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Malformative Uropathies: Epidemio-Clinical and Therapeutic Aspects in Children at the Urology Department of the University Hospital Center Point-G

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Abstract **Original Research Article**

The aim of this study was to determine the epidemiological-clinical and therapeutic aspects of MU in children. This was a descriptive cross-sectional study, over a period of 5 years from January 1, 2016 to December 31, 2020 carried out in the urology department at the University Hospital Center "Point-G". We collected a total of 69 cases of malformative uropathy (MU) in children. The frequency was 1.41% of all hospitalizations and 5% of patients operated on during the study period. The sex ratio was 7.6 in favor of the male sex. They were admitted by referral from health personnel in the majority of cases, i.e. 93%. The mean age at diagnosis was 7 years. The circumstances of discovery were ectopic abutment of the urethral meatus (43.5%), pain in the lumbar fossa (23.2%) or bladder globe (10%). Ultrasound was performed in all of our patients, and revealed uropathy in 25.9% of cases. The most common uropathies were hypospadias (42%), pyelo-ureteral junction syndrome (23.2%) and posterior urethral valves (13%). All cases benefited from surgical correction adapted to the type of malformative uropathy. The evolution was without complication in the majority of cases in the 1st postoperative week, i.e. 84% of cases.

Keywords: Malformative uropathy, hypospadias, Pyeloureteral junction syndrome, Antenatal diagnosis.

INTRODUCTION

Malformative uropathies (UM) are the set of both morphological and functional abnormalities related to a disorder of embryonic development of the kidneys and excretory pathways [1].

They can affect the number, shape, structure or topography of one or more structures in the urinary tract. They are common in pediatrics, 1% of children would be carriers according to the literature and represent 25% of childhood surgical pathologies [2, 3].

A study conducted in sub-Saharan Africa in 2017 on the subject, had found a prevalence of 12.5% in Burkina Faso, 12% in Côte d'Ivoire, 4.3% in Guinea Conakry and 2.5% in Mali [4].

The circumstances of discovery of UM in children are diverse. If the diagnosis is essentially antenatal and based on obstetric ultrasound in advanced countries, in developing countries like ours, it is made after birth [5, 6].

The discovery may be fortuitous in some cases during the exploration of another device.

The prognosis depends on the type of malformation with the long-term risk of repercussions on renal function because (UM) is one of the main causes of chronic and end-stage renal failure in children and young adults [7-9].

Therapeutic decisions are made not only after anatomical analysis of the malformation but also according to its impact on renal function.

In Mali, there are very few studies on malformative uropathies in children.

The purpose of this study was to take stock of the epidemiological, clinical and therapeutic aspects of malformative uropathies in children in the urology department of the Point-G University Hospital.

PATIENTS AND METHODS:

This was a descriptive cross-sectional study, carried out in the urology department of the CHU Point G over a period of 5 years, from January 1, 2016 to December 31, 2020.

All children (0 to 15 years) received and treated in the malformation uropathies ward during the study period were included in the study.

Not included were all children under the age of 15 with an unusable record.

Data were collected from hospital records, hospitalization records and operative reports.

The parameters studied were: socio-demographic data (age, sex, residence), history, clinical and paraclinical data, diagnosis (types, sites), treatment, evolution after treatment.

Data analysis was performed on IBM SPSS STATISTICS 20 software.

RESULTS

At the end of this study, we collected 69 cases of malformative uropathies or 5% of all surgical activities in our department during the study period and 1.84% of hospitalizations with an average of 14 cases per year. The 5 to 10 age group was the most represented with 60.9% of cases. We observed a large predominance of the male sex with a sex ratio of 7.62. The majority of our patients resided in an urban area and were referred by healthcare staff in 93% of cases. Urinary schistosomiasis was the urological history found in 8.7% of cases. Some patients had a surgical history of urethroplasty and penis straightening, 5.8% and 4.3% of cases, respectively. External genital dysmorphism was the reason for consultation in the majority of cases (43.5%) followed by lower urinary tract symptoms in 34.8% of cases. Ectopic obstruction of the urethral meatus was found in 43.5% of cases. Renal function was impaired with objectified hypercreatinine in 8.7% of cases. Escherichia coli UTI was present in 23.2% of cases. Abdominal-pelvic ultrasound made it possible to objectify hydronephrosis in 17.4% of cases. The preferred seat of uropathies was the lower urinary tract, i.e. 67% of cases. Hypospadias was the most common malformative uropathy and accounted for (29/69 cases) or 42%, followed by Pyeloureteral Junction Syndrome with 23.2% of cases. Urethroplasty was the most commonly practiced surgical technique (40% of patients). The evolution was uncomplicated in the majority of cases in the 1st post-operative week or 84% of cases. However, the recurrence of hypospadias by letting go of the threads was observed in 2.9% of patients following suppuration of the operative wound.

DISCUSSION

At the end of this study, we collected a total of 69 cases of malformative uropathies, an average of 14 cases per year. During the period, they accounted for 5% of operated patients and 68.31% of all congenital malformations of the urogenital tract with a hospital frequency of 1.41%.

In the literature, epidemiologically, malformative uropathies are quite common [4, 9]. In children, its frequency is variously evaluated around the world [1, 2, 11, 13, 15].

In our country, we do not have a statistical study on the frequency of UM in children, due to the lack of congenital malformation registries and surveillance programs.

However, a study similar to ours, conducted in 2017 in sub-Saharan Africa, found an average prevalence of 4.25%, high compared to that of Western countries that have an almost insignificant prevalence in postnatal [4, 12].

The age group of 5 to 10 years was the most represented 60.9% of cases with extremes of 2 and 15 years. This result is close to that of Tekou *et al*., in 1998 in Togo, which had found a frequency peak between 2 and 6 years [16].

The average age at diagnosis was 7 years in our study. In developed countries, diagnosis is made before birth through antenatal ultrasound, as part of a multidisciplinary management of uropathies.

The delay in the diagnosis of uropathies in our context could be explained not only by the absence of antenatal diagnosis, but also by the clinical latency of certain uropathies, the systematic non-referral from the discovery after childbirth to a specialized service and the lack of financial means of the parents.

We observed a large predominance of the male sex with a sex ratio of 7.62. This predominance found in several studies could be explained by the diversity of malformative pathologies in boys (phimosis, valve of the posterior urethra, hypospadias, epispadias etc).

Clinically, urethroplasty and penis straightening were surgical histories in 5.8% and 4.3% of cases, respectively. These were cases of hypospadias that had already had a first time of management.

Dysmorphism of the external genitalia was the reason for consultation in the majority of cases (43.5%) followed by lower urinary tract symptoms (34.8%).

According to several authors, urinary tract infection is the most common discovery circumstance [17-19]. We recorded 27.4% of cases had a urinary tract infection on cytobacteriological examination of urine (ECBU).

Malformative uropathies are the leading cause of renal failure in children [20]. In our study, impaired renal function with hypercreatinine was found in 8.7% of cases.

Especially obstructive UMs are risk factors for recurrent urinary tract infections due to urinary stasis and associated vesicoureteral reflux. ECBU therefore remains essential for screening for urinary tract infections in order to initiate effective treatment. In our series, an Escherichia coli was present in 23.2% of cases.

Sagbo G *et al*., in Benin in 2013 had shown that urinary tract infection was the most frequent reason for consultation with 28% of cases [21].

Antenatal ultrasound is essential for early diagnosis of these malformations [22]. Ultrasound is a first-line examination, allows a morphological study of the kidneys, participates in the diagnosis and follow-up of UM [23, 24].

It was performed in all of our patients, and revealed uropathy in 25.9% of cases. Hydronephrosis was the predominant abnormality and was objectified in 17.4% of cases, followed by ureterocele with 2.8% of cases. In Tunisia in 2010, in the series of Kahloul *et al*., the predominant anomaly was pyel-calycal dilation (30%) [2]. Similarly, in France Faures, had shown that 30% of cases had dilation of the renal cavities [25]. These results show that there is indeed a risk of impact of uropathies on the upper urinary tract.

The indications of the uroscanner in children are less frequent than in adults because of its irradiating nature and the nephrotoxicity of the contrast medium. It was performed in 20/69 cases in our study. In contrast, only 4/71 children benefited from this examination in the series of Kahloul *et al*., 2010 [26, 2]. The pyeloureteral junction syndrome was the most frequent objectified abnormality, accounting for 18.8% of cases. Tengué K *et al*., 2016 made the same observation [22].

The most common malformative uropathy found in our series was hypospadias followed by pyeloureteral junction syndrome and posterior urethra valves, respectively 42%; 23.2% and 13% of cases. These results are consistent with those of Morocco, where hypospadias was the most common urinary malformation with 55%, followed by pyeloureteral junction syndrome with 19.2%, and posterior urethra valves with 8.5% of cases [30]. On the other hand, in the series of Kahloul *et al*., 2010, vesicoureteral reflux occupied the first place with 45% [2].

The seat of uropathy in our series was at the level of the lower urinary tract, 67%. The therapeutic conduct was adapted according to the malformation and the clinical context. Treatment with open surgery was adopted in all cases. Hypospadias being the UM frequents it in our series, its operating techniques are many and varied in the literature. Urethroplasty was the most practiced surgical technique in 40% of patients (Mathieu in 18.4% and Duplay in 17.4%), followed by pyeloplasty in 23% of cases according to Anderson Küss and Hynes in pyeloureteral junction syndrome. These results are consistent with those of Ndour O *et al*., in 2015 and Habou O *et al*., in 2017 [27, 28].

The evolution at 1 postoperative week was uncomplicated in the majority of cases (84%). Recurrence by release of the wires was observed in some patients operated for hypospadias following suppuration of the operative wound or 2.9% of cases.

Annexes:

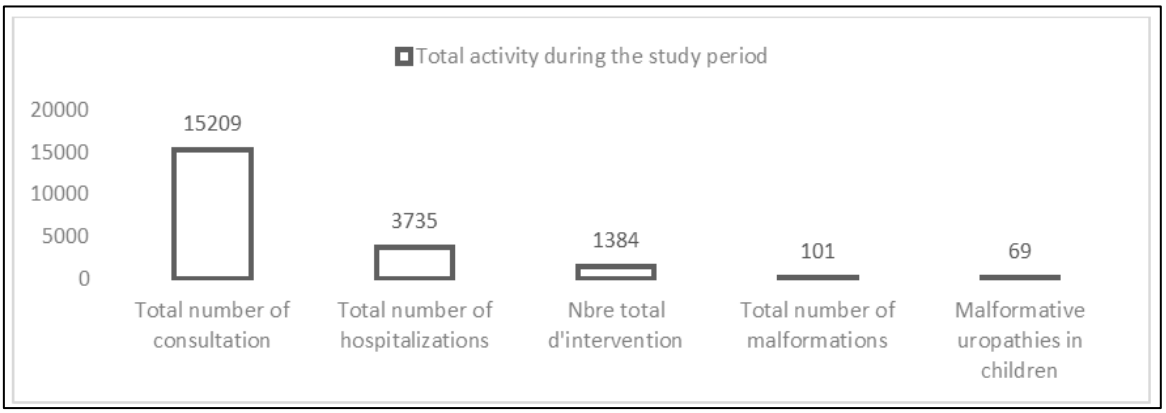

Figure 1: Total activities during the study period

Table I: Distribution by type of malformative uropathy

Types of malformative uropathies	Number of patients	Percentage
Hypospadias	**29**	**42,0**
Pyeloureteral junction syndrome	16	23,2
Posterior urethral valves	9	13,0
Bladder exstrophy	3	4,3
Right ureterocele	1	1,4
Polycystic kidney disease	1	1,4
Renal agenesis	1	1,4
Urethral bifidity	1	1,4
Paraphimosis	1	1,4
Phimosis	3	4,3
Epispadias	1	1,4
Left renal ectopia	1	1,4
Left ureteral ectopia	2	2,9
Total	69	100

Table II: Distribution by type of intervention

Type of intervention	Effectifs	Pourcentage
Pyeloplasty Küss Anderson Hynes	**16**	**23,2**
Urethroplasty according to Mathieu	13	18,8
Urethroplasty according to Thiersch-Duplay	12	17,4
Striping + Transurethral Probe	9	13,0
Posthectomy	4	5,8
MAGPI	2	2,9
Bladder uretero reimplantation	3	4,3
Bladder extrophy cure	3	4,3
Straightening of the penis	2	2,9
Left nephrectomy	2	2,9
Urethroplasty according to Ranslay	1	1,4
ureterolithotomy + Right ureterocele cure	1	1,4
Nephrolithotomy on left renal ectopia	1	1,4
Total	**69**	**100**

CONCLUSION

Malformative uropathies are the most common birth defects in children. This work allowed us to see that the preferred seat was the lower urinary tract. External forms are easy to diagnose, but internal ones, imaging remains essential for the diagnosis of certainty. The delay in management is responsible for the impact on renal function. On the other hand, antenatal diagnosis is of crucial importance since it could contribute to the improvement of functional prognosis and also to the adaptation of therapies.

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