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Reconstructive Urology

Correlation Between Primary Hypospadias Repair and Subsequent Urethral Strictures in a Series of 408 Adult Patients

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Abstract

Background: The correlation between primary hypospadias repair and subsequent urethral strictures in adults has never been addressed.

Objective: To evaluate the correlation between the site of primary hypospadias repair and the site of subsequent strictures and to investigate the predictive factors of failure after urethroplasty.

Design, setting, and participants: An observational, retrospective, descriptive study of adult patients with urethral strictures following hypospadias surgery was carried out in a single centre.

Intervention: Meatotomy, meatoplasty, end-to-end anastomosis, urethroplasty, perineostomy, urethrotomy, and fistula closure.

Outcome measurements and statistical analysis: We performed correlations between the site of primary hypospadias and the site of subsequent strictures, treatment failure, and patient lack of motivation for definitive treatment. Cross-tables, Kaplan-Meier curves, and logistic or Cox regression were used.

Results and limitations: A total of 408 patients, with median follow-up of 96 mo, were included. Concordance between the site of primary hypospadias repair and the site of subsequent strictures was observed. Multivariable analysis revealed that the number of previous operations needed for initial hypospadias repair was not associated with the risk of treatment failure (hazard ratio [HR] 0.96; 95% confidence interval [CI] 0.88–1.04; $p = 0.3$) or a lack of patient motivation (odds ratio 0.99, 95% CI 0.90–1.10; $p = 0.9$). Length of stenosis (HR 1.38, 95% CI 1.11–1.71; $p = 0.004$) and lichen sclerosus (HR 1.73, 95% CI 1.03–3.25; $p = 0.035$) were associated with a higher risk of treatment failure. Our study is not representative of the entire population of patients with hypospadias repair.

Conclusions: The stricture site is usually consistent with the site of hypospadias. Stricture length, but not the number of previous operations needed for primary hypospadias repair, was associated with the risk of failure.

Patient summary: The number of operations needed for hypospadias repair was not associated with failure of subsequent urethroplasty.

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1. Introduction

The most common adverse outcomes of primary hypospadias surgery involve the urethra (meatal regression back to the original site, meatal stenosis, urethrocutaneous fistula, diverticulum, urethral stricture), the corpora cavernosa (residual curvature or torsion), and the penile skin and glans (scarring, aesthetic defects) [1–4]. Acquired urethral strictures are generally located at the site of primary repair, but Mundy [1] also reported 20% of proximal bulbar strictures in patients who underwent hypospadias repair, suggesting iatrogenic or post-instrumentation or congenital aetiology. In some patients who underwent repair of primary hypospadias during infancy, the reconstructed urethra provided a normal urinary stream. Unfortunately, others showed increasing urinary problem and difficulties 10, 12, or 15 yr after the hypospadias surgery when they were fully involved in sexual activity [4].

Repair of urethral strictures after hypospadias surgery still represents a challenging clinical scenario [1–6]. Although it is possible that undergoing more than one surgery for correction of primary hypospadias might represent a risk factor for urethral repair failure, no evidence is available to date.

We investigated correlation between the site of primary hypospadias repair and the site of subsequent strictures and factors predictive of failure in adult patients treated for urethral strictures after primary hypospadias repair failure. We also tested the specific hypothesis that the number of operations needed for repair of primary hypospadias might have a negative impact on the surgical treatment of secondary urethral strictures.

2. Patients and methods

2.1. Patient population

An observational, retrospective, descriptive study of adult patients with anterior urethral strictures related to a previous primary hypospadias repair who underwent surgical treatment at our centre from 1990 to 2015 was performed. Only patients with clinical documentation regarding the type of primary hypospadias and the number of operations needed to repair hypospadias were included in the study. The type of surgery was not considered a variable owing to a lack of clear and specific surgical documentation. Missing data, malignant penile lesions, and posterior strictures were considered exclusion criteria.

2.2. Surgical techniques

The specific surgical technique was tailored according to the patient and stricture characteristics. The types of surgery included: meatotomy; meatoplasty; end-to-end anastomosis; one-stage urethroplasty using an oral mucosal graft; one-stage urethroplasty using a skin graft; first-stage urethroplasty leaving the urethral meatus in an abnormal position along the penile shaft; two-stage urethroplasty; two-stage urethroplasty using an oral mucosal graft in the first or second stage; perineostomy; cold-knife urethrotomy; and fistula closure.

2.3. Definition of variables

For each patient, we collected data regarding age, body mass index (BMI), smoking status, (classified as no or yes/former), diabetes (classified as

absent vs present), site of hypospadias (classified as balanic, penile, or penoscrotal), involvement of meatus (classified as not involved or involved), number of previous operations needed for primary repair of hypospadias, pathological diagnosis of lichen sclerosus assessed via multiple biopsies from the glans and penile skin, length of stenosis, site of stenosis (meatus navicularis, penile, bulbar, or panurethral), and type of previous treatments (classified as urethroplasty or associated treatments).

2.4. Follow-up

Follow-up was calculated for each patient from the time of surgery to the last office follow-up. Patients underwent urine culture, uroflowmetry, postvoid residual urine measurement, and assessment of symptoms every 6 mo in the first 2 yr, and annually thereafter. For patients with alleged meatal stenosis, the urethral meatus was calibrated using progressive Nelaton catheters (8 Fr, 10 Fr, 12 Fr, 14 Fr, 16 Fr). When symptoms of a lower force of stream were present and the uroflowmetry was <12 ml/s, urethrography, urethral ultrasound, and urethroscopy were repeated to fully document the restrictive features.

2.5. Outcomes definition

The outcomes of the study were: (1) concordance between the site of primary hypospadias and the site of the subsequent stricture; (2) treatment failure, investigated only in the subcohort of patients treated with urethroplasty and defined as the need for any postoperative instrumentation according to subjective (voiding/storage/infective symptoms) and objective (maximum flow, postvoid residual urine volume, urethrography, urethroscopy) findings; and (3) lack of motivation for definitive treatment, defined as patient refusal to undergo urethroplasty when offered.

2.6. Statistical analysis

Statistical analyses and reporting and interpretation of the results consisted of four steps. First, the median and interquartile range (IQR) and frequency and proportion were reported for continuous and categorical variables, respectively. Second, the relationship between the primary site of hypospadias and the subsequent site of urethral strictures was investigated using a cross-table. Third, for the subpopulation of patients treated with urethroplasty, failure-free survival rates were described using Kaplan-Meier curves, and multivariable Cox regression analysis predicting treatment failure was performed. Finally, the rate of lack of patient motivation was assessed, and multivariable logistic regression analysis predicting the lack of motivation was conducted. All statistical analyses were performed using Stata version 12.0 (StataCorp LP, College Station, TX, USA). All tests were two-sided with a significance level set at $p < 0.05$.

3. Results

3.1. Patient characteristics

Overall, 408 patients were included (Table 1). The median follow-up was 96 mo (IQR 55–145). The site of primary hypospadias was penile in 56% of cases, balanic in 32%, and penoscrotal in 12%. Lichen sclerosus was diagnosed in 10% of patients. The median number of operations to repair primary hypospadias was three (IQR 2–5). The site of subsequent urethral strictures was penile in 49% of cases, meatus-navicularis in 36%, bulbar in 8%, and panurethral in 7%. The most frequent surgical techniques used to repair

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