

Evaluation of Dorsal Dartos Facial Flap Role in Tubularized Incised Plate Hypospadias Repair

Dr. Atheer Alameri

Board Certified Senior Plastic Surgeon. M.B.Ch.B, FIBMS (PRS).Iraq/Baghdad

*Corresponding Author: Dr. Atheer Alameri

ABSTRACT:

Background: Since introduction of Tubularized incised plate (Snodgrass technique, TIP) in 1994 and with its worldwide acceptance so many studies performed with original and modification in technique ,and this study is in the same scope to deal with this important congenital anomaly (i.e. hypospadias)

Aim of study: Is to evaluate the efficacy and role of dorsal dartos facial flap in achievement of good results with lower complications in this type of hypospadias repair surgery

Patients and methods: Fifty Iraqi boys with mean age 18 months presented with primary distal and midshaft(less) hypospadias not associated with chordee or curvature operated between march 2014 and April 2017 in alwasity teaching hospital for plastic surgery in Baghdad /Iraq by implementation of Snodgrass (TIP) method with dorsal dartos facial flap harvested by deepithelialization of dorsal hooded penile foreskin up to the edges of planned tubularized incised plate by two superficial incisions and one deep subcoronal incision with penile shaft degloving and transferring this flap ventrally by buttonhole manoeuvre to cover neourethra in multiple layers to decrease fistula and penile shaft rotation incidence .

Results: Two patients developed fistula one healed spontaneously and the other with unknown fate because family gave up follow up ,two patients developed meatal stenosis completely resolved conservatively by regular family guided meatal dilatation ,All other case healed uneventfully with good functional (i.e. good straight urine stream) and good aesthetic appearance (i.e. normally circumcised penis).

Conclusion and recommendations: This technique proved to be efficient regarding reduction in fistula rate and penile shaft rotation adding to that very good looking circumcised penis although it can only be used in distal and midshaft hypospadias not associated with chordee providing availability of good dorsal foreskin

I. INTRODUCTION

One of the ideal surgical operations that is being used for management of distal penile and midshaft hypospadias not associated with chordee is Tubularized Incised Plate urethroplasty (TIP) which is commonly known as Snodgrass method which has been introduced in 1994 gaining worldwide acceptance as a procedure of choice for addressing of distal and midshaft types because of its versatility, simplicity, low complication rate and accepted cosmetic appearance with vertically oriented neomeatus. ^{(1) (2) (3)}

One of the most common complications that is associated with hypospadias surgery is fistula formation. The overall incidence of fistula after different methods of repair is ranging from 0-27% but it is generally less in Snodgrass procedure. Earlier reports of fistula frequency in this type was 5.5% in series study between 1994 and 1999. A recent report of fistula rate with using Snodgrass method was 2.4% across different major centres ^{(4) (5) (6)}

Many techniques have been described to reduce the incidence of fistula in hypospadias repair and one of those includes using additional nearby tissue to cover neourethra ,these layers could be dartos fascia harvested from prepuce either laterally ,dorsally or ventrally, tunica vaginalis tissue and distal spongiosal tissue. ^{(2) (7) (8) (9)}

In this method we used dorsal dartos fascia harvested by circumferential deepithelialization of prepuce tissue by two superficial incision till the edges of proposed urethral plate incisions and one deep incision for degloving the penile shaft to enable flap transference by buttonhole technique to the ventral side of penile shaft to cover the neourethra.

II. PATIENTS AND METHODS

Between march 2014 and April 2017, fifty patients with mean age (18 months) were presented with distal penile hypospadias (total No.40 patients) and midshaft hypospadias (total No.10 patients) without chordee or previous surgical intervention(i.e. Primary cases) all cases surgically managed by using Snodgrass (TIP) with modification of multiple layer covering of neourethra by dartos facial flap transferred ventrally by buttonhole method. All patients examined clinically and sent for abdominal ultrasonography to exclude any other congenital anomaly and all other preoperative general investigation(e.g. Hb,PT,PTT,viral screen ,GUE) , All operations done under general anaesthesia, 4x magnification surgical loupe was being used during the hole

procedure ,and after painting and draping traction 2/0 silk suture put in tip of glans penis ,meatal and urethral calibration with Heger urethral dilators gradually to examine the hole urethra up to the bladder connection to exclude any abnormality and ensuring good pathway for urine stream ,planning all lines of surgical incisions with surgical dye (e.g. methylene blue fig 1 a,b,c) ,rubber tourniquet used accordingly in the penile root to facilitate bloodless dissection then starting with dissection of dorsa facial flap by two parallel superficial incisions one 5 mm subcoronal and the second accordingly (i.e. more proximal dorsally curving more distal ventrally)both incisions ends at the margins of the planned bilateral urethral plate tubularization incisions fig 1c ,after completion of deepithelialization deepening of sucronal incision down to Bucks fascia mainly dorsally , bilaterally and as required ventrally to complete the degloving of penile shaft creating fully mobile facial flap fig 1d ,transference of this flap ventrally by buttonholing it ,urethral stent and urine diversion tube is inserted (8 Fr sialastic stomach tube with 3 holes(one in the tip and 2 side holes) fixed in appropriate position by the same 2/0 traction glauar tip traction stich) ,dissection of the two bilateral and one central urethral plate is done to create new tube and development of bilateral glanular wing flaps is achieved also .fig1htubularization is done by using 6/0 absorbable vicryl sutures in either 2 interrupted or one interrupted and one continuous (surgical preference) aiming to make neourethra with oval shaped neomeatus (i.e. the most distal stich ends at the midglans level) ,flipping the facial flap over neourethra fixing it by quilting sutures to the paraneourethral tissue to cover the hole length to ensure good fixation and preventing any dead space then flipping the excess bilateral facial tissue over itself from each side accordingly with trimming of extra bulkiness as required ending with multiple layers cover of the tubularized incised plate neourethra ,after releasing the tourniquet and ensuring good haemostasis of the surgical field, the closure is accomplished from distal to proximal of glanular wings flaps suturing them by 2 deep sucuticularabsorbable stiches (6/0 vicryl) and sometimes one or two full thickness stiches ,redraping the undermined penile shaft skin circumferentially to close the hole woundfig 1l ,no drain is used ,dressing done in two layers with antibiotic impregnated thin layer gauze and dry layer gauze with plastering the hole dressing to the suprapubic skin to reduce movement and oedema,the dressing changed regularly to keep the wound dry and clean and sometimes kept on only local antibiotic ointment after few days postoperatively without gauze dressing according to age and family preference, all patients kept on injectable 3rd generation cephalosporin for 5 days and further 5 days on oral appropriate antibiotic which is the time of urethral stent removal at that time the patient kept on daily urethra dilatation for several weeks to ensure clean and patent urine stream usually done by family using simple thermometer and regular follow up on monthly basis and every 3 months for the next 12 months

III. RESULTS

All operated cases were primary hypospadias managed by the previously explained surgical technique with mean follow up 8 months ,No major postoperative complications (e.g.bleeding,heamatoma,wound infection ,wound dehiscence and flap necrosis) happened to any patient ,all patients had very good functional and cosmetic results with an oval shaped neomeatus and normally appearing circumcised penis ,only two of cases developed fistulae ,one of them happened as we believe because obstruction of rubber folys catheter for more than 24 hours in the 7th postoperative day (which was the only case we use this type of catheters as urethral stent and urine diversion) unfortunately we didn't know the fate of this case because the family gave up subsequent follow up visits. The other case had develop small fistula in the 2nd week postoperatively after removal of stent within few days and this fistula has been closed conservatively by applying manual pressure during micturition and application of local scar remedies during early healing period within 5 weeks .Two of our early operated patients had developed meatal stenosis since in the early operated cases we didn't paid high attention to the creation of adequate oval shaped meatus and/ or the families were not compliant with doing urethral dilation on regular basis as we routinely instructed theme but fortunately both managed conservatively by frequent urethral dilatation done by our team in the early period and then bystrictly encouraged families with ultimately good functional results without further sequel or patient complain ,all of our patients ultimately achieved straight urine stream without splashing fig 2c and no penile shaft rotation complication has been noticed to any case during follow up period .

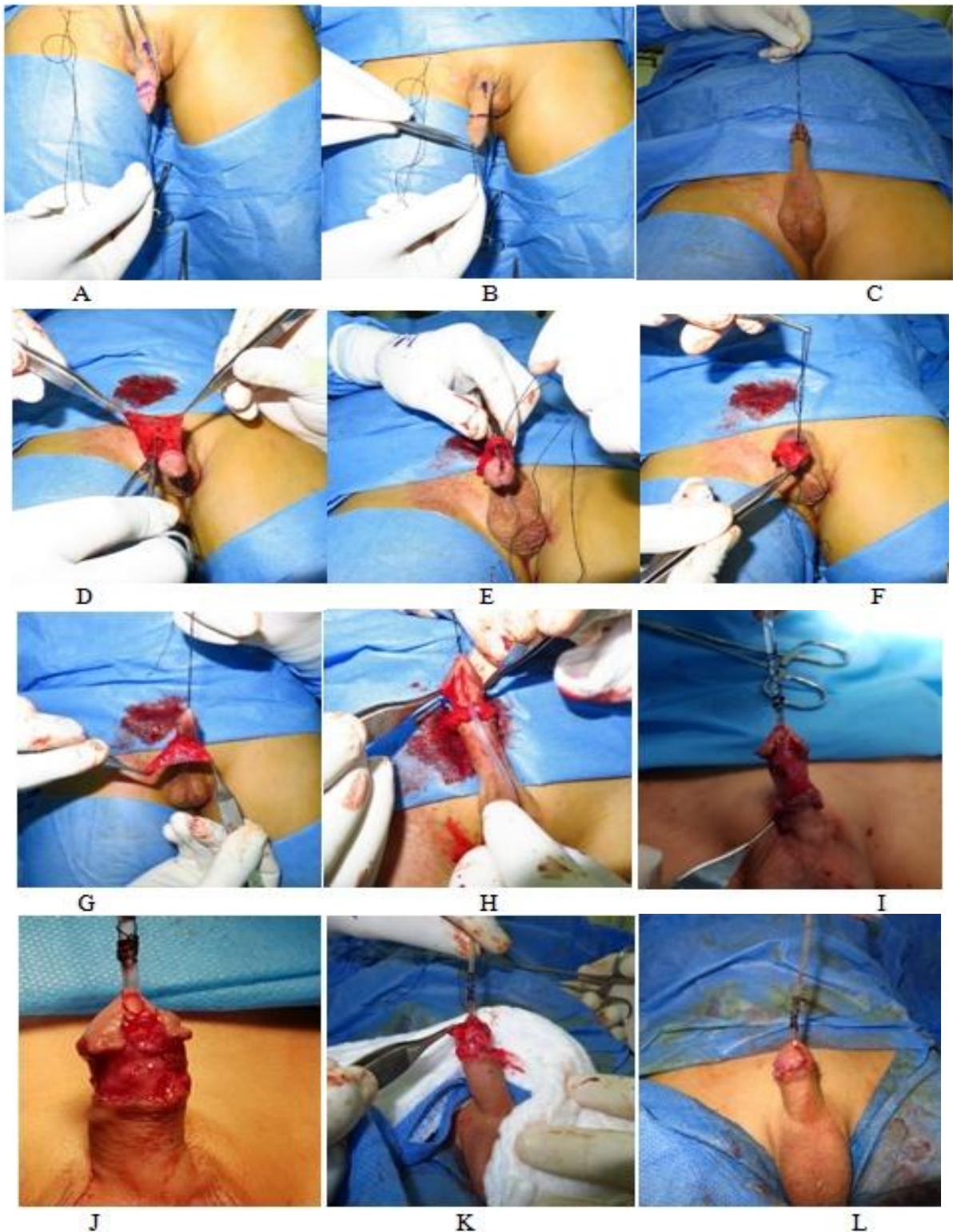


FIG 1 technique : a,b,c planning . d,e,f,g creation and flipping of dartos facial flap ventrally by buttonholing.h,i,j,k tubularization of incised urethral plate and multiple layer covering by flipping the harvested flap over neourethra. l final normal circumcised penis after clouser of all incisions



**FIG 2 results: a,b normally circumcised penis (final shape with good aesthetic appearance).
C good caliber and straight urine stream during micturition**

IV. DISSCUSION

Despite all precautions taken during hypospadias surgery, the fistula complication still occurs although it has been decreased in the past two decades. The cause of fistula remains unknown and many factors may play role in fistula formation postoperatively like infection, hematoma, ischemia, poor tissue handling and distal obstruction. In the last decade many principles have been implied during surgery that may lead to decrease the incidence of fistula formation like delicate tissue handling, tension free clouser, inversion of mucosa with subepithelial suturing and the most important thing is using multilayered clouser by adequately vascularized tissue with suture lines overlapping avoidance^{(10) (11) (12)}. Although recent studies shown that the incidence of urethrocutaneous fistula with Snodgrass operation is 2.4% however several studies figure out that the incidence is much higher like Guralimck et al (16%), Amukele et al (17%) and Chatterjee et al (15%). Using multilayered clouser is one of the effective methods used to reduce the incidence of urethrocutaneous fistula to cover neourethra in TIP repair. There are different types of tissues with different designs and in this study we used dorsal dartos facial flap harvested by deepithelialization of hooded prepuce transferring it ventrally by buttonholing the flap to be used as multiple layers cover for the tubularized incised plate (neourethra). The results were satisfactory from functional and aesthetic point of view with overall fistula incidence 4% (2 patients) although one of them healed spontaneously and the other with unknown fate, so this low percent proved the effectiveness of this procedure with previously mentioned details by implementation of the concept of multiple layers facial cover of neourethra as preventive method of urethrocutaneous fistula development and buttonhole transference of the flap will reduce the chance of penile rotation. One of our cases developed fistula is attributed to obstruction of rubber Foley's catheter for about 24 hours in the 7th postoperative day leading us to avoid this type of stent and urine diversion by using silastic nasogastric tube with at least 3 holes with strict instructions for good hydration to ensure clear urine which has been found effective in the other cases although one more case developed small fistula but healed spontaneously later on. Two of our early operated cases in this series had developed meatal stenosis which is attributed to a certain extent to round shape neomeatus although resolved by frequent urethral dilatation in the follow up period so this has been avoided in the subsequent cases by concentrating more about creation of an oval shape neomeatus by making the distal most stitch at a point not more than midglans during tubularization step of the operation in addition to strict instruction of performing urethral dilatation after removal of urethral stent routinely for several weeks to ensure the patency and cleanliness of the neourethra during early period of healing. The efficacy of urethral dilatation was evaluated by Elbakry who found excellent functional and cosmetic results in those patients who do regular dilatation since he found 8 of his patients (35%) who had no urethral dilatation required reoperation⁽¹⁴⁾.

Dorsal dartos fascia can be transferred ventrally by rotation technique which can lead to penile shaft rotation due to its torque effect which was not used in our study. The dartos fascia also can be harvested from ventral aspect of penile shaft to cover the neourethra either by advancement or rotation but sometimes it is poorly developed or even absent which is considered as a limiting factor and poor option. Although dartos facial flap is transferred ventrally by buttonholing technique in Snodgrass procedure but still 14% complication rate is reported which could be due to non multilayering cover with abundant and robust tissue as adopted in our study⁽¹⁵⁾.

Based on the fact that the distal spongiosum is not affected in most hypospadias cases, Yerk et al adopted reinforcement of neourethra by using spongiosum wrap in Y to I manner, however its use is limited and can not be utilized for midshaft hypospadias, in addition to that this procedure requires completely mobilization of the spongiosum from the corpora which increases the complexity of the procedure^{(9) (14)}. Finally tunica vaginalis can be used as blanket wrap to prevent fistula formation in Snodgrass procedure, however tunica vaginalis is more suitable for proximal hypospadias and needs dissection to scrotum.⁽²⁾

V. COCLUSION AND RECOMMENDATIONS

The use of dorsal prepuce harvested by deepithelization of prepuce with buttonhole transference to cover the tubularized incised plate neourethra in multilayer fashion reduces the incidence of fistula formation, preventing rotation of penile shaft and produces good functional and aesthetic final result.

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***Corresponding Author: Dr. Atheer Alameri**
Board Certified Senior Plastic Surgeon. M.B.Ch.B, FIBMS (PRS). Iraq/Baghdad