

Fixation of the glans penis and urethral catheter to the abdominal skin to avoid wound dehiscence after a hypospadias surgery: A comparative study

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ABSTRACT

Objective: To evaluate the effect of glanular and urethral catheter fixation to the abdominal skin on wound dehiscence.

Material and methods: After a standard tubularized incised plate urethroplasty (TIPU) for hypospadias repair, 128 patients were divided into two groups based on glanular and urethral catheter fixation to the abdominal skin as follows: no glanular and urethral catheter fixation (Group A) and glanular and urethral catheter fixation (Group B). Groups A and B included 61 and 67 patients, respectively.

Results: No significant difference was determined between the groups with respect to age, meatal localization, and length of hospital stay. Wound dehiscence was noted in 13.1% and 2.9% patients in Groups A and B, respectively, after surgery ($p=0.029$, odds ratio=4.9). Patients in Group B had no excessive analgesic usage and unpleasant scarring due to the glans suture.

Conclusion: Glanular and urethral catheter fixation to the lower abdominal skin considerably reduced wound dehiscence after hypospadias repair.

Keywords: Glanular fixation; hypospadias; wound dehiscence.

Introduction

Hypospadias is an abnormal opening of the urethral meatus to any point from the ventral face of the glans penis to the perineum. It is the most common pathology of congenital penile anomalies in boys, and its incidence varies based on the geographical region, with reported rates of 19.9/10,000 births in Europe and 34.2/10,000 in North America.^[1] Based on the location on the urethral meatus, hypospadias is classified as posterior (proximal), penile (middle), and anterior (distal).^[2] To date, more than 300 surgical techniques have been described to create a functional urethra in a hypospadias repair.^[3] Of the surgical techniques and modifications, tubularized incised plate urethroplasty (TIPU) is the most commonly performed because of the ease of application, high success rates, and good cosmetic results.^[4] A previous study by the current authors has reported that

TIPU is highly successful in both primary and recurrent hypospadias cases.^[5]

Complication rates of 6%-8% in distal hypospadias and 15%-45% in proximal hypospadias after repair with TIPU have been reported.^[6] Many factors affect the success of a hypospadias surgery, including patient-related factors, such as age, type of hypospadias, presence and degree of penile chordee, quality and width of the urethral plate, and pre-procedural hormone use, and surgery-related factors, including the type of suture used, suture technique, use of magnification during operation, flap status usage, applied dressing type, and size and type of the catheter used.^[7] In addition, studies have indicated that the surgeon's experience is the most important factor.^[8-10] Wound care is extremely crucial for successful results and prevention of postoperative complications. Therefore, the surgical site should remain immobile, dry, and clean until wound healing is complete.^[9]

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In a study by Snodgrass et al.^[11], glans dehiscence (GD) was reported as the most frequent complication after a hypospadias repair, resulting in a subcoronal meatus with suboptimal cosmesis and the potential for spraying urination. The authors stated that GD was the most common indication for reoperation among the patient population. Catheter fixation is considered to be able to straighten the penoscrotal angle, theoretically preventing ischemia when edema occurs, and may reduce the pressure of the drainage tube on the glans. Therefore, the present study aimed to evaluate the effect of fixing the glans penis and urethral catheter with a suture to the lower abdomen to avoid wound dehiscence in patients who underwent TIPU for distal and penile hypospadias repair.

Material and methods

In total, 128 pediatric patients who underwent the TIPU technique for distal and penile hypospadias between April 2010 and May 2017 were retrospectively evaluated. Adult patients, those with proximal hypospadias, and those with a history of unsuccessful hypospadias repair or a surgery other than TIPU were excluded. A detailed informed consent form was preoperatively obtained from parents. The study was conducted in compliance with the principles of the World Medical Association Declaration of Helsinki, "Ethical Principles for Medical Research Involving Human Subjects" (amended in October 2013). Due to its retrospective nature, ethics committee approval was not required. Demographic characteristics of patients, the location of the external meatus, length of hospital stay, and follow-up findings were recorded. Preoperative testosterone was not used for any patient.

The surgical technique was planned after the re-assessment of the hypospadiac meatus under general anesthesia. After the placement of a traction suture on the glans penis, patients with suspected penile chordee were evaluated using artificial erection. In patients with penile chordee, the penile skin was degloved to the penoscrotal region, and the penis was straightened by releasing the chordee in the same session. Penile plication

was not necessary. If the width of the urethral plate was not sufficiently large for constructing a neo-urethra over the catheter, then the urethral plate was incised in the midline from the point of the native meatus to the hypospadiac meatus. After preparing the urethral plate to be tubularized over the catheter, the glandular wings were laterally dissected to cover the neo-urethra without tension in the midline. Both sides of the urethral plate were sutured using 5/0 polydioxanone running sutures over an 8-12 F Foley urethral catheter according to the urethral calibration. The external urethral meatus was located on the tip of the penis. To avoid fistula formation, a vascularized dartos flap harvested from the subcutaneous tissue of the dorsal preputial skin or the penile shaft was prepared and placed to cover the neo-urethra. The dartos fascial flap was sufficiently mobilized to avoid torsion of the penis. The glandular wings and ventral skin defect were closed using 5/0 vicryl separate sutures. A standard midline closure of the skin was applied. These procedures were the same in all patients.

Patients were divided into two groups according to glanular and urethral catheter fixation to the abdominal skin before dressings. Group A comprised patients with no glanular and urethral catheter fixation, and Group B comprised those with glanular and urethral catheter fixation. After hypospadias repair in Group B, the glans penis and urethral catheter were fixed to the abdominal skin with a traction suture placed on the glans penis to avoid catheter pressure over the suture line (Figure 1). A circular dressing with elastic bandage was not used for patients in Group B, but a single layer of surgical gauze and another piece of surgical gauze soaked in nitrofurazone were placed over the penis. For patients in Group A, a circular dressing with a surgical gauze soaked in nitrofurazone was used. The dressing was opened and changed in the first 24 h postoperatively and once a day thereafter. Cystostomy was not used in any patient.

According to the recommendation of pediatricians, patients were given Paranox[®] Supposituar immediately after surgery for postoperative pain. After starting the oral intake, paracetamol suspension 10 mg/kg was used three to four times a day. If the patient was experienced any pain after 3 days, then paracetamol suspension was given on demand. No questionnaires were used for the evaluation of postoperative pain.

Urethral catheters were removed on postoperative day 7. The two groups were compared in terms of wound dehiscence. Patients were evaluated in follow-up examinations 1 week and 6 months postoperatively.

Statistical analysis

Statistical analysis was conducted using the Minitab[®] 17 statistical software (2017; State College, PA, USA: Minitab, Inc.).



Figure 1. Traction suture placed to the glans penis

Conformity of data to normal distribution was assessed using the Anderson Darling test. The difference between mean ages in two groups was compared using Mann-Whitney U-test. The length of hospital stay was assessed using Student's t test to determine a difference between the two groups. Chi-square test was used to evaluate early wound opening, hypospadias localization, and cord presence; the predicted value below 5 was assessed using Fisher's exact test. $P < 0.05$ was considered statistically significant.

Results

Group A comprised 61 patients with a mean age of 36.2 ± 30.1 months, and Group B comprised 67 patients with a mean age of 37.4 ± 30.8 months. No significant difference was observed between the groups with respect to age ($p = 0.88$). In Group A, the location of the hypospadiac meatus was midpenile in 50 patients (81.9%) and distal penile in 11 (18.1%), whereas in Group B, it was midpenile in 54 (80.5%) and distal penile in 13 (19.5%). No significant difference was observed between the two groups with respect to meatal localization ($p = 0.843$). Mild ventral penile chordee was observed in three patients in Group A and in four in Group B ($p = 0.794$). The mean length of hospital stay was 7.3 days in Group A and 7.1 days in Group B ($p = 0.89$).

Wound dehiscence postoperatively developed in eight (13.1%) of the 61 patients in Group A and in two (2.9%) of the 67 in Group B ($p = 0.029$, odds ratio=4.9). Early wound dehiscence was seen in 1 (9%) of 11 patients with distal hypospadias and in seven (14%) of 50 with midpenile hypospadias in Group A and in two (3.7%) of 54 patients with midpenile hypospadias and in none of patients with distal hypospadias in Group B.

Wound dehiscence was in the form of partial glanular separation in Group B and in the form of partial glanular separation in five and complete wound opening in three patients in Group A. No further wound dehiscence was observed at the 6-month follow-up. In Group B, no excessive analgesic usage or unpleasant scarring due to the glans suture was noted compared with Group A. Analgesic treatment was the same for both groups.

Discussion

Wound dehiscence is a complication following hypospadias repair, which has been reported at varying rates. In our study, postoperative wound dehiscence was found in 13.1% patients in Group A and 2.9% in Group B; the difference between the two groups was statistically significant. In a study by Nguyen and Snodgrass^[12] on 31 patients who underwent revision urethroplasty for a failed hypospadias surgery, partial or complete wound dehiscence after TIPU re-operation was reported in two (6%) patients. Leslie et al.^[13] evaluated a group of patients who

underwent staged buccal mucosa graft urethroplasty for a secondary hypospadias repair and reported that glanular dehiscence developed in 10% of patients. In another study, 47 patients with midpenile and proximal hypospadias who underwent a standard TIPU procedure were evaluated according to the skin closure technique. A standard midline closure was applied to 19 patients, and a Byar flap was used in 28 patients. GD developed in 10.5% of patients in the standard closure group and in 7% of those in the Byar flap group.^[14] In a study by El-Hawy^[15], standard TIPU (Group 1, $n = 196$) was compared with modified TIPU (Group 2, $n = 173$). GD in the whole group was reported at the rate of 1.89% (2% for Group 1 and 1.7% for Group 2).

Snodgrass et al.^[11] investigated risk factors, such as age at surgery, meatal localization, use of preoperative testosterone, glansplasty suture type (polyglactin vs chromic), and revision TIP surgery for wound dehiscence after TIPU and found GD in 32 (5%) of 641 patients despite repairs performed by the same surgeon using the same sutures and operative technique. The age at surgery, use of preoperative testosterone, and glansplasty suture did not have any effect on the risk of GD. GD developed in 20 (4%) of 520 distal, 1 (2%) of 47 mid-shaft, and 11 (15%) of 74 proximal TIPU repairs, with the odds of GD being 3.6 times higher in patients with proximal meatal localization than those with distal meatal localization. Patients undergoing reoperative (9/64, 14%) vs primary (23/577, 4%) TIPU had a 4.7-fold increased risk of GD. Proximal meatal localization and revision surgery, most commonly for prior GD, have been reported to increase the rate of GD by 3.6- and 4.7-fold, respectively.^[11]

A randomized, prospective study investigated the effect of dorsal dartos flaps on complication rates in a hypospadias repair. Patients were randomly divided into two groups according to the use of dorsal dartos flap. Group 1 included patients with dorsal dartos flap used in hypospadias repair and Group 2 included patients in whom flaps were not used. GD was reported in eight (3.7%) of the total 214 patients, including in six (5.6%) patients in Group 1 and in two (1.9%) in Group 2. The authors concluded that the use of dartos flaps in hypospadias repairs provided no statistically significant advantage over flapless repairs with respect to complication rates and that placing the dartos flap in the glans wings, particularly in the small glans, causes extra bulk that makes approximation more difficult and dehiscence more frequent. Therefore, it was recommended that dartos flaps are not placed below the glans wings, but should only extend up to the coronal level.^[16]

The reasons for wound dehiscence following a hypospadias repair may be the use of a large catheter, tension in the suture line, and wound infection. The effect of the urethral catheter on the suture line is important for wound healing even if the size of the catheter is suitable. The urethral catheter should be kept im-

mobile after hypospadias repair because wound dehiscence may occur otherwise. In this study, the effect of glanular and urethral catheter fixation to the lower abdominal skin with a suture was investigated. The hypothesis that the pressure on the anastomotic line is reduced by glanular and urethral catheter fixation to the lower abdominal skin and, thus, wound healing would be better, was confirmed by the results. Unpleasant scar formation and excessive analgesic usage due to the glans suture were not seen in Group B compared with Group A. Our study had some limitations, including the retrospective design, limited number of cases, and the fact that repairs were performed by multiple surgeons.

In conclusion, the present study showed that glanular and urethral catheter fixation to the lower abdominal skin significantly reduced wound dehiscence after a hypospadias repair. Our results should be confirmed in further comparative studies.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki “Ethical Principles for Medical Research Involving Human Subjects”, (amended in October 2013).

Informed Consent: Written informed consent was obtained from the parents of the patients who participated in this study.

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