



ORIGINAL ARTICLE

Factors associated with reoperation in hypospadias surgery — A nationwide, population-based study



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urethroplasty

Summary *Background/Objective:* To analyze the preoperative factors associated with the need for secondary surgery following primary urethroplasty.

Methods: This study utilized a subset of the National Health Insurance Research Database, which includes the data on all paid medical benefit claims from 1997 to 2007, for 1 million beneficiaries in 2005. We analyzed the claims data for all patients with hypospadias who had undergone primary urethroplasty. The characteristics of the patients, surgeons, and hospitals associated with surgical outcomes were analyzed to investigate possible associations with the need for secondary surgery.

Results: Among 52,705 live male newborn babies, 218 were diagnosed with hypospadias, of whom 89 received repair surgery. A total of 75 (84.3%) male newborn babies received single hypospadias surgery, and 14 (15.7%) underwent more than two surgical procedures. Univariate analysis demonstrated that the type of hypospadias and the surgeon caseload volume were significantly associated with the need for additional hypospadias surgery ($p = 0.02$ and $p = 0.03$, respectively). In multivariate analysis, the type of hypospadias (distal vs. proximal,

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odds ratio, 0.25; $p = 0.03$) and the surgeon caseload volume (high vs. low, odds ratio, 0.04; $p = 0.05$) were significantly correlated with secondary operation.

Conclusion: The type of hypospadias and the surgeon caseload volume were significantly associated with the need for secondary hypospadias surgery. The findings of this study provide important information on the outcomes of hypospadias repair for parents and specialists.

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1. Introduction

Hypospadias, a condition marked by an abnormal ventral urethral meatus, an incompletely developed prepuce, and abnormal ventral penile curvature, is a frequent congenital malformation in male newborn babies.^{1,2} In spite of considerable advances in surgical techniques, a number of patients experience complications and may require multiple surgeries. Common complications that require a secondary surgery include urethral stricture, persistent hypospadias, urethrocutaneous fistulae, diverticula, urethral calculi, obstruction from hair-bearing skin used in previous repair, and chordee.³ The experience of the surgeon and patient age are strongly associated with outcomes.^{4,5} Significant risk factors requiring reoperation are penoscrotal or proximal shaft hypospadias, a lack of neo-urethral vascular tissue coverage, and patient age above 4 years.⁶

Previous studies on hypospadias outcomes have been from single-center series or small multi-institutional series with highly experienced surgeons,⁷ and a population-based analysis of secondary surgery after hypospadias repair is still lacking. In the present study, we aimed to investigate the factors associated with reoperation in hypospadias surgery by analyzing data from the National Health Insurance Research Database (NHIRD) in Taiwan.

2. Methods

2.1. Data source

2.1.1. NHIRD

This study utilized data from the NHIRD, which is provided by the Bureau of National Health Insurance (NHI), Department of Health, Taiwan, and managed by the National Health Research Institutes, Taiwan. As of 2005, the NHI program covers nearly 99% of the population of Taiwan, and the NHI registry of beneficiaries (individuals enrolled during all or any part of the year 2005) numbers 22.72 million. The NHIRD includes a registry for contracted medical facilities, another for board-certified specialists, a monthly summary of inpatient claims, and details of inpatient orders and principal operational procedures. The NHI has collected claim records covering all paid inpatient and outpatient medical benefit claims for the entire population of Taiwan from the inception of its program in 1995, and the National Health Research Institutes makes considerable data

available for research. The entire data collection is known as the NHIRD.

2.1.2. Longitudinal Health Insurance Database 2005

The present study utilized a subset of the NHIRD known as the Longitudinal Health Insurance Database (LHID) 2005, which contains all inpatient and outpatient medical benefit claims from 1997 to 2007 for a sample of one million beneficiaries randomly drawn from the total number of individuals in the NHI Registry of Beneficiaries as of 2005 (individuals enrolled for all or any part of the year 2005). The 1 million de-identified individuals included in the LHID 2005 provide a good statistical representation of the whole population.

2.2. Study sample

The study protocol was approved by the Research Ethics Committee of National Taiwan University Hospital (No. 201004006R). The study was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. According to Taiwanese laws concerning the ethics of human subject research and to the formulae of the Institutional Review Board of the National Taiwan University Hospital, Taipei, Taiwan informed consent was not required for this purely retrospective review study. We first selected data from the LHID 2005 on all male babies born alive during the study period, and identified a total of 52,705 newborn babies. Among them, 218 had a claims record, including a diagnosis of hypospadias as defined by code 752.6 (1992 edition) or 752.61 [2001 edition; International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)]. Eighty-nine of these patients underwent primary repair. The associated congenital anomalies identified by ICD-9-CM codes 740–759 were also analyzed. The primary surgeries included all one-stage procedures for hypospadias and were categorized as repair for proximal and distal hypospadias. The secondary surgeries included minor revision surgeries, such as cystourethroscopy, urethral dilatation, meatotomy, and correction of chordee, and major revision surgeries, such as fistula repair and re-do urethroplasty.

2.3. Key variables of interest

The following variables were included in the analyses.

Patient characteristics included year of surgery, age and comorbidities based on the Charlson comorbidity index, type of surgical procedure codes (distal vs. proximal

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