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FACTORS AFFECTING THE OUTCOME OF SURGERY IN DISTAL HYPOSPADIAS

Surgery

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ABSTRACT

Introduction: Hypospadias is one of the most common congenital anomalies in live male births. We aim to describe our experience of treating hypospadias in our department and describe how complication rates were associated with the patient related variables.

Methodology: This observational study of patients aged between 18 months and 12 years with a clinical diagnosis of hypospadias was conducted in the Department of General Surgery, Rajarshee Chhatrapati Shahu Maharaj Government Medical College and Chhatrapati Pramila Raje Hospital, Kolhapur from October 2016 till April 2018. Patients' clinical information and postoperative complications were noted. Association of complication with patient related variables were assessed using chi-square or Fisher's exact test.

Results: Among the 50 patients included in the study, the most common age group was less than 3 years, 24% were full term with low birth weight and 16% were preterm and low birth weight. Distal type of hypospadias was the most common type (68%). Post-operative complications were observed in a total of 16 (32%) of the patients, most commonly being fistula formation (n=12). Complications were more common among older patients, those with poorly developed foreskin, short urethral plate and shallow glans groove.

Conclusions: Postoperative complications after hypospadias surgery should be anticipated and the surgical technique should be planned accordingly.

KEYWORDS

Complications; Distal penile; Hypospadias; Penoscrotal

INTRODUCTION

Hypospadias is one of the most common congenital anomalies with an incidence that varies from 0.3 to 0.7% in live male births. The risk of hypospadias appears to be increasing based upon population surveys throughout the world. For instance, in Denmark, the incidence has doubled from 0.24 to 0.52% from 1977 to 2005. Similarly, in the United States also the hypospadias rates has doubled from 1970 to 1993. Although these trends may reflect improved surveillance and detection, these findings also suggest that temporal changes may be due to increases in risk factors, especially greater exposure to environmental contaminants or drugs that may disrupt the androgenic stimulation required for the development of the external male genital. At the time of diagnosis, a pediatric urologist should be consulted to determine the severity of the hypospadias, and review with the parents the clinical consequences of uncorrected hypospadias, and the need for surgical correction. Numerous techniques to repair hypospadias are available and used based upon the severity of the defect. However, there is no consensus on the best surgical approach to correcting severe hypospadias. In the present study, we aim to describe our experience of treating hypospadias in our department and describe how complication rates were associated with the patient related variables.

METHODOLOGY

Study Design and Sampling

This observational study of patients with a clinical diagnosis of hypospadias was conducted in the Department of General Surgery, Rajarshee Chhatrapati Shahu Maharaj Government Medical College and Chhatrapati Pramila Raje Hospital, Kolhapur. Ours is a tertiary level care hospital from western Maharashtra. All patients, aged between 18 months and 12 years with a confirmed diagnosis of hypospadias and who required single stage hypospadias surgery (without chordee) and staged repair (with chordee) from October 2016 till April 2018 were included in the study. Patients who required a second stage hypospadias repair, with other associated congenital anomalies like intersex, undescended testis, prostatic utricle or had severe associated diseases like cerebral palsy or cardiac disease were excluded from the study. Parents/legal guardians of the children were explained the purpose of the study and an informed assent was taken from them. the study was approved by the institutional ethics committee.

Surgical technique

All the cases underwent hypospadias surgery under spinal anaesthesia. After giving prophylactic antibiotics, glans width was determined at its widest point and a polypropylene stay stich was placed. The ventrally incision was approximately 2 mm below the meatus. For glanuar cases without fusion of the glans wings, the incision was made a few millimetres below the corona. Next degloving was done in different planes and dissection continued to the penopubic and penoscrotal junction. A tourniquet was placed at the base of the penis and dissection continued down to the surface of corpora and then laterally on each side to approximately 3 and 9 o'clock position. Additional dissection was done if the glans width less than 14 mm. Urethral plate was held on either side and gently stretched laterally with forceps. French infant feeding tube of number 6 or 7 was passed into the bladder and tied to the glans traction suture. Urethral plate tubularization was done using 7-0 polyglactin and a ventral dartos flap was raised, split into two longitudinal segments and crossed over neourethra to provide two layer coverage. Glansoplasty approximated the wings with 6-0 polyglactin subepithelial interrupted sutures, starting distally and continuing to the corona proximately. Residual ventral shaft skin attached to the inner prepuce was excised and the collar was approximated using 7-0 polyglactin interrupted subepithelial stiches. The dorsal prepuce was split in the midline to the edge of the inner preputial collar and then fixed in the midline using a 7-0 polyglactin subepithelial stich. The ventral midline skin was closed to recreate a median raphe and remaining excess skin laterally on either side was excised to complete circumcision. All skin edges are closed with subepithelial stiches. Urinary diversion done for 10 days. Six hours post-operatively, liquid and soft diet was started. Analgesics were administered on demand basis. Dressing was opened on 10th postoperative day and infant feeding tube (catheter) removed. All patients were advised follow up after 7 days and then once in 15 days.

Data Collection and Data Analysis

Using a pre-designed semi-structured proforma demographic information, clinical examination findings, procedure done, any intraoperative and postoperative complications were noted. The patients were examined post operatively for any surgical related complications like operative site bleeding or hematoma. Suture line examined for any necrosis, wound infection, seroma or hematoma. Meatus opening was examined and urinary stream and fall was noticed. Data were codified and analysed in SPSS software (IBM, Copr, NY). Quantitative data were described as mean and standard deviation and qualitative as frequency and percentages. Nominal data were analysed using chi squared or Fisher's exact test for strength of association. The alpha error till 5% was taken to be statistically significant.

RESULTS

During the study period, a total of 50 patients were included in the study. The most common age group was less than 3 years (36%) and

only 16% of the children were above the age of 10 years (Table 1). Our study had 30 (60%) patients with full term delivery, 12 (24%) patients had full term with low birth weight and 8 (16%) patients with preterm and low birth weight. Distal type of hypospadias was the most common type (68%), and the group comprised of glandular type (n=12), coronal (n=9), and sub-coronal (n=13). Proximal type of hypospadias was the next most common type (22%), which had penoscrotal type (n=6), scrotal (n=3) and perineal (n=2) type. Further, we classified the patients according to the anatomic variants and 60% had well developed foreskin while rest had poorly developed foreskin. Based on the urethral plate, 56% had wide urethral plate and rest had short plate. Based on glans size, 48% had adequate size of more than 14 mm, while rest had inadequate size. Finally, based on the glans groove, 56% had a deep groove while rest had shallow groove. Post-operative complications were observed in a total of 16 of the patients (Table 2). Most common complication was fistula formation (n=12). Other reported complications were meatal stenosis (n=2), stricture formation (n=1) and glans dehiscence (n=1). Table 3 describes how the post-operative complications were associated with various patient related variables. In the youngest age group, 16.6% had post-operative complications, while 62.5% in the oldest age group had pot-operative complications. With advancing age, complication rate was observed to increase significantly (p value = 0.04). In addition, approximately half of all proximal type hypospadias patients were found to have post-operative complications, while only a little more than one fifth of all patients with distal type had complications. Based on the foreskin, half of all patients with poorly developed foreskin had complications (p value = 0.01). Patients with short urethral plate had a higher complication rate as compared to those with a wide urethral plate (54.54% vs 14.28%, p value = 0.001). The complication rate between patients with adequate and inadequate glans size was not statistically significant (p value = 0.051). Patients with shallow groove had a significantly higher complication rate as compared to those with a deep groove (45.4% vs 21.4%, p value = 0.03).

DISCUSSION

Males with severe uncorrected forms of hypospadias may have difficulties in control of their urinary stream, which may require urination in a sitting position, erectile dysfunction, and infertility. Mild hypospadias typically has little effect on function except for the direction of the urinary stream. These patients may not require surgical correction, especially if the urethral meatus is on the glans of the penis. This approach was supported by a report of 56 adult men with uncorrected hypospadias including 44 with a mild form. Most of the patients were satisfied with the appearance of their penis, voided in a standing position, and were not infertile. However, patients with uncorrected hypospadias may develop anxiety regarding sexual performance and control of their urinary stream, and dissatisfaction in the appearance of their penis. The goal of surgical correction is to create a penis with normal function and appearance with a urethral opening as close as possible to the ventral tip of the penis. Surgical correction should result in a properly directed urinary stream and a straightened penis upon erection. In most cases, the corrected penis will be similar in appearance to a circumcised normal penis; however, the foreskin may be preserved in cases of mild to moderate hypospadias without curvature.

In our study, we included patients above the age of the 18 months, as before 18 months size of phallus is small and patient's weight is too less for routine anaesthesia. Also, about 40% of the patients in our study were either low birth weight, preterm or both. Hypospadias is known to be associated with lower birth-weight and a shorter gestation period. It has been reported that the frequency of hypospadias is up to 10-fold higher among very low-birth weight infants than among normal weight infants. Recently, a correlation between hypospadias and fetal growth restriction (FGR) was reported, suggesting that hypospadias is associated with placental insufficiency.

Fistula formation was the most common post-operative complication in our study population. which is characterized as two urinary streams because of the extra urethral opening. This complication is reported in about 4 to 20% of patients depending on the severity of their hypospadias. Urethral stricture is another common complication, which occurs due to tightening of the reconstructed urethra within the glans, which is referred to as meatal stenosis. These children will have symptoms of straining or pushing on urination, and a thin or fine urinary stream. Correction of a urethral stricture requires a second operation at least six months from the prior surgery. In our study, patients from older age group were more likely to have postoperative complications. Similar results have been presented by previous authors. Perlmutter et al suggested that hypospadias repair is safely performed in children 4 to 6 months of age and repairing at a later age may inadvertently place the patient at a greater risk of complications. Though not clearly understood, prolonged exposure to smegma inducing inflammation in the glans and prepuce and leading to an increased incidence of complications may be a possible explanation.

Higher proportion of post-operative complications were also observed in patients with poorly developed foreskin (p = 0.01), short urethral plate (p = 0.001), and shallow glans groove (p = 0.03). While some authors have demonstrated the importance of the plate characters in the success of repair, others studies have suggested the success of repair to be independent of plate characters. Further research is needed in this area.

CONCLUSION

Hypospadias is one of the most common congenital anomalies in live male births. We had a post-operative complication rate of 32%, which was more common in older patients, those with poorly developed foreskin, short urethral plate and shallow glans groove. This being a single centre study, our results might not be applicable to other surgical centres where different surgical techniques may be used. Further research is needed to support the results of our findings.

Table 1. Distribution of patients according to their baseline demographic and clinical characteristics

Variable	No. of patients	Percentage
Age group (in years)		
to 3	18	36%
3 to 6	14	28%
6 to 10	10	20%
10 and above	08	16%
Prematurity and birth weight		
Full term	30	60%
Full term with low birth weight	12	24%
Preterm with low birth weight	08	16%
Type of Hypospadias		
Proximal type		
Penoscrotal	06	12%
Scrotal	03	06%
Perineal	02	04%
Middle shaft type	05	10%
Distal type		
Glanular	12	24%
Coronal	09	18%
Sub coronal	13	26%
Anatomical variants		
Based on fore skin of penis		
Well developed	30	60%
Poorly developed	20	40%
Based on urethral plate		
Wide urethral plate	28	56%
Short urethral plate	22	44%
Based on glans size		
Adequate size (>14mm)	24	48%
Small size (<14 mm)	26	52%
Based on glans groove		
Shallow groove	22	44%
Deep groove	28	56%

Table 2. Various post-operative complications

Types of complications	Number of patients with postoperative complications
Fistula	12 (24%)
Meatal stenosis	02 (04%)
Stricture	01 (02%)
Glans dehiscence	01 (02%)
Total	16 (32%)

Table 3. Post-operative complications in relation to age of patients, type of hypospadias and anatomical variants

Variables	Total number of patients	Number of patients with postoperativeomplications	Proportion of patients	P value
Age Groups (in years)				
1.5 to 3	18	03	16.6%	0.045

3 to 6	14	04	28.57%	
6 to 10	10	04	40%	
10 and above	08	05	62.5%	
Type of Hypospadias				0.14
Proximal	11	06	54.5%	
Middle Shaft type	05	02	40%	
Distal type	34	08	23.5%	
Anatomical Variants				
Based on foreskin of penis		0.0129		
Well developed	30	06	20%	
Poorly developed	20	10	50%	
Based on urethral Plate				0.0012
Wide urethral plate	28	04	14.28%	
Short urethral plate	22	12	54.54%	
Based on glans Size				0.0519
Adequate size (>14mm)	24	05	20.8%	
Small size (<14mm)	26	11	42.3%	
Based on glans groove				0.0353
Shallow groove	22	10	45.4%	
Deep groove	28	06	21.4%	