



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



HANAA ALY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



HANAA ALY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



HANAA ALY



Snodgraft versus Snodgrass repair of primary distal hypospadias comparative study

Thesis

Submitted to the Faculty of Medicine- Ain Shams University in partial fulfillment of requirement of MD Degree in

Pediatric Surgery

BY

Wael Omar Abd El Aziz Zeina

**M.Sc. In General Surgery
Faculty of Medicine - Menoufia University**

Supervisors

Prof. Dr.

Ahmed Medhat Zaki

**Professor of Pediatric Surgery
Faculty of Medicine - Ain Shams University**

Prof. Dr.

Osama Abdel-Ellah Al-Najjar

**Professor of Pediatric Surgery
Faculty of Medicine - Ain Shams University**

Prof. Dr.

Ehab Abd El Aziz El Shafei

**Professor of Pediatric Surgery
Faculty of Medicine - Ain Shams University**

Dr.

Mohamed Abdel-Sattar Mohamed

**Lecturer of Pediatric Surgery
Faculty of Medicine - Ain Shams University**

**Faculty of Medicine - Ain Shams University
2021**

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالُوا سُبْحَانَكَ
لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا
إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

صَبِّحْهُ وَاللَّهُ الْعَظِيمُ

سورة البقرة
آية رقم ٣٢

Acknowledgements

*First of all, I wish to express my sincere thanks to **ALLAH** for his care, generosity throughout my life and helping me to finish this work,*

*I wish to express my sincere thanks and regards to **Prof. Dr. Ahmed Medhat Zaki**, Professor of Pediatric Surgery, Faculty of Medicine, Ain Shams University for suggesting the present point of study, he presents great efforts and guidance, providing me with references related to the subject and for the continuous encouragement during the preparation of this work,*

*I wish also to express my deepest gratitude to **Prof. Dr. Osama Abdel-Ellah Al-Najjar**, Professor of Pediatric Surgery, Faculty of Medicine, Ain Shams University for his great help, kind care and continuous assistance in carrying out this work,*

*I would like to thank heartily **Prof. Dr. Ehab Abd El Aziz El Shafei**, Professor of Pediatric Surgery, Faculty of Medicine, Ain Shams University for his valuable advices, generous help, and constructive criticism in supervising this work,*

*I would like to pay my special regards to **Dr. Mohamed Abdel-Sattar Mohamed**, Lecturer of Pediatric Surgery, Faculty of Medicine, Ain Shams University, for his continuous support and training.*

Many thanks to all patients who allowed me to look at their cases, wishing them healthy life.



Wael Zeina

List of Contents

Contents	Page
List of Tables	II
List of Figures	III
List of Abbreviations	V
Introduction	1
Aim of the Work	3
Review of literature	
✂ Embryology of the Penis and Male Urethra	4
✂ Anatomy of the penis and male urethra	9
✂ Histology of the male urethra	13
✂ Hypospadias	15
✂ Etiology	20
✂ Epidemiology	22
✂ Classification of Hypospadias	24
✂ Clinical Diagnosis	27
✂ Surgical Management	29
✂ Snodgrass Technique (TIP)	34
✂ Snodgraft Technique	37
Materials and Methods	46
Results	66
Discussion	78
Summary and Conclusion	87
References	91
Arabic Summary	١

List of Tables

Table	Title	Page
Table (1)	Courtesy of Suresh et al., 2018	24
Table (2)	Age (months) in both groups	66
Table (3)	Meatal position in both groups	67
Table (4)	Meatal shape in both groups	69
Table (5)	Glans Width (in mm) in both groups	70
Table (6)	Urethral plate width (mm) in both groups	71
Table (7)	Urethral plate width (mm) after operation in both groups	72
Table (8)	Operative time (minutes) in both groups	73
Table (9)	Complications in both groups	74
Table (10)	Complication and success rate in both groups	75
Table (11)	Postoperative assessment using additional techniques	77

List of Figures

Figure	Title	Page
Figure (1)	Male genitalia origin. (a) Undifferentiated stage; (b) elongation of genital tubercle to form the penis; (c) male genitalia totally developed	5
Figure (2)	Formation of penile urethra, glans, and foreskin, ventral view	6
Figure (3)	Courtesy of Fahmy 2017	8
Figure (4)	Courtesy of Lindquist et al., 2019	9
Figure (5)	Courtesy of Bostwick and Cheng, 2008	13
Figure (6)	Courtesy of Renaux-Petel et al, 2019	16
Figure (7)	Anatomy of the hypospadias	17
Figure (8)	Courtesy of Waterloos et al., 2017	25
Figure (9)	Check list for diagnosis and classification of Hypospadias	28
Figure (10)	Courtesy of Carrasco and Murphy, 2020. Tubularized incised urethral plate (TIP) technique.	35
Figure (11)	Courtesy of Gundeti et al., 2005	39
Figure (12-28)	Surgical technique	49-59
Figure (29)	Calibration	60
Figure (30)	(A, B) follow up of Snodgrass case	61
Figure (31)	(A, B) follow up of Snodgraft case	62
Figure (32)	(A, B) long term follow up of Snodgrarft case	63
Figure (33)	Uroflowmetry	64
Figure (34)	Cystoscope	65
Figure (35)	Age (months) in both groups	66
Figure (36)	Meatal position in both groups	68
Figure (37)	Meatal position in both groups	69

Figure (38)	Glans Width (in mm) in both groups	70
Figure (39)	Urethral plate width (in mm) in both groups	71
Figure (40)	Urethral plate width (mm) after operation in both groups	72
Figure (41)	Operative time (in minutes) in both groups	73
Figure (42)	Complications in both groups	74
Figure (43)	Complications in group I	75
Figure (44)	Complications in group II	76

List of Abbreviations

AAP	American Academy of Pediatrics
DHT	Dihydrotestosterone
DSD	Disorder of Sex Development
EAU	European Association of Urology
GAP	Glans Approximation Procedure
GTIP	Grafted Tubularized Incised Plate
HCG	Human Chorionic Gonadotropin
SD	Standard Deviation
TIP	Tubularized Incised Plate

Introduction



INTRODUCTION

Hypospadias is the second most common birth defect in males and the most common congenital anomaly of the penis. It occurs in approximately 0.7% of males but reports from both Europe and the US in the recent years indicate increasing prevalence. Hypospadias may be associated with other congenital anomalies such as inguinal hernias and undescended testes (*Snodgrass, 2011*).

Hypospadias is a congenital developmental disorder characterized by the abnormal position of urethral meatus on the ventral penile shaft proximal to end of the glans at any site from the glans to the perineum (*Murphy, 2014*).

It is caused by the arrest of normal development of the urethra, at various stages of embryonic development (9 to 13 weeks of pregnancy). Besides urethral affection; the development of the raphe and the foreskin can also be involved which results in hypospadias with deviation from the raphe, the formation of a redundant dorsal prepuce foreskin and other ventral defects of the prepuce (*Troncoso and López, 2008*).

Management of hypospadias is mainly surgical and about 400 surgical techniques for treatment have been published but the search for the “perfect hypospadias correction” still continues (*Tourchi and Hoebeke, 2013*).

Unfortunately; hypospadias repair even with proper surgical skills can be associated with numerous complications, including urethrocutaneous fistula, meatal stenosis, glanular dehiscence, stricture, urethral diverticula (*Kaya et al., 2007*).

Tubularized incised plate urethroplasty (TIP) (Snodgrass technique) repair is the most commonly performed technique to correct distal and mid shaft defects in the absence of severe chordee (*Manzoni et al., 2004*).

Although this technique is widely accepted and performed with good cosmetic outcome; several complications including meatal and/or neourethral stenosis have been reported (*Snodgrass and Nguyen, 2002*), prolonged catheterization (7–14 days) remains the main disadvantage of the TIP repair (*Aslan et al., 2007*).

Urethral stricture is a common problem after hypospadias repair and the second most common complication of hypospadias surgery after urethrocuteaneous fistula (*Tuygun et al., 2009*)

Snodgraft repair using an inner preputial free graft has been described as an effective method for hypospadias repair with the main advantage of reducing the risk of meatal and neourethral stenosis because it could preserve the urethral plate and increase the surface area of healthy epithelium. It does not leave the neourethra with a large raw surface liable to reepithelialization and scar formation (*Ahmed and Alsaid, 2015*).

The snodgraft technique will also allow the extension of the incision up to the neomeatus at the tip of the glans, which is especially helpful in a hypospadiac penis with a flattened glans. With suturing of the graft in the incision, a vertical slit like neourethral meatus is formed at the glans tip without the risk of stenosis (*Nerli et al., 2014*).

This is a prospective study aimed to demonstrate that dorsal inlay inner preputial graft urethroplasty is a safe and viable option in the treatment of distal hypospadias. It helps in augmenting the urethral plate so as to make it possible to tubularise the plate.

Aim Of The Work

