Evaluation of Tubularised Incised Plate (Snodgrass) Technique In Repair of Distal Penile Hypospadias

Thesis

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بسم الله الرحمن الرحيم

﴿وَقُل رَّبِّ زِدْنِي عِلْماً﴾

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Contents

List of Abbreviations

AAP	:	American Academy of Pediatrics.
AMH	:	Anti-Müllerian hormone .
DDF	:	Double dartos flap .
DSD	:	Disorders of sex development.
EAU	:	European Association of Urology.
GAP	:	Glans approximation procedure.
GMS	:	Glans-Meatus-Shaft Score.
HOPE	:	Hypospadias Objective Penile Evaluation.
HOSE	:	Hypospadias Objective Scoring Evaluation.
ICCS	:	International Children's Continence Society.
MAGPI	:	Meatal advancement glanuloplasty incorporated.
MBVDF	:	Meatal based ventral dartos flap .
MEMO	:	Meatal mobilization.
PPPS	:	Pediatric Penile Perception Score.
TIP	:	Tubularized incised plate
UCF	:	Urethrocutanous fistula .

List of tables

List of Figures

List of Figures (Cont.)

List of Figures (Cont.)

Introduction

Hypospadias is one of the most common anomalies of male external genitalia with a 1:300 incidence ratio in newborn boys in which the penis is similar to the normal one except on the ventral aspect where the foreskin, the urethra and urethral spongiosum are deficient (**Baskin, 2000**).

The ectopic external urethral meatus exits ventrally anywhere from the glans to the perineum and according to this abnormal meatal location, hypospadias is classified into: Anterior (50%); involving the glanular, coronal and the sub coronal regions. Middle (30%); involving the distal penile, mid-shaft regions .Posterior (20%); involving the proximal penile, the penoscrotal, scrotal and perineal regions (**Hadidi, 2004**).

The treatment of hypospadias is only surgical, The aim of surgery in hypospadias is to achieve a functional penis with a normal cosmetic appearance **(Tourchi and Hoebeke, 2013), (Robinson et al., 2013).**

Although over 300 procedures have been described for operative correction and continuous evaluation of surgical techniques there is no universal operative technique **(Ozturk et al., 2005).**

Snodgrass described the tubularized incised plate hypospadias repair in 1994, which involve incising the urethral plate vertically then tubularizing it to form the new urethra. And he wrapped his anastomosis by preputial flap **(Mustafa, 2005).**

Since its introduction in 1994 by Snodgrass, the Tubularized Incised Plate (TIP) urethroplasty has become a very popular repair for hypospadias **(Riccabona et al., 2003)**.

It has become the preferred technique in primary hypospadias repair in many pediatric urology centers worldwide and even in secondary hypospadias repairs also **(Riccabona et al., 2003)**.

Advantages of Snodgrass technique include the use of native urethral mucosa to reconstruct the urethra, a single urethral suture line and vascularized subcutaneous flap for coverage of neourethra **(Riccabona et al., 2003)**.

But there have been queries over whether the longitudinal incision through the urethral plate or the sutured closure leads to scar formation and meatal stenosis, fistula formation, urethral stricture later in life (**Marie et al., 2011**).

Aim of the Work

The aim of this work was to measure the short and intermediate term outcomes of Snodgrass technique tubularized incised plate (TIP) in repair of distal penile hypospadias.

Anatomical Considerations Relevant to the Hypospadias Surgery

The male urethra is divided into six parts: bladder neck, prostatic urethra, membranous urethra, bulbous urethra, penile (pendulous urethra), and the fossa navicularis within the distal glans. The corpus spongiosum is the erectile tissue below the corpora cavernosa, the penile and bulbar urethra lie within the spongiosum, the penile urethra lies in a central location within the spongiosum, whereas the bulbar urethra lies eccentrically closer to the dorsal spongiosum prior to exiting dorsally to become the membranous urethra to join the prostate **(Fig.1).** ***(Brooks, 2007)*****.**

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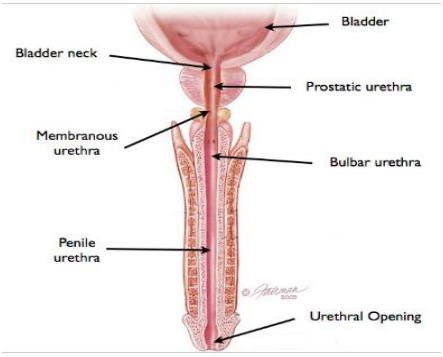

Fig.1: Parts of the urethra

The corpora cavernosa are enclosed by the tough layer which is called tunica albuginea, which is predominantly collagenous, its outer part is longitudinal and the inner part is circular, both fibers form an undulating meshwork when the penis is flaccid and appear tightly stretched with erection**,** the corpus spongiosum is surrounded also by the tunica albuginea but with a thinner form **(Fig.2) (*Goldstein et al., 1982)***.

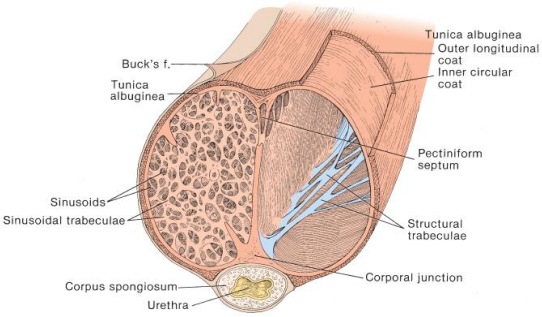

Fig.2: Arrangement of the tunica albuginea

Both corpus cavernosa and spongiosum are enclosed within two layers fascia which are: Buck's fascia and Dartos fascia ***(Gray, 1985).***

Buck's fascia is the deeper of the two and it lies adjacent to the tunica albuginea. It is an elastic layer which envelopes the erectile bodies in the penis and extends into the perineum, separately enveloping each crus of the corpora cavernosa .In the shaft of the penis it splits around the corpus spongiosum and in the perineum it envelops the bulb **(Fig.3)** ***(Gray, 1985).***

The Dartos fascia surrounding Buck's fascia is the envelop of the penis and is connected dorsally (at the base of the penis) with the Scarpa's fascia of the anterior abdominal wall. Ventrally in the scrotum and perineum, this dartos fascia continues as Colles' fascia which attaches to the central tendon of the perineum, and laterally to the ischium and the ramus of the pubis **(Fig.3)** ***(Gray, 1985).***

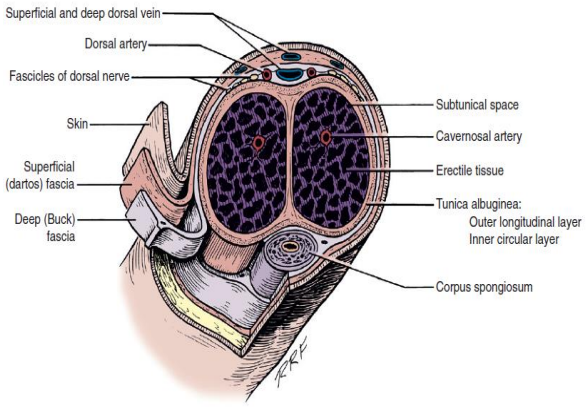

Fig.3: Arrangement of the Buck's and dartos fasciae

Regarding the nerve supply and the blood supply of the penis, it is important to note that the dorsal nerves do not lie directly in the dorsal midline, but rather extend from the 11 and 1 O'clock positions , the structure of hypospadiac penis has showed that the nerves and the corporal bodies have the same anatomical relationship as the normal penis, the most important difference between the normal and hypospadiac penis was in the vascularity and the deficient corpus spogiosum surrounding the abnormal part of the urethra **(Fig.4), (Fig.5)** ***(Baskin et al., 2000),*** **(Erol et al., 2000).**

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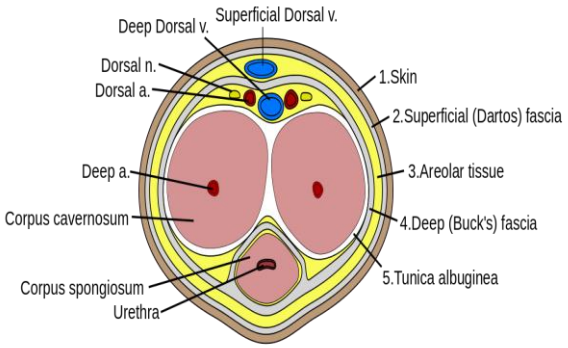

Fig.4: normal structure of the neuro-vascular bundle of the penis