

Safety and benefits of early urethral catheter removal after resectioning the recto urethral fistula during posterior sagittal anorectoplasty

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ABSTRACT

Aims: A urethral catheter must be placed before PSARP (posterior sagittal anorectoplasty) is performed on boys with rectourethral fistula. However, there is no agreement on when the catheter should be removed. Surgeons usually keep the catheter for more than weeks, which is uncomfortable for patients. This study assesses the advantages and safety of removing the catheter early after PSARP.

Methods: We have divided the patients into two groups. In Group 1, patients underwent PSARP with resection of rectourethral fistula (RUF) from January 2017 to February 2021, and the urethral catheter was kept for 14 days. In Group 2, patients were operated on between March 2021 and July 2023, and the urethral catheter was removed on the second day after the operation. The two groups' demographic and clinical variables were compared using SPSS version 26. Outcome variables were post-operative urinary retention, difficulty in micturition, catheter blockage or dislodgement, fistula recurrence, hospital stay duration, and antibiotic therapy duration.

Results: No patients in either group had urinary retention, recurrence of fistula, or lower urinary complication. However, postoperative hospital stay and antibiotic therapy significantly reduced from 11.2 ± 2.3 days in Group 1 to 4.1 ± 0.5 days in Group 2 ($p < 0.01$).

Conclusion: Early catheter removal after PSARP is safe, improves patient comfort, and reduces unnecessary hospital stays and antibiotic therapy.

Keywords: Anorectal malformation, rectourethral fistula, posterior sagittal anorectoplasty, urethral catheterization

INTRODUCTION

Anorectal malformation (ARM) is a complex congenital condition. The type and severity of the anomaly can vary significantly between males and females. In boys, the most common type of ARM is rectourethral fistula, where the rectum ends in the urethra, either in the bulbar or prostatic urethra.¹ This connection between the rectum and the urethra makes reconstruction challenging, as the two tracts share a common wall for some distance. Separating these two tracts is a critical process that must be done carefully to avoid injuring either.² The Pena's posterior sagittal procedure became popular among pediatric surgeons worldwide after its introduction in 1982. This procedure offers excellent visualization of muscle structures, the rectum, and the urethra.² Over the years, several changes have been made to simplify the process and enhance the results, such as laparoscopic fistula resection, muscle complex sparing PSARP, and endoscopy-assisted fistula identification.³⁻⁹ In their report, Pena emphasized placing a urethral catheter

to prevent urogenital injury and fistula recurrence. Pena's groundbreaking article recommended keeping the catheter in for 10 to 14 days after surgery.² Most studies, regardless of whether they use a laparoscopic or perineal approach, recommend leaving the catheter in place for almost a week, and sometimes even longer after resecting a rectourethral fistula. This is due to concerns about the possibility of fistula recurrence or urinary retention during the immediate postoperative period.^{5,9-11}

However, long-term use of a urethral catheter can lead to various drawbacks such as increased risk of infection, prolonged antibiotic therapy, longer hospital stays, and even urethral stricture in the long term. Catheter blockage and spontaneous dislodgement cause distress for patients, parents, and surgeons. In a report by Lepor et al.¹⁴, it was found that the catheter caused more discomfort than incision pain after radical retropubic prostatectomy.¹²⁻¹⁴



There is a growing trend towards early catheter removal after urethral procedures. In adults, research has shown that removing the catheter early after anastomotic posterior urethroplasty benefits patients.¹²⁻¹⁴

In children, stent-less urethroplasty has shown better outcomes than stented urethroplasty.^{15,16} Snodgrass et al.¹⁷ reported successful repair of urethrocutaneous fistula without requiring urinary diversion. This indicates that the stent does not prevent short-term or long-term complications.

We hypothesized that removing the catheter earlier after the resection of the rectourethral fistula would reduce patient discomfort and a shorter hospital stay without compromising the treatment outcome. This study aims to present the outcome of early catheter removal after PSARP surgery in boys with RUF.

METHODS

Before March 2021, we used to keep the urethral catheter in for 12-14 days after rectourethral fistula resection. After that, we changed our practice to remove it on the second postoperative day. We have compared the demographic and clinical data of these two patient groups. We have included all boys who underwent PSARP from January 2017 to July 2023. Boys without rectourethral fistula, patients with rectovesical fistula (required an additional abdominal approach), abnormal sacrum, and whose stomas are yet to be closed were excluded. Patients who underwent redo PSARP (primary operation done elsewhere) were also excluded. The patients were divided into two groups. Group 1: Patients operated on between January 2017 and February 2021. Group 2: patients who were operated between March 2021 to July 2023. Demographic and clinical variables were compared between the two groups. Outcome variables were post-operative urinary retention, difficulty in micturition, catheter blockage or dislodgement, fistula recurrence, hospital stay duration, and antibiotic therapy duration.

Operative Procedures

In group 1, we strictly followed the Pena procedure. After identifying the fistula, we took multiple stay sutures proximal to it, continued the submucosal dissection up to the bladder neck, and then mobilized the full-thickness rectum. The urethral catheters were left in place for 12 to 14 days. If the catheter became blocked, it was removed. Further catheterization was not attempted in case of spontaneous dislodgement of the catheter. The patients were discharged after catheter removal.

In group 2, we performed a complete proximal separation of the rectum before dividing the fistula. This involved separating the rectum proximal to the fistula in the retrovesical space and pulling it upwards. The fistula was then divided without traction sutures. After surgery, the urethral catheter was removed on the second day, and patients were discharged on the third day. We published this technique earlier.¹⁸

Ethical Clearance

Ethical approval for this study was obtained from the Institutional Ethic Review Board (IRB) of Bangladesh Shishu Hospital and Institute. (No. Admin/BSHI/2024/2513). All

procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Statistical Analysis

Data were analyzed using the Statistical Package for Social Science (SPSS) version 26. Continuous data were presented as mean \pm SD, and the differences between the groups were analyzed using an independent sample T-test. The categorical data were presented as percentages and analyzed using the Chi-square and Fisher's Exact Test. The p-value <0.05 was considered significant.

RESULTS

Data were analyzed on 54 patients who met the inclusion and exclusion criteria. Group 1 had 24 patients, while Group 2 had 30 patients. The mean age at operation was 10.6 ± 9.1 months in group 1 and 2.1 ± 9.3 months in group 2, and there was no significant difference between the two groups ($p = 0.57$). In group 1, 20 patients had a bulbar urethral fistula, while in group 2, the number was 24, and the difference was not statistically significant ($p=0.51$). After the early removal of the urethral catheter, group 2 had a significantly shorter postoperative hospital stay and duration of antibiotic therapy. In group 1, three patients experienced a catheter block; in group 2, one had spontaneous catheter dislodgement. Table 1 summarizes the results of patients in either group who had urinary retention, recurrence of fistula, or lower urinary complication. The minimum follow-up period was six months (ranging from 6 months to 4 years). The follow-up schedule included appointments two weeks after stoma reversal, followed by monthly check-ups for 6 months, and then yearly check-ups thereafter. It's worth noting that none of the patients in either group experienced urinary complications during the follow-up period.

Table. Outcome variables

Outcome variables	Group 1 (n=24)	Group 2 (n=30)	p
Postoperative hospital stay (day)	11.2 \pm 2.3	4.1 \pm 0.5	<0.01
Duration of antibiotics (day)	11.2 \pm 2.3	4.1 \pm 0.5	<0.01
Catheter blockage	3	0	0.08
Catheter dislodgement	1	1	0.69

DISCUSSION

Before performing PSARP surgery in boys, a urethral catheter must be placed to prevent urethral injury. However, there is no agreement on how long to keep the catheter in place after the surgery. Surgeons tend to keep the catheter in the urethra longer to rest the repaired urethra and avoid urinary retention and fistula recurrence. However, there is no evidence that keeping the catheter in the urethra for a longer period prevents fistula recurrence. Moreover, it can be uncomfortable for patients. Pena et al.¹⁹ stressed the significance of fully separating the rectum and urinary tract and sufficiently mobilizing the rectum to avoid recurring fistulas. A rectum that is inadequately mobilized and fixed under tension or a rectum that is injured, repaired, and has its suture line placed over the repaired urethra can lead to fistula recurrence. A urethral catheter helps delineate the surgery but does not prevent fistula recurrence.^{19,20}



Arunachalam and colleagues²¹ discussed their experience with urinary retention after PSARP. They found that all of their patients had some form of urinary injury as a cause of retention. It has been reported that a significant number of patients who undergo PSARP experience neurogenic bladder, which is thought to be due to extensive abdominal and retrovesical dissection or an abnormal sacrum. Hong and colleagues²⁰ found that 10% of patients with neurogenic bladder after primary PSARP at a neonatal age should wait until they weigh at least 25 pounds for definitive reconstruction. However, earlier anatomy reconstruction can help to attain the defecation reflex earlier.^{22,23} Our series had a higher mean age of reconstruction than most reported studies, which may be due to the socioeconomic background of our patients.^{10,18} No patient in our series had a urinary injury and post-operative retention.

Four patients in our group 1 had catheter-related complications, and we had to remove the catheter early. These patients suffered no complications. Based on this observation and the evidence of successful stent-less urethroplasty in children, we started removing the urethral catheter of group 2 patients on the second postoperative day. This changed approach had no impact on the urinary outcome of these patients. However, it significantly reduced the postoperative hospital stay and the duration of antibiotic therapy.

The study excluded patients with rectovesical fistula, as retrovesical dissection may cause temporary urinary retention. A longer urethral catheterization may benefit these patients.

CONCLUSION

Removing a urethral catheter on the second day after PSARP surgery is safe. This improves patient comfort and reduces the duration of hospital stay and antibiotic therapy without causing urinary complications. During the surgery, complete separation of the rectum from the urinary tract and minimal retrovesical dissection should be prioritized. However, any urological injury during surgery may require a longer catheterization period.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of Ethical Committee of Faculty of Institutional Ethic Review Board (IRB) of Bangladesh Shishu Hospital and Institute (No. Admin/BSHI/2024/2513).

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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