ORIGINAL ARTICLE

Hypospadias from the Perspective of a Single-Surgeon Practice in Malaysia

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SUMMARY

The last decade has witnessed an alarming increase in the worldwide incidence of hypospadias. For non-hypospadiologists, the surgical correction of hypospadias will be increasingly demanding. This paper aims to evaluate the effectiveness of a treatment strategy devised by a single-surgeon practice in Malaysia to tackle this anticipated surge of caseload. Over a period exceeding eight years, 254 boys underwent corrective hypospadias surgery by a single paediatric surgeon at Alor Star Hospital, Malaysia. Patient demographics, racial distribution and meatal location were among the data collected retrospectively. The various types of corrective procedure employed, their outcome as well as complications were evaluated. Distal type of hypospadias dominated this series. There was an explainable peculiarity in the age distribution of hypospadias. For all types of repair, the complication rate was 33% consisting mainly of urethrocutaneous fistula (18%) and meatal stenosis (9%). Complication rate for tubularised incised plate (TIP) urethroplasty, the commonest technique of repair, was 30%, mainly from meatal stenosis (15%) and urethrocutaneous fistula (13%). Univariate analysis revealed that proximal hypospadias, repairs done during the initial four years of study and utilisation of repair other than TIP to be adverse risk factors. Tubularised incised plate urethroplasty was appropriate for almost all types of hypospadias. For the remainder, the two stage repair is satisfactorily employed. This study from a primary referral centre also dispelled the notion that proximal hypospadias predominate in this region. The versatility and reliability of TIP urethroplasty lends itself readily in tackling primary and repeat hypospadias surgery within a single-surgeon practice.

KEY WORDS:
Hypospadias, Tubularised incised plate urethroplasty, Fistula, Stenosis

INTRODUCTION

Of late, numerous reports[1-3] have testified to the worldwide increase in the incidence of hypospadias. The conventional incidence of 1 in 300 has peaked to as high as 1 in 200[1], which has been blamed on endocrine disruptors present in many consumer products. The surgical correction of hypospadias remains a highly specialised expertise, and many countries including Malaysia lament the dearth of robust epidemiological data on the subject. If this deluge of hypospadias cases materialise, it would present a unique dilemma to the local healthcare establishment.

The evolution of hypospadias surgery has produced consistent and optimal results from dedicated hypospadiology units[2]. Constant refinements of surgical techniques by committed hypospadiologists have created numerous recommended protocols and algorithms[3]. In contrast, hypospadias surgery in this country is often performed by the general paediatric surgeons or urologists, typically in a single-surgeon practice. The high caseload mandates that hypospadias correction is by no means the 'occasional' operation. Thus, an efficient and effective strategy will need to be in place to consistently yield optimal results.

Headed by a single consultant (M.N.), the Department of Paediatric Surgery of Alor Star Hospital served the three northern states of Perlis, Kedah and Pulau Pinang, with a population exceeding three million. To accommodate hypospadias surgery into hectic operating lists, a modified algorithm to correct almost all types of hypospadias was adopted. This protocol has been developed at a period when revolutionary techniques such as the tubularised incised plate (TIP) urethroplasty were being increasingly preferred for their superior cosmetic and functional results[4,5]. Thus, the primary objective of this study is to critically evaluate the feasibility of this approach in the management of hypospadias within the constraints of a single-surgeon practice.

MATERIALS AND METHODS

Between January 1998 and July 2006, 254 boys with hypospadias were treated at the hospital. Both primary and re-operative procedures were retrospectively reviewed. Parameters analysed included the age at operation, race, type of hypospadias, technique of repair, duration of operation, and the complications following repair.

The techniques of repair were as described previously, and they comprise of TIP urethroplasty[6], two stage operation[7], meatal advancement and glanuloplasty (MAGPI)[8], transverse preputial island flap (TPIF)[9], parameatal based flap (Mathieu procedure)[8] and glans approximation procedure (GAP)[10]. TIP repair was appropriate for nearly all boys except for those with severe chordee or unsatisfactory plate integrity necessitating plate transection[11]. Two-stage repair is performed when TIP is contraindicated. TPIF and Mathieu repairs (designated the 'non-TIP' repairs) were conventional techniques that were gradually supplanted with TIP urethroplasty until their cessation by 2000. Postoperative urethral catheters were always inserted. Assessment of

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outcome was done by outpatient clinic reviews and confidential telephone surveys. Clinical evaluation was performed not earlier than two months after the repair. Mean follow up period was 28 (range, 3-62) months. Statistical analysis was performed using Statistical Package for Social Sciences version 13 (SPSS, Chicago, Ill), with p value of less than .05 considered significant.

RESULTS

There were no intraoperative complications. Over the period of eight years, a total of 254 consecutive hypospadias repairs were examined. The mean age of the boys at operation was 6.1 years old, and they range from 6 months to 16 years old. As seen from Figure 1, there was a second peak age of incidence at about 10 years old which corresponded to defects detected at the age of religious circumcision. Data was incomplete for 24 patients, resulting in the final analysis of 230 boys. Ethnically, Malay boys constituted the largest proportion of patients (193 boys, 84%) followed by Chinese patients (23 boys, 10%) and Indian boys the smallest group (14 boys, 6%).

After correction of chordee, distal defects constituted 48% of all hypospadias (111 patients), whilst midshaft and proximal types represented 23% (52 patients) and 29% (67 patients) respectively. More than half of all repairs (132 patients, 57%) were performed using TIP urethroplasty. The next most common technique was the two-stage operation (51 patients, 22%), followed by MAGPI (19 patients, 8%), TPIF (13 patients, 6%), Mathieu repair (9 patients, 4%) and least commonly, GAP (6 patients, 3%).

Overall, complications occurred in about a third of repairs (77 patients). Urethrocutaneous fistulas constitute 18% of complications (41 cases) followed by meatal stenosis which occurred at a rate of 9% (22 cases). Glans dehiscence and urethral stricture make up the remainder, at 4% (10 cases) and 2% (4 cases) respectively. Re-operation was required for 30 of the 77 patients (39%), whilst the remainder which constituted the meatal stenosis were adequately treated with outpatient urethral calibration.

With regards to TIP urethroplasty, a total of 132 boys with an average age of 5.5 years (range 6 months to 14 years) underwent the procedure. Six procedures were salvage urethroplasty. The defects comprises of 75 proximal (57%), 43 midshaft (33%) and 14 proximal (10%) hypospadias. TIP urethroplasty took an average of 135 minutes to perform (range, 65 to 255 minutes). Complications occurred in 30% of TIP repairs (40 patients), most commonly meatal stenosis (20 patients, 15%) and urethrocutaneous fistula (18 patients, 13%). The rate of urethral stricture and glans dehiscence was about 1% (1 patient) each. Of the 24 encountered meatal stenosis post repair, only three patients required meatotomy/ meatoplasty while the rest underwent office neourethra calibration. 10 of 17 patients (59%) who developed fistulation underwent fistula repair, while the remaining fistula healed spontaneously. Most significantly, the complications of TIP urethroplasty have declined steadily over the years (Figure 2).

Complete records were available for only 22 patients who had undergone the non-TIP repairs. Nevertheless, when comparing these two groups of repairs, younger boys were found to undergo the TIP urethroplasty (mean age 5.5 versus 8.1 years old). Median duration of operation for TIP was also shorter than non-TIP, 135 and 191 minutes respectively. In comparing the complications, a third of TIP urethroplasty develop complications in contrast to more than half of the non-TIP group. While the predominant complications for TIP repair were meatal stenosis and urethrocutaneous fistula, almost a third of all non-TIP complications were attributed to urethral stricture and glans dehiscence. This would account for the higher re-operation rate in the latter group. All these differences were however not statistically significant owing to the small number of non-TIP procedures.

Via univariate analysis, complication rate was found to be higher with the more proximal type of hypospadias, non-TIP procedures and the earlier repairs; i.e. the first four years of the study. However, when these factors were re-tested using logistic regression multivariate analysis, no independent risk factor was identified.

DISCUSSION

This study charted the local evolution of hypospadias surgery. Such analysis from a developing country is timely, given the reports of increasing international incidence of hypospadias. The only other paper from Malaysia originated from a tertiary referral centre[12] which dealt with the more proximal forms of hypospadias. This probably fuelled the notion that hypospadias in this region tends to be of the more proximal variety. In contrast, this series at a primary referral centre was predominated by the distal type. We nevertheless acknowledge that the actual prevalence is probably underestimated, as implied from the second peak of incidence shown in Figure 1. This later peak skewed the mean age of operation to six years old, which would otherwise be about four years old, as recommended[3].

The shortage of paediatric urologists in Malaysia is compounded by the lack of dedicated hypospadiologists. Regionalisation of hypospadias services, believed to offer better results[13], simply does not exist. Therefore, despite the surgeon's enthusiasm hypospadias surgery is often the casualty of a busy operating list. The solution may lie in the use of a few well-practised techniques to simplify the decision-making process. Given the vast array of procedures for the various types of hypospadias, this remains a formidable task. The prerequisites of choosing the right operation depend not only on glans and meatal configuration but most crucially on urethral plate integrity. The fact that there were more than 300 described procedures[3] bear testament to its difficult mastery. The ideal technique should be reliable, versatile and without a steep learning curve. The last criterion would guarantee its preference among surgical trainees.

Essentially an intermediate-term appraisal of a personal series, the preponderance of TIP urethroplasty underscores its preference in this analysis. Although not statistically significant, better outcome was demonstrated in TIP rather

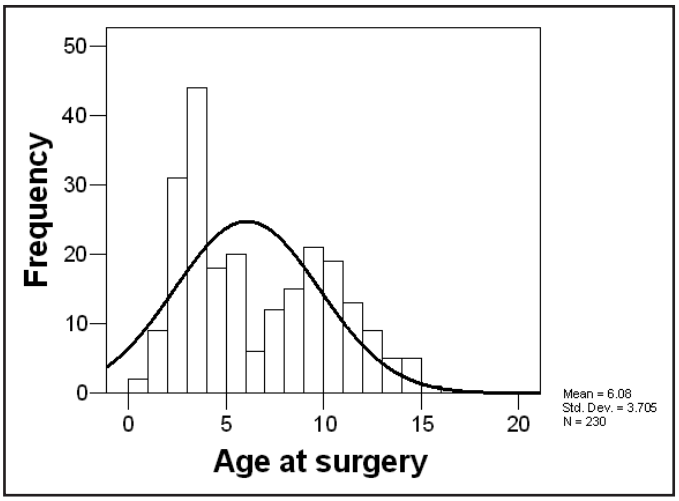

Fig. 1: Age distribution at surgery for hypospadias

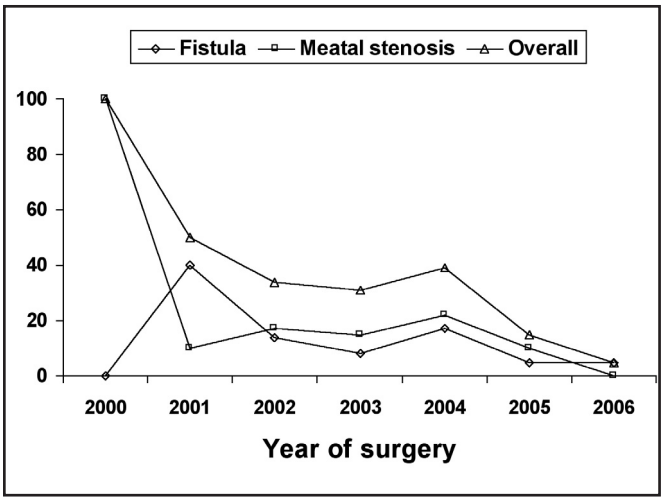

Fig. 2: Overall complication rates of TIP urethroplasty according to year of surgery

than non-TIP procedures. It can be argued the differences are greatly influenced by the surgeon factor rather than the inherent flaw of the techniques themselves[14]. By the same contention, a single surgeon minimises inter-operator variability and partiality, with more consistent results[15]. TIP urethroplasty's effectiveness is validated by the substantial decline in the complication rates as shown in Figure 2, which compare favourably with those from established units[4,15-17]. This review also found meatal stenosis, which was easier to manage, as the commonest complication as compared to urethrocutaneous fistula quoted in most studies[4,16].

We concur with several reviews that TIP urethroplasty can reliably create a functional neourethra with a vertically-oriented meatus[15,18]. Surgical technique is not affected by meatal position[4], thus simplifying decision-making. The manoeuvre of a midline relaxing incision to hinge the urethral plate facilitates its tubularisation regardless of the glanular configuration. In hypospadias with narrow urethral grooves, this provides an excellent alternative to the Mathieu procedure or vascularised pedicle flap[4]. Moreover, as skin flaps are not required, TIP procedure lends itself quite readily to repeat hypospadias repair. Finally, its forte lies in its technical simplicity[16,19], in response to criticism that most hypospadias procedures are difficult to master[20].

This study is not so much for the exaltation of TIP urethroplasty over the conventional techniques of repair as it is for the advocacy to simplify decision-making in hypospadias surgery[3]. A dependable protocol for correcting almost all primary and repeat hypospadias using a few logically related procedures is indispensable particularly in the dearth of specialisation and centralisation of services in Malaysia. Personally, we have come to rely heavily on this workhorse of hypospadias repair, and strongly believe that TIP urethroplasty should feature in every hypospadiologist's armamentarium.

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