

STAGED REPAIR OF PROXIMAL HYPOSPADIAS - A RETROSPECTIVE STUDY IN A TERTIARY REFERRAL CENTRE

Dr Roseline kiruba. A

Department of Paediatrics

Sri SIDDHARTHA medical College, TUMAKURU

Email: roselinkrupa@gmail.com

Dr ARRAVIND k.s

Department of Paediatrics

Sri Siddharth academy of higher education

DECLARATION: I AS AN AUTHOR OF THIS PAPER /ARTICLE, HERE BY DECLARE THAT THE PAPER SUBMITTED BY ME FOR PUBLICATION IN THE JOURNAL IS COMPLETELY MY OWN GENUINE PAPER. IF ANY ISSUE REGARDING COPYRIGHT/PATENT/OTHER REAL AUTHOR ARISES, THE PUBLISHER WILL NOT BE LEGALLY RESPONSIBLE. IF ANY OF SUCH MATTERS OCCUR PUBLISHER MAY REMOVE MY CONTENT FROM THE JOURNAL WEBSITE. FOR THE REASON OF CONTENT AMENDMENT /OR ANY TECHNICAL ISSUE WITH NO VISIBILITY ON WEBSITE /UPDATES, I HAVE RESUBMITTED THIS PAPER FOR THE PUBLICATION.FOR ANY PUBLICATION MATTERS OR ANY INFORMATION INTENTIONALLY HIDDEN BY ME OR OTHERWISE, I SHALL BE LEGALLY RESPONSIBLE. (COMPLETE DECLARATION OF THE AUTHOR AT THE LAST PAGE OF THIS PAPER/ARTICLE)

ABSTRACT

Introduction: Proximal hypospadias is a complicated congenital anomaly. Its main characteristic is distal displacement of the urethral meatus and severe curvature of the penis on its ventral aspect. Management at surgery still remains very difficult, with techniques having to ensure maximum functional and aesthetic results.

Aim: The objective of this study will be to assess the effectiveness, complication rates, success rates, as well as long-term functional and aesthetic outcomes of the Byers 2-stage repair in the surgical treatment of proximal hypospadias in children.

Purpose: This is a retrospective analysis that is aimed at the surgical outcome and complications post surgery of children treated in a tertiary referral center by undergoing the Byers 2-stage operation for proximal hypospadias, which mainly deals with assessing whether such an approach could help to improve functional as well as aesthetic outcomes.

Method: This is a retrospective study held at a tertiary referral center focused on pediatric urology. It covered 36 cases of pediatric patients diagnosed with proximal hypospadias who underwent Byers 2-stage surgery. Details of surgery, namely flap types, including different varieties such as sliding flaps, Snodgrass, Byers, and penoscrotal transposition; placement of tunica vaginalis flaps, were accounted for. Complications observed post-operatively included

disruption, fistula, flap resurfacing, and buccal grafting. The analysis of data was done by descriptive statistics and software to determine the success and complications of the procedure.

Results: The mean age of the patients at surgery was 9 months. In the first stage, different techniques for chordee repair were used, and types of flaps were selected depending on the needs of each patient. In the second stage, a tunica vaginalis flap was used in 34 patients. Post-operative complications developed in 14% of the patients. These included a complete disruption requiring Bracka's repair, a lateral fistula, flap resurfacing in four cases, and a buccal graft for persistent ulcer in one case. There were no meatal complications. The complication management was effective, and overall surgical outcomes were favorable.

Conclusion: The Byers 2-stage repair technique for proximal hypospadias gives both good functional and aesthetic outcomes. Although there was a minimal incidence of post-operative complications, all of the complications were managed well. The study suggests that the solution to the challenges presented by proximal hypospadias is staged repair. Further long-term follow-up studies are needed, however, to assess durability and success over time.

Keywords: Staged Repair, Proximal Hypospadias, Retrospective Study, Tertiary Referral Centre, Surgical Outcomes

1. INTRODUCTION

Proximal hypospadias is a condition of congenital malformation of the male urethra characterized by an abnormal placement of the urethral meatus, often located along the ventral surface of the penis, sometimes near the scrotum or perineum. This is one of the most severe forms of hypospadias, and the condition is often associated with other anatomical deformities, such as chordee, which can be severely disabling to both functional and cosmetic functions of the penis. The abnormal position of the meatus, coupled with the associated deformities, can lead to difficulties in urination, sexual dysfunction, and psychosocial challenges, especially during adolescence and adulthood.

The complex anatomy is one of the challenges of treating proximal hypospadias. The meatus has a distant location from the normal site, and often, the tissues that enclose it are deformed, like the penile shaft and the scrotum, making surgical correction technically challenging. The

existence of severe chordee will add to the complexity as this can be uncomfortable and embarrassing to urinate or have sex. Therefore, surgical repair needs to be well-planned and executed with a perfect accuracy to achieve functional as well as aesthetic outcomes; both are essential for a patient's well-being.

The management of proximal hypospadias has significantly improved with the years. There are various techniques that have been devised, and even the single-stage repair methods are there in order to rectify the condition. Despite this, the success rates of single-stage repairs remain poor due to anatomical complexity. These repairs have been associated with a high rate of complications, which include fistulas, urethral strictures, and meatal complications. These complications may prolong healing and lead to additional surgery and longer recovery periods.

To overcome the challenges of single-stage repair, staged repair has become increasingly popular. In this approach, the surgical correction is carried out in two separate phases: first, addressing the most immediate anatomical concerns, which include chordee and penile curvature, and second, focusing on fine-tuning the reconstruction of the urethra. The advantages of the staged repair technique over single-stage techniques are as follows: It allows for correction of deformities in an even more controlled and incremental manner, where each level gives an opportunity to study the progress of healing that may need to be sorted out. This two-staged procedure not only mitigates the risk of potential complications but also gives surgeons more leeway in tailoring techniques for each situation.

A number of studies have shown that staged repairs, including the Byers 2-stage operation, yield fewer complications and better long-term results than single-stage repairs. In fact, the staged repair is particularly advantageous for the management of chordee, for tailored flaps in urethral reconstruction, and for dealing with complications that may arise in the early stages of healing. Thus, the staged repair technique has emerged as the preferred management technique for proximal hypospadias, particularly in more complex cases.

Despite the increasing number of articles in favor of staged repair, there is still a necessity for more research that evaluates its long-term outcomes concerning both functional and aesthetic results. Proximal hypospadias repair remains a challenging procedure, and this retrospective study intends to contribute to the existing literature by evaluating the outcomes of staged repair

in a pediatric population. Specifically, this study focuses on the Byers 2-stage operation to investigate its effectiveness in proximal hypospadias repair, complications addressed, and functional and aesthetic results improved. The findings of this study will be useful in clinical practice, informing practitioners and providing insight into the role of staged repair in this challenging congenital condition. Finally, this research will help to further elucidate the long-term effectiveness and safety of staged repair techniques for proximal hypospadias.

2. Aim

This is a retrospective study aimed to review the effectiveness and results of staged repair for proximal hypospadias in a tertiary care referral center. The overall aim of the study includes reviewing the success rates and complications and long-term functional and aesthetic outcomes of such a surgical approach in handling proximal hypospadias.

3. Objectives

1. To assess the Byers 2-stage operation's efficacy in treating chordee and using different flap types in the surgical care of proximal hypopadias.
2. To examine the management of post-operative problems, such as flap resurfacing, fistula closure, buccal grafting, and total disruption.
3. To evaluate the meatal problems' long-term effects in patients receiving phased treatment for proximal hypopadias.

4. RESEARCH METHODOLOGY

1. Study Design and Setting

This is a retrospective study carried out in a tertiary referral center that specialized in pediatric urology. The aim of this study was to assess outcomes and complications of staged proximal hypospadias repair, particularly focusing on the Byers 2-stage procedure. The study consisted of a review of medical records of patients who underwent surgical correction for proximal hypospadias between [study period] in the referral center.

2. Study Participants

This study had a total of 36 children with proximal hypospadias diagnosed for staged repair through the Byers 2-stage operation. All the patients received their treatment at an average age of 9 months. Selection criteria were as follows: receiving the Byers 2-stage operation for proximal hypospadias and having follow-up data of all the patients in detail for analysis.

3. Sampling and Sample Size

There were 36 patients for this study, who were operated upon at the tertiary referral centre with the Byers 2-stage procedure. Patient selection was not random since it depended on meeting some inclusion criteria such as having a diagnosis of proximal hypospadias, and complete availability of medical records and follow-up data.

4. Study Procedure

Each patient in this study was given the Byers 2-stage procedure at a mean age of 9 months. The procedure was in two stages: Stage 1 measured the degree of chordee and treated it, selected appropriate flap types for patients, and many more were treated in that stage. The flap types employed in the procedure were as follows: sliding flaps-criss-cross for 3 patients, proximal Snodgrass combined with distal Byers flaps for 14 patients, and penoscrotal transposition correction for 4 patients. In Stage 2, the second layer consisted of a tunica vaginalis flap in 34 cases except for the first two cases, who were excluded from receiving this flap. Post-operative complications were followed carefully, with 1 patient needing Bracka's staged repair due to complete disruption, 1 patient requiring closure of a lateral fistula, and 4 patients being trimmed and resurfaced under short general anesthesia with the Byers flap. Additionally, in Stage 2, 1 patient needed a buccal graft for persistent ulceration. No meatal complication was noted in the study.

5. Data Analysis

Medical records data were analyzed to understand surgical outcomes and complication rates. The data was summarized with descriptive statistics, such as frequencies and percentages, concerning the demographics of the patient population, surgical procedures, and complications in the post-operative setting. Data analysis was also aimed at assessing the effectiveness of the

Byers 2-stage operation in managing proximal hypospadias, focusing on complications and the success of interventions in surgical management. Statistical analysis was done using software which could assess any correlations and patterns of the results.

5. DATA ANALYSIS

The information shown in Table 1 demonstrates the surgical procedures and patient demographics of 36 pediatric patients who had undergone the Byers 2-stage procedure for proximal hypospadias. The mean age at which the procedure was done for all patients was 9 months.

Table 1: Surgical Procedures and Patient Details

Surgical Procedure	Number of Patients	Details
Byers 2-stage operation	36	All patients underwent the operation at a mean age of 9 months.
Degree of chordee treatment	All 36 patients	The degree of chordee was measured and treated.
Flap Types Used		
Sliding flaps (criss-cross)	3 patients	
Proximal Snodgrass and distal Byers flaps	14 patients	
Penoscrotal transposition correction	4 patients	
Stage 2 Operation (Tunica vaginalis flap)	34 patients	All except first 2 patients had tunica vaginalis flap as a second layer.

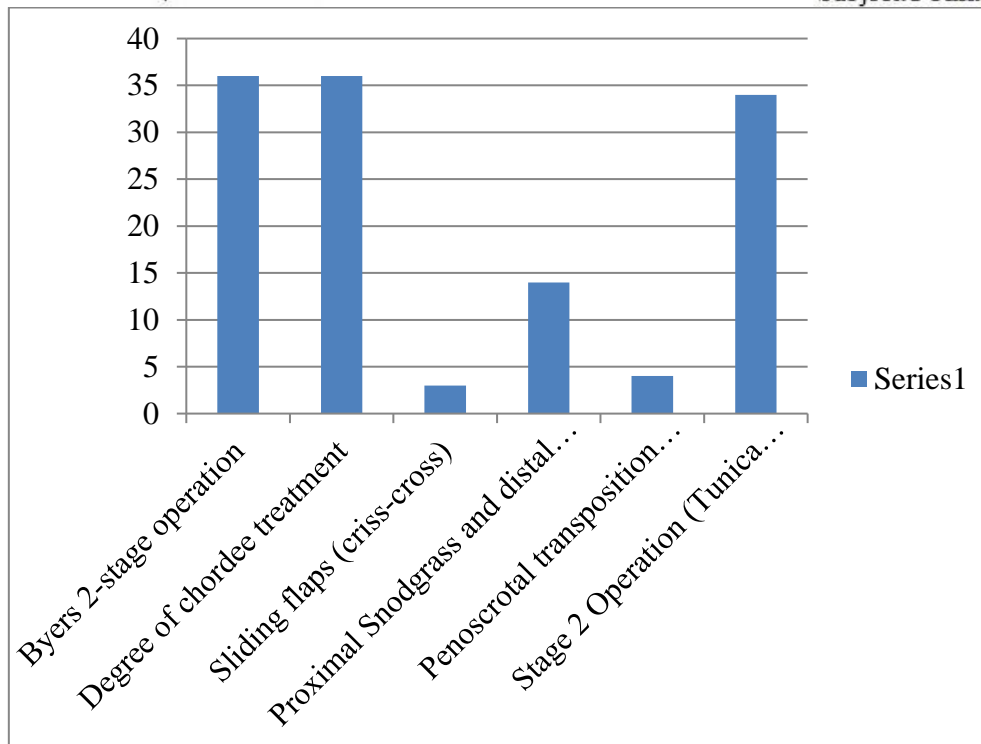


Figure 1: Graphical Representation on the percentage of Surgical Procedures and Patient Details

During the initial phase of the procedure, in all 36 patients, the degree of chordee, which is another associated deformity in hypospadias, was measured and corrected. Varying types of surgical methods were used to correct the defect, with different kinds of flaps being applied according to the needs of the individual patient. Precisely, 3 had sliding flaps (criss-cross), 14 others a combination of proximal Snodgrass and distal Byers flaps, while the other 4 had correction for penoscrotal transposition. In the second stage, 34 patients had their second layer with a flap of tunica vaginalis, while the first two did not have this flap. The surgical techniques were therefore adapted to achieve the best results for each patient, considering the degree of hypospadias and associated anatomical problems.

Table 2: Post-Operative Complications and Management

Post-Operative Complication	Number of Patients	Management Details
Complete disruption (underwent Bracka’s staged repair)	1 patient	Underwent Bracka’s staged repair due to complete disruption.
Lateral fistula (underwent closure)	1 patient	Closure of the lateral fistula.
Trimming and resurfacing of Byers flap (under short general anaesthesia)	4 patients	Trimming and resurfacing of Byers flap performed under short general anaesthesia.
Buccal graft (persistent ulcer over Byers flap)	1 patient	Buccal graft performed during second stage operation for persistent ulcer.
Meatal Complications	0 patients	No meatal complications reported.

The details in Table 2 detail postoperative complications experienced by the 36 patients undergoing the Byers 2-stage procedure for proximal hypospadias. Of these, 5 developed complications. One patient suffered complete disruption of the surgical repair; he was placed on Bracka's staged repair to correct this problem. The other developed a lateral fistula, which healed on closure. Four patients required freshening and resurfacing of the Byers flap, which was done under short general anesthesia. One patient had a persistent ulcer over the Byers flap that had to be covered with a buccal graft at the second stage of surgery. Notably, none of the patients developed complications related to the meatus, thus indicating that this component of the surgical outcome was also favorable in the study group. The strategies in managing the

complications were very clear and effective, hence achieving an optimum recovery of the patients.

6. DISCUSSION

In a promising result, the 2-stage Byers repair for proximal hypospadias in 36 pediatric patients was accomplished with a mean age of 9 months. Chordee is a common associated condition for the surgeries where the patient underwent individualized flap techniques such as sliding flaps, proximal Snodgrass and distal Byers flaps, and penoscrotal transposition. A tunica vaginalis flap was used in the second stage in 34 patients to improve the repair. Postoperative complications included 5 patients (14%), which consisted of total disruption requiring Bracka's repair, lateral fistula closure, flap resurfacing, and buccal graft for persistent ulcer. The complications were well managed. Meatal complication was none, indicating good surgical performance. Long-term outcomes were not evaluated in this study, but no major complications were observed, and minor complications were handled effectively. Thus, this Byers 2-stage repair might offer a strong solution for proximal hypospadias, producing positive outcomes in terms of function and cosmesis. To determine the durability and the true functional success of the procedure, long-term follow-up studies are required.

7. CONCLUSION

In conclusion, the Byers 2-stage repair for proximal hypospadias in this cohort of 36 pediatric patients has shown promise in the management of this complex congenital condition. The staged procedure, carried out at a mean age of 9 months, dealt with not only hypospadias but also concomitant conditions such as chordee through individualized flap techniques, including sliding flaps, proximal Snodgrass, distal Byers flaps, and penoscrotal transposition. The second stage included the addition of a tunica vaginalis flap, which improved the structural strength of the repair. Minor post-operative complications occurred in 14% of patients, such as complete disruption requiring Bracka's repair, lateral fistula closure, and flap resurfacing, all of which were successfully managed. A buccal graft was necessary due to a persistent ulcer in one patient, and no patient experienced meatal complications, achieving a significant success rate by the high incidence of those complications in hypospadias surgeries. These findings indicate that the Byers 2-stage repair offers advantageous functional and cosmetic outcomes. However,

two limitations of the study is the absence of long term follow-up data to evaluate the durability, as well as the results of the function of this procedure. Further research in the area, including more extended follow-up, will provide a further understanding of its long-term efficacy and influence on urinary and sexual function along with a better assessment of patient satisfaction. Overall, the report is a justification of the long-term continued utilization of Byers 2-stage repair and that this approach has been useful in treatment for proximal hypospadias in a pediatric patient with good prognosis with minimal occurrence of major complications if followed through correctly.

REFERENCES

1. AbouZeid, A. A., Shahin, A. E. M., Elsadek, M., Dahab, M. M., Amra, H. S., & Shokry, S. S. (2023). Urethral Plate substitution in two-stage hypospadias repair: grafts versus flaps. *Journal of Pediatric Surgery*, 58(10), 2027-2033.
2. Badawy, H., Dawood, W., Soliman, A. S., Fahmy, A., Mahfouz, W., Moussa, A., ... & Youssef, M. (2020). Staged repair of proximal hypospadias: reporting outcome of staged tubularized autograft repair (STAG). *Journal of Pediatric Surgery*, 55(12), 2710-2716.
3. Dodson, J. L., Baird, A. D., Baker, L. A., Docimo, S. G., & Mathews, R. I. (2007). Outcomes of delayed hypospadias repair: implications for decision making. *The Journal of urology*, 178(1), 278-281.
4. El-Kassaby, A. W., Saber Khalaf, M., & Reyad, A. M. (2021). Management of men with ultra-short penile urethral stricture using augmented anastomotic penile skin flap urethroplasty; a retrospective analysis. *African Journal of Urology*, 27, 1-7.
5. Emeka, C. K., Chikaodili, E. T., & Nkiruka, O. (2023). Complications of Hypospadias Repair in Children: A Single Center Experience. *Mathews Journal of Urology and Nephrology*, 5(1), 1-5.
6. Emeka, C. K., Livinus, A. P., & Chikaodili, E. T. (2023). Unsuccessful Hypospadias Repair in Children: An Analysis of Possible Predictive Factors. *J Clin surg Care Res 2 (1)*, 01, 4.
7. Gama, M., Abitew, B., & Abebe, K. (2022). Clinical Profiles and Surgical Outcome of Hypospadias Repair at a Teaching Hospital in Ethiopia. *Ethiopian Journal of Health Sciences*, 32(3).

8. Indriasari, V., & Suritno, R. (2022). Biometry of Hypospadiac Penis in Children: Study From a Tertiary Referral Hospital. *Malays. J. Med. Health Sci*, 18, 31-34.
9. Jurat, R., Rahimi, M. T., & Barolia, R. (2021). Surgical outcomes and socio-demographic pattern of hypospadias patients treated in a tertiary care center in Kabul, Afghanistan. *Journal of Pediatric Urology*, 17(5), 674-e1.
10. Leunbach, T. L., Skott, M., Ernst, A., Hvistendahl, G. M., & Rawashdeh, Y. F. (2022). Referral patterns, clinical features and management of uncorrected hypospadias in a series of adult men. *Journal of Pediatric Urology*, 18(4), 480-e1.
11. Lucas, J., Hightower, T., Weiss, D. A., Van Batavia, J., Coelho, S., Srinivasan, A. K., ... & Long, C. J. (2020). Time to complication detection after primary pediatric hypospadias repair: a large, single center, retrospective cohort analysis. *The Journal of urology*, 204(2), 338-344.
12. NGOO, A. (2020). PENILE SQUAMOUS CELL CARCINOMA FOLLOWING CHILDHOOD HYPOSPADIAS REPAIR: A CASE FOR LONG-TERM FOLLOW UP. *ANZ J. Surg*, 90(S1), 141-148.
13. Poondla, V. R., Ravi, H., & Gorthi, R. P. (2019). Study of Hypospadias in a Tertiary Care hospital in Coastal Andhra Pradesh. *Journal of Evolution of Medical and Dental Sciences*, 8(25), 1993-1998.
14. Spinoit, A. F., Poelaert, F., Groen, L. A., Van Laecke, E., & Hoebeke, P. (2013). Hypospadias repair at a tertiary care center: long-term followup is mandatory to determine the real complication rate. *The Journal of urology*, 189(6), 2276-2281.
15. Zhang, Y., Chao, M., Zhang, W. P., Tang, Y. M., Chen, H. C., Zhang, K. P., ... & Lou, D. H. (2021). Using buck's fascia as an integral covering in urethroplasty to restore the anatomical structure of the penis in one-stage hypospadias repair: a multicenter Chinese study comprising 1,386 surgeries. *Frontiers in Pediatrics*, 9, 695912.

Author's Declaration

I as an author of the above research paper/article, here by, declare that the content of this paper is prepared by me and if any person having copyright issue or patent or anything otherwise related to the content, I shall always be legally responsible for any issue. For the reason of invisibility of my research paper on the website /amendments /updates, I have resubmitted my paper for publication on the same date. If any data or information given by me is not correct, I shall always be legally responsible. With my whole responsibility legally and formally have intimated the publisher (Publisher) that my paper has been checked by my guide (if any) or expert to make it sure that paper is technically right and there is no unaccepted plagiarism and hentriacontane is genuinely mine. If any issue arises related to

Plagiarism/ Guide Name/ Educational Qualification /Designation /Address of my university/ college/institution/ Structure or Formatting/ Resubmission /Submission /Copyright /Patent /Submission for any higher degree or Job/Primary Data/Secondary Data Issues. I will be solely/entirely responsible for any legal issues. I have been informed that the most of the data from the website is invisible or shuffled or vanished from the database due to some technical fault or hacking and therefore the process of resubmission is there for the scholars/students who finds trouble in getting their paper on the website. At the time of resubmission of my paper I take all the legal and formal responsibilities, If I hide or do not submit the copy of my original documents (Andhra/Driving License/Any Identity Proof and Photo) in spite of demand from the publisher then my paper maybe rejected or removed from the website anytime and may not be consider for verification. I accept the fact that as the content of this paper and the resubmission legal responsibilities and reasons are only mine then the Publisher (Airo International Journal/Airo National Research Journal) is never responsible. I also declare that if publisher finds Any complication or error or anything hidden or implemented otherwise, my paper maybe removed from the website or the watermark of remark/actuality maybe mentioned on my paper. Even if anything is found illegal publisher may also take legal action against me.

Dr Roseline kiruba. A
Dr ARRAVIND k.s
