

OUTCOME OF THE MODIFIED MAGPI PROCEDURE FOR PRIMARY REPAIR OF DISTAL HYPOSPADIAS

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ABSTRACT

Objective: To determine the outcome of the modified MAGPI procedure for primary repair of distal hypospadias.

Methodology: This prospective descriptive study was performed in three hospitals of Bannu and Peshawar. A total of 24 cases with distal hypospadias were included in the study with coronal, subcoronal and glandular hypospadias. Those with chordee and more proximal forms where the MAGPI was not the procedure of choice were excluded from the study. The procedure of modified MAGPI included a modification of the original MAGPI (meatal advancement and glanduloplasty) by excision of a triangular shaped piece of glanular tissue or a vertical incision in the glans distal to the meatus. The patients were followed up for 6 months.

Results: The total number of patients who underwent modified MAGPI procedure was 24. The age range was 2- 10 years. The average length of hospitalization was 24 hours. Complications observed in 4 (16.6 %) cases. We observed two (8.3%) patients with meatus retraction and one (4.2%) with glanular dehiscence or total disruption and one (4.2%) with wound infection. No case with fistula was observed. Straightening of penis, good micturating stream and cosmetic outlook as well as parents satisfaction was achieved in 83.3% (n=20/24) cases.

Conclusion: Follow up of all the operated cases of the modified MAGPI procedure for primary repair of distal hypospadias showed good functional and cosmetic results. Complication rate was 16.7%.

Key words: MAGPI procedure, Hypospadias, Coronal

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INTRODUCTION

Hypospadias is a common congenital anomaly of the children. One in 300 boys has hypospadias.¹ The causes of hypospadias are essentially unknown though several theories have been suggested regarding aetiology. Some endocrine disorders have been described like insufficient secretion of androgens or insufficient response by the target tissue. However, in very few cases these disorders can be confirmed.² Hypospadias can be found in several members of the same family which indicates some genetic disorder.³ Babies born to mothers of extreme of ages and with low birth weight and twins are more prone to have hypospadias, possibly explained by placental

insufficiency.^{2,4} The significant increase in hypospadias over the last 20 years, raise the role of environmental factors e.g. hormones and chemicals of day to day use.^{3,5} The correction of hypospadias is compulsory for normal aesthetic appearance, urinary function and sexual act in the adult life.

The meatal advancement and glanduloplasty (MAGPI) procedure was first described in 1981 for the repair of distal hypospadias.⁶ The majority of cases are distal hypospadias with an incidence of 75%.^{7, 8} Distal hypospadias refers to an orifice in the distal third of the penile shaft. Correction of distal hypospadias requires different techniques, depending on the location of the meatus. Simple advancement techniques can be used for most distal hypospadias, whereas hypospadias with chordee requires reconstruction of a urethra. The more proximal the meatus more likely chances of development of ventral curvature of penis (chordee).⁹ Complications such as meatal stenosis, meatal retraction/ regression and fish mouth-like meatus can be seen after MAGPI procedure, though it usually yields good results. Some modifications of MAGPI for correction of distal hypospadias have been tried with more acceptable cosmetic appearance than with classical MAGPI.^{7,10}

The main goals in hypospadias surgery are penile straightening, urethroplasty, meatoplasty and glanduloplasty and skin coverage. The success of the operation

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is determined by excellent cosmetic appearance and normal voiding in a straight direction from the tip of the glans.^{11, 12} The modified MAGPI operation provided good cosmetic and functional results. Thus, the proposed modification (MAGPI-Duckett) ensures a more reliable variant of meatoglanuloplasty in glandular, coronal and subcoronal hypospadias.¹³ These additional procedures helped to reduce the number of postoperative complications and improved cosmetic and functional results.

Hypospadias surgery is one of the most challenging surgical interventions that still need further refinements for increased success rate.¹⁴ More than 300 procedures have been described in the literature which indicates the poor successful results and the higher rate of complications of all the techniques described.

In Pakistan, various studies have been conducted on various techniques for the management of hypospadias with promising results.^{9,15-17} This study was planned to determine the outcome of the modified MAGPI procedure for primary repair of distal hypospadias in various hospitals of Peshawar and Bannu districts of Khyber Pukhtunkhwa, Pakistan.

METHODOLOGY

This prospective descriptive study was performed in three hospitals Khalifa Gul Nawaz Hospital, and DHQ hospital, Bannu and Alkhidmat hospital, Peshawar to evaluate outcome of Modified MAGPI repair for distal hypospadias. A total of 24 cases with distal hypospadias were included in the study with coronal, subcoronal and glandular hypospadias. Those with chordee and more proximal forms where the MAGPI was not the procedure of choice were excluded from the study. The age range was 2 -10 years. The procedure of modified MAGPI is actually a modification of the original MAGPI. The modification involves excision of a triangular shaped piece of glandular tissue or a vertical incision in the glans distal to the meatus. By means of this excision, burying of the meatus into the glans was eased without inducing extra mobilization of the glans wings. As less glans tissue was left at the dorsal urethra the urethral meatus could be replaced in the center of the glans and better anatomic reconstruction could be attained. A stay suture of 3/0 silk was taken at glans dorsal to the neomeatus. Per urethral catheterization was performed. Tourniquet was applied at the base of penis to minimize bleeding. A 1.5cm rectangular skin flap is mobilized proximal and based at the urethra. Then the urethra is mobilized with a circular incision around it. A longitudinal incision is given into glans distal to the meatus. The rectangular flap of skin is hold with a stay suture and pulled distally. Now this urethra is buried and fixed with delayed absorbable suture into the distal slit created into the glans and the wings of glans are wrapped around the urethra and fixed with suture 5/0 vicryl. The prepuce/ hood skin was left and circumcision was not performed in any case. The reason is that the left over skin may be used for revision surgery in case of com-

plications. The Foley's catheter and feeding tubes were used as stents for 1- 5 days. Post operative patients were discharged on 1– 5 days. Follow up was initially fortnightly and then at 3 monthly intervals. Minimum follow up period was 6 months.

RESULTS

The total number of patients who underwent modified MAGPI procedure was 24. Among them 12 (50%) cases were coronal, 7(29 %) were subcoronal and 5(20.8%) were glanular form of hypospadias the age range was 2- 10 years. The average length of hospitalization was 24 hours. Complication rate was 16.7% (n=4/24). Meatus retraction observed in 2 (8.3%) cases was the most common complication (**Table 1**). No case with fistula was observed. Foley's catheter and feeding tube was used as perurethral stent and for urinary drainage in equal number of patients twelve (50%) each. We found two Foley's catheter (16.6%) blocked and removed after 2 days. One (8.3%) caused total disruption of the neo-urethra during removal. No complication was observed with feeding tube. Straightening of penis, good micturating stream and cosmetic outlook as well as parents satisfaction was achieved in 83.3% (n=20/24) cases.

COMPLICATIONS OF MODIFIED MAGPI PROCEDURE

Complications	Frquency	%Age
Meatus retraction	2	8.3%
Glandular dehiscence	1	4.1%
Wound infection	1	4.1%

Table I

DISCUSSION

The aim of hypospadias repair is to achieve a functionally and cosmetically acceptable urethral opening. More than 200 surgical techniques have been described, using various flaps and grafts to replace or supplement the urethral plate.⁴ It means that no single procedure is 100% successful, universally acceptable and suitable to all types of hypospadias and acceptable to all surgeons. There is no single method that could be used for all hypospadias as have been stated by Duckett JW¹⁸, but in this study we have found that modified MAGPI technique can be used for a range of hypospadias from coronal, subcoronal and glandular types with a good success rate. Mostly one stage repair procedure is preferred now a days.¹⁵ This technique has a success rate of over 91% in distal types of hypospadias particularly the glanular form. Though some centers may not be in favour for repair of this type and may be satisfied with simple circumcision, but we used to do modified MAGPI to get better shape and parents' satisfaction.⁵ Hypospadias repair must be accomplished by the time boy reaches school or may be by the age of 02 years. The awareness of possible psychogenic impact of

genital malformations in childhood recommends an early correction of hypospadias, if possible in first year of life.²⁰

The age range in our study was 2-10 years while a local study mentioned an age range of 1-25 years. The age factor neither affects the selection of a procedure nor the outcome. As the child grows older the impact of genital malformations affects the social behavior and self esteem.⁹ Now the awareness is increasing and the parents notice it earlier and visit the general practitioner who can refer it to the treating surgeon.

Though the postoperative fistula is a documented complication, we didn't observe any case with fistula postoperatively in our study. The reason may be either the smaller specimen of our study or the beauty of the technique. According to D W Man et al the fistula rate was zero as well and there were no other complications and they recommended Modified MAGPI as the operative procedure of choice for glanular, coronal and subcoronal hypospadias.^{21,22} While Harrison observed a 2.1% fistula rate, only one patient required secondary operation.²³

In our study the meatal retraction was observed in two cases (8.3 %) which is comparatively higher than a 6.4% meatal retraction observed by Harrison.⁽¹⁹⁾ In our study the successful results were 83.3 % while Ayman reported a success rate of 90.5% with good cosmetic, functional results and vertical slit meatus. According to Ayman the overall complication rate was 9.4% (3/32), retraction of meatus in two cases (6.25%) and dehiscence of glanular flap in one case (3.1%).²⁴

There was no postoperative meatal stenosis in our study in contrast to the reported meatal stenosis in the literature.²³

We excluded hypospadias with chordee from our study but there is an experience of some centers that modified MAGPI could be helpful even in some cases of minor chordee. Jawad AJ²⁵ reported the overall complication rate as 4% which was observed during the treatment of 102 patients (glanular 50, coronal 47, and subcoronal 5). According to him this technique can be used effectively in patients with coronal and subcoronal hypospadias, particularly in the presence of distal chordee, fibrotic immobile urethral meatus where the original MAGPI repair is otherwise limited. It was also found in another study that MAGPI can improve the position of the urethral meatus, correct meatal stenosis, release associated skin chordee and produce the aesthetic appearance of a normal penis.²¹

We used urethral Foley's catheter and feeding tubes for postoperative urine drainage. Our experience with Foley's catheter was not good. It usually gets blocked and its balloon even after deflation causes damage to neourethra on removal. We found at least one such case with total urethral disruption when the blocked Foley's catheter was removed. We found feeding tube anchored with stay suture at the glans better than Foley's catheter. There was no blockage or urethral disruption observed during removal. No urethral stent or suprapubic diversion

was used in any case. Rasool M et al⁹ used indwelling Foley's catheter for 07-14 days and found satisfactory results and patient compliance than the urethral stents. They used urethral stents as well and found them painful for patients and hesitancy was observed while micturating through it. They usually got dislodged and resulted in disruption of repair. This study cannot comment on use of urethral stents. Different studies have practiced bladder drainage from 07-10 days in contrast to our experience of 1-5 days.^{9,21} Suprapubic diversion was used for 04-11 days for secondary repair or fistula repair after hypospadias surgery was found beneficial in protecting repair site.^{26,27}

We used encircling guaze dressing over tulle gauze. It was removed after 24 hours in some cases along with catheter removal and after 5 days in the rest. We found no difference in any case on the timing of removal of dressing and per urethral catheter or feeding tube. Dressing following the hypospadias surgery has the benefit of gentle compression for hemostasis, immobilization of wound and formation of hemostatic seal. Potential disadvantage of dressing include ischemia, infection and pain during removal. In a comparative study of dressed and non dressed hypospadias repair, no gross difference was observed in outcome. This study concludes that success rate of hypospadias repair is independent of dressing used. Dressing may not be indicated for all hypospadias repairs.^{28,29}

Criteria for the success of any hypospadias repair is glanular meatus, single forward directed stream, unimpeded voiding, absence of penile chordee, good cosmesis and no need for secondary procedure. "Hypospadias objective scoring evaluation" (HOSE) system has been validated for assessing the outcome of hypospadias repair by evaluating the shape & location of meatus along with stream of micturation, straightness of erection and urethral fistula.³⁰

CONCLUSIONS

Follow up of all the operated cases of the modified MAGPI procedure for primary repair of distal hypospadias showed good functional and cosmetic results. Complication rate was 16.7% and meatus retraction, glanular dehiscence or total disruption and wound infection were the common complications. Straightening of penis, good micturating stream and cosmetic outlook as well as parents satisfaction was achieved in 83.3% cases.

REFERENCES

1. Ahmed SF, Cheng A, Hughes 1A. Assessment of gonadotrophin gonadal axis in Androgen insensitivity syndrome. Arch Dis Child 1999; 80: 324-9.
2. Feyaerts A, Forest MG, Morel Y, Mure PY, Morel-Journal N, Mallet D, et al. Endocrine screening in 32 consecutive patients with hypospadias. J Urol 2002; 168: 720-5.
3. Stoll, C, Alembik Y, Roth MP, Dott B, Genetic and environmental factors in hypospadias. J Med Genet 1990; 27: 559-63.

4. Clup OS, McRoberts JW, Hypospadias; in Alken CE, Editors. Encyclopedia of Urology. New York Springer. V. 1968; 11307-113449.
5. Sulaiman AA. Repair of hypospadias in Mosul Paediatric Surgery Centre (analysis of 125 cases). Ann Coll Med Mosul 2008; 34(2): 109-17.
6. Duckett JW, Synder HM. The MAGPI hypospadias repair in 1111 patients. Annals Surg 1991; 213(6): 620-6.
7. Taneli C, Genç A, Günsar C, Sencan A, Arslan OA, Daglar Z, et al. Modification of meatal advancement and glanuloplasty for correction of distal hypospadias. Scand J Urol Nephrol 2004, 38 (2):122-4.
8. Elemen L, Tugay M. Limited Urethral Mobilization Technique in Distal Hypospadias Repair with Satisfactory Results. Balkan Med J 2012;29: 21-5.
9. Rasool M, Tabassum SA, Sheikh AH, Amin MM, Hypospadias Repair. Professional Med J 2007; 14(4): 677-84.
10. Baran CN, Sungur N, Kılınc H, Ozdemir R, Sensöz O. Incision Technique in Distal Hypospadias: A Modification of Meatal Advancement and Glanuloplasty ©2002 American Society of Plastic Surgeons.
11. Alkan M, Oguzkurt P, Ezer SS, Ince E, Hicsonmez A. Evaluation of the results of eccentric circummeatal-based flap with combined limited urethral mobilization technique for distal hypospadias repair. J Pediatr Urol 2008; 4: 206-9 1.
12. Baskin LS, Ebberts MB. Hypospadias: anatomy, etiology, and technique. J Pediatr Surg 2006;41:463-72.
13. Rudin IuE, Anikiev AV, Shishkov MV.[Modification of meatoglanuloplasty (MAGPI-Duckett) for treatment of balanic and coronal forms of hypospadias in children]. Urologiia 2001;1:31-6.
14. Sommer JT, Stephen FD. Dorsal urethral Diverticulum of fossa navicularis, symptoms, diagnosis and treatment. J Urol 1980; 124:94-98.
15. Iqbal T, Uddin N, Khan M, Naz S. Frequency of complications in the Snodgrass repair and its risk factors. Pak J Surg 2011;27(3):188-193.
16. Khan D. Management of hypospadias in children. J Surg Pak 2008;13(2):82-4.
17. Khattak IU, Akbar M, Nawaz M, Al-Saleh A, Noor B, Ziaur-Rehman. An audit of single stage hypospadias repair at Ayub Hospital Complex, Abbottabad. J Ayub Med Coll Abbottabad 2004;16(4):21-5.
18. Duckett JW. Hypospadias repair in: O'Donnel and Koff SA, Editors Pediatric Urology 3rd ed. Oxford: Butterworth, Heinemann 1997: 551-568.
19. Kogan BA. Intra operative pharmacological erection as an aid to pediatric hypospadias repair. J Urol. 2000 Dec; 164 (6): 2058-61
20. Bianchi M: Correction of hypospadias. Arch Ital Urol Androl. 1998 Dec; 70 (5): 219-22.
21. Man DW, Hamdy MH, Bissett WH. Experience with meatal advancement and glanuloplasty (MAGPI) hypospadias repair. Br J Urol 1984; 56(1):70-2.
22. Andersen B, Mitchell M. Recent advances in hypospadias: current surgical technique and research in incidence and etiology. Curr Urol Rep 2001;2(2):122-6.
23. Harrison DH, Grobbelaar AO. Urethral advancement and glanuloplasty (UGPI): A modification of the MAGPI procedure for distal hypospadias. Br J Plast Surg 1997; 50(3):206-11.
24. Safwat A. Modified MAGPI for repair of distal hypospadias. Benha M J 2004;21(1):709.
25. Jawad AJ. Urethral advancement and glanuloplasty UAGP vs. MAGPI for distal hypospadias repair. Int Urol Nephrol 1997;29(6):681-6.
26. Elbakry A. Management of urethrocutaneous fistula after hypospadias repair, 10 year experience. BJU Int 2001; 88(6): 590-5.
27. Latifoglu O, Yavuzer R, Unal S, Cavasoglu T, Atabay K. Surgical treatment of urethral fistula following hypospadias repair. Ann Plast Surg 2000; 44(4):381-6.
28. Van-Savage JG, Palanca LG, Slaughenhaupt BL. A prospective randomized trial of dressing versus no dressing for hypospadias repair. J Urol 2000; 164(3):981-3.
29. Oh Sumi N. Post operative compressive penile dressing using fibrin seal (Tisseal) and tulle gauze for hypospadias repair. Plast Reconstr Surg 1998; 101(6): 1737-8.
30. Holland AJ, Smith GH, Ross FI, Cass D. HOSE: An objective scoring system for evaluating the results of hypospadias surgery. Br J Urol Int 2001;88(3): 255-8.

AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

- HUR:** Conception and design, acquisition of data, drafting the manuscript
- TW:** Drafting the manuscript
- IUR:** Final approval of the version to be published
- MI:** Revision of manuscript

CONFLICT OF INTEREST

Authors declare no conflict of interest

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