, fig 9. Twenty-two of the surgical interventions for PUJO were stented intraoperatively, (13 double J stents and 9 improvised pediatric feeding tubes). A summary of the results is as shown in figure 10. All patients had remarkable improvements in symptoms during follow-up.

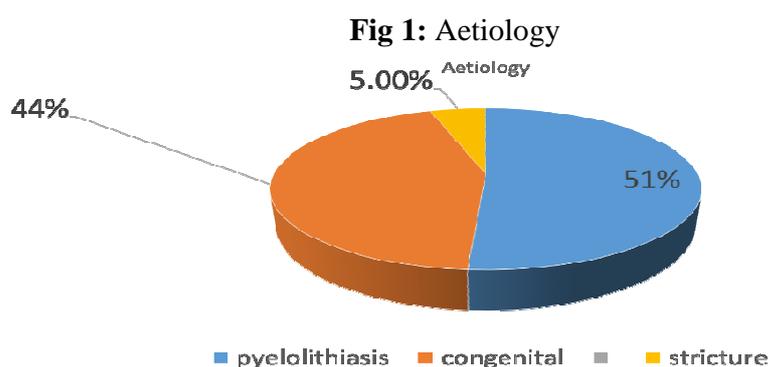


Fig 2: Sex distribution

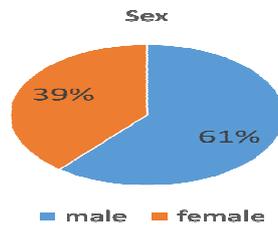


Fig 3: Sex distribution: Renal pelvis stones

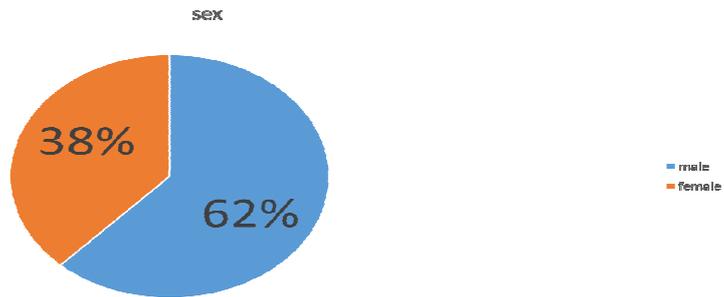


Fig 4: Sex distribution: Congenital PUJO.

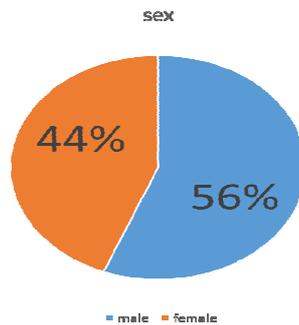


Fig 5: Side of Renal unit with PUJO

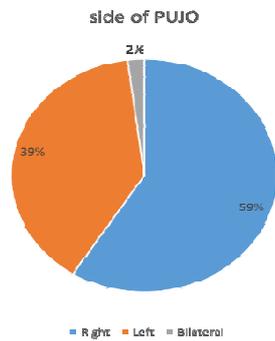


Fig 6: Side of renal unit with renal pelvis stones.

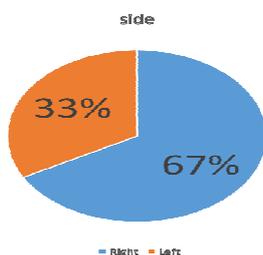


Fig 7: Side of renal unit with congenital PUJO

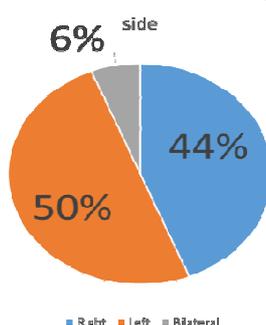


Table 1: Frequency of Symptoms

presentations	frequency	percentage
Loin pain	40	97.6
Nausea/vomiting	25	61
fever	16	39
haematuria	10	24

Fig 8: Imaging Studies

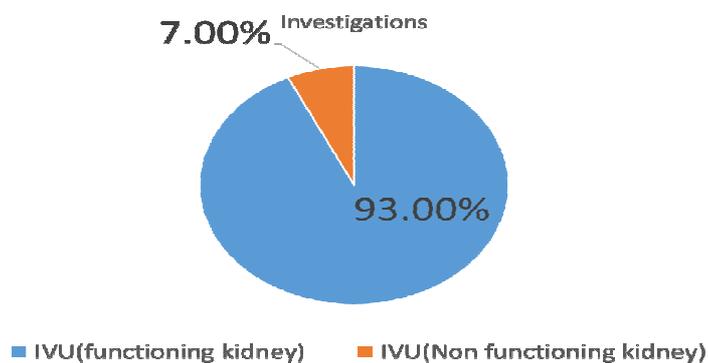


Fig 9: Intervention

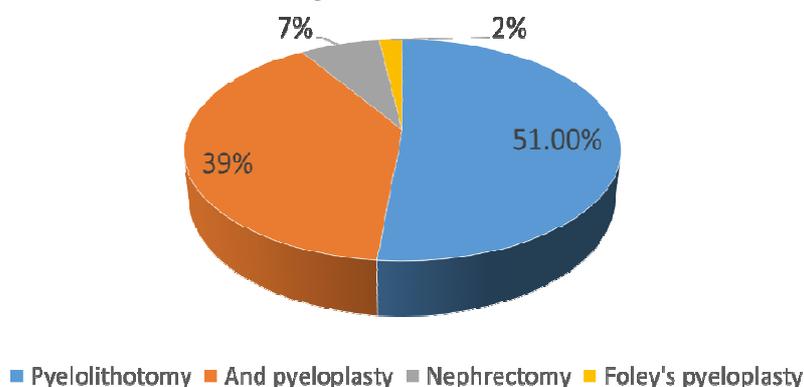
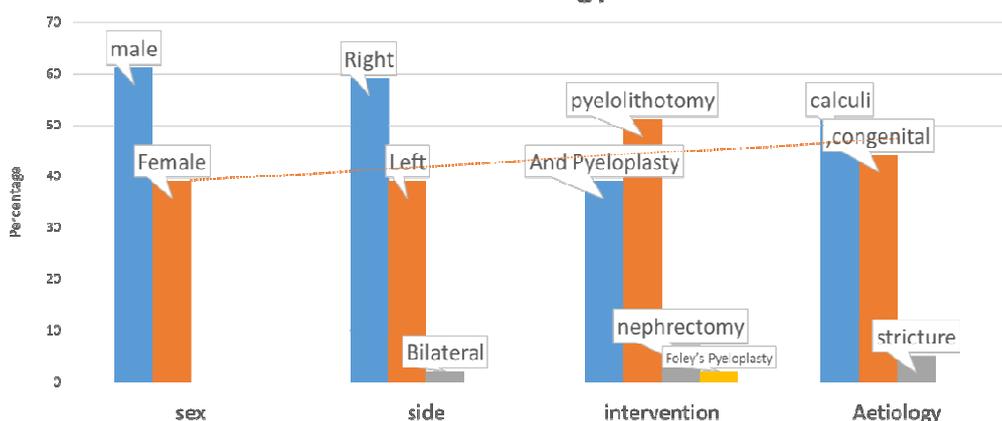


Fig 10: Results. Summary

Percentage frequency chart of sex, side, intervention and aetiology



Discussion:

PUJ obstruction is the most common cause of neonatal and prenatal hydronephrosis, occurring in one per 1500 live births⁵.

PUJ obstruction is less common in adults than in children but is not rare in either population⁵.

In this study, 41 patients were retrospectively reviewed over a 10-year period, most patients were adults, and age range was 3 to 67 years, with mean age of 33.1 +/- 15.7 years. This was similar to that of Obarisiagbon et al in Benin, Nigeria, who studied 27 patients over a 7-year period, with mean age of 28.8 ± 18.9 years². Furthermore, Ibrahim et al, Nigeria also

studied a total of 18 patients with age range 2-38 years and mean age of 27.5 years³.

We had more males, 25 (61%) than females, 16(39%), with a male to female ratio of 1.56:1 in this study, fig 2. This is similar to the findings of Ibrahim et al with a male to female ratio of 1.57:1 and that of Obarisiagbon et al with a male to female ratio of 1.25:1^{2,3}. However most other literatures reported much higher male to female ratio of 3-4:1⁵. Also when both congenital PUJO and PUJO from renal pelvis calculi were analyzed separately, they both had more affected males than females, figs 3 and 4 respectively.

Most studies reported the left sided lesion commonly than the right sided obstruction, ratio of 5:2^{2,3,7}. However we found more right sided lesion than the left sided lesion in this study, ratio of 1.5:1, fig 5. Though when congenital PUJO was analyzed separately from renal pelvic stone obstructions, the left sided obstruction from congenital PUJO becomes predominant, with a left to right sided ratio of 1.13:1, fig 7, albeit not as high as the ratio 5:2 stated above. Whereas, right sided obstruction for PUJO due to renal pelvis stones remained commoner with right to left ratio of 2:1, fig 6. This observation may not be unconnected to the fact that most literatures usually have more cases of congenital PUJO than renal pelvis stones, the reverse which was the case in this study with more cases of renal pelvis calculi induced PUJO.

In terms of etiology, renal pelvis stone was the most common cause of PUJO in this study, fig 1. This is similar to the findings of Ramyil in Jos, Nigeria, where he found renal pelvis calculi accounting for most causes of upper urinary tract obstruction, closely followed by congenital PUJO¹⁰. These two findings differ from those in most studies where congenital obstruction appeared to be the commonest causes of PUJO^{1,2,3}. These disparities in our findings from what has been reported previously in most literatures, may suggest that we missed many cases of congenital PUJO in childhood due to challenges of delayed referral to appropriate facilities and lack of proper prenatal diagnosis in poor resource settings like ours. As in previous works, loin pain was found to be the commonest presenting symptom in our study^{2,3,6}. The mean duration of symptoms before presentation was 17.6 +/- 30.3 months, with a range of one month to 180 months (15 years). This late presentation may be explained by the fact that most of the patients patronize unorthodox medical practitioners when they start experiencing abdominal pain, only to present late afterwards with renal and other

complications. This late presentation was also reported by Obarisiagbon et al, Ibrahim et al as well as Ramyil et al^{2,3,6}.

Abdominal ultrasonography and IVU are the two most commonly done investigations². Ultrasonography is able to pick up evidence of pelvi-calyceal dilatation and hydronephrosis. It can also help in distinguishing cases of multicystic kidneys from PUJO, but may not identify causes like a crossing vessel^{7,9}. Intravenous urography (IVU) is helpful in the presence of hematuria, also to identify some acquired causes like calculi⁹. IVU may also show delay in excretion on the side with pelvicalyceal dilatation suggesting, impairment of function⁹. Other investigative modalities include, voiding cystourethrogram (VCUG), especially in children to identify vesicoureteric reflux⁵. Computerized tomography scan (CT scan) which will help in identifying the presence of crossing vessels⁹. Less readily available investigative modality in this environment includes, renal scintigraphy, Magnetic resonance imaging (MRI) and pressure flow studies (Whitaker)^{5,11}.

Indications for intervention include, symptomatic obstruction, impairment of overall renal function or progressive impairment of ipsilateral function, presence of stones or infection, or, uncommonly, causal hypertension⁹. In some cases, with asymptomatic congenital PUJO, the place of selective non-operative (conservative) measures have been explored and found to give good results^{12,13}. However 25% will eventually require interventions for pain, infections, or reduced renal function on repeat nuclear scan⁷. Interventions are surgical, which could be categorized as 1) open surgery 2) endoscopic approaches 3) laparoscopic procedures¹. Historically, the main stay has been the open surgical approach using the Anderson Hynes dismembered pyeloplasty¹⁴. Other techniques in open surgery includes the Culp-DeWeerd Spiral Flap, Foley Y-V

Plasty, Scardino-Prince Vertical Flap, and Ureterocalycostomy¹. Due to anatomical variations, no single procedure is adequate for all the situations⁷. Essentially, all successful procedure has in common the creation of a dependent, funnel shaped ureteropelvic junction of adequate caliber. These anastomosis in the various techniques are done over an internal ureteral stent. Rarely nephrectomy may be an option of management⁹. This is indicated when there is diminished or non-function of the involved moiety in the presence of a normal contralateral kidney, also when there is extensive stone disease, chronic infection in the face of a normal contralateral kidney. Furthermore, in cases with normal contralateral kidney, where repeated attempts at repair have failed and further attempts may be more complicated⁹. In this study, Anderson hynes pyeloplasty was done in 16 (39%) patients (14 with congenital PUJO and the two with ureteric strictures). One patient with congenital PUJO had foley YV pyeloplasty due to a high insertion of the ureter on the affected side, fig 9.

Three other patients with congenital PUJO had simple nephrectomies for non-functioning kidneys which were symptomatic. While the 21 (51%) patients with Renal pelvis calculi all had open pyelolithotomy, fig 9. This differs from the findings of most other workers where pyeloplasty was the most common procedure done^{2,3}. 22 of the surgical interventions for PUJO were stented intraoperatively, (13 with double J stents and 9 with small size feeding tubes). The double J stents were removed within 6 to 12 weeks, while the NG tubes were removed within 10 to 14 days post-operatively. None of the patient was managed conservatively. All patients had remarkable improvements in symptoms during follow-up.

Conclusion

PUJO is a common abnormality of the upper urinary tract. Presentation in later life is common in our environment even for

congenital pathology. Renal pelvic stones were the most common etiological cause of PUJO in our center (51%), followed closely by congenital causes (44%). Pyelolithotomy was the most common intervention (51%), then Pyeloplasty (41%) and simple nephrectomy (7%). Overall right sided obstruction was more than the left side. However, for congenital PUJO, the left sided obstruction was commoner. Surgical intervention (pyeloplasty and pyelolithotomy) resulted in good outcome with preservation of renal function even in those presenting as adults.

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