

## Original Research Article

# Postoperative complications and outcomes of Mathieu and Snodgrass techniques in a sample of Iraq patients with anterior distal shaft hypospadias

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## ABSTRACT

**Background:** Hypospadias is a common congenital anomaly of the penis in which the urethra opens proximal to its normal position at the tip of the glans. The purpose of this study was to compare the outcomes of Mathieu and Snodgrass techniques in the repair of anterior distal shaft hypospadias.

**Methods:** From October 2009 to November 2010, forty five patients with the ages ranged 1 to 12 years suffering from anterior distal shaft hypospadias, were assessed. Inclusion criteria were anterior distal shaft hypospadias, and exclusion criteria were association with chordee, circumcision, and surgical repair history. Twenty-five patients underwent surgical repair using Snodgrass technique and 20 patients using Mathieu technique. Surgery was performed by one single surgeon, acquainted with both techniques. Patients were examined 1 week, and 1 month after discharge. Data including duration of the surgery, stenting time and any kind of complications such as break down, meatal stenosis, and fistula formation were collected. Also, success rate was calculated for every single patient and accordingly, the two groups were compared.

**Results:** Mean operative time were  $74 \pm 26$  minutes for Mathieu group and  $106.11 \pm 23$  for minutes in Snodgrass group ( $P < 0.05$ ). Stenting mean duration was  $6.8 \pm 1.1$  days, in Mathieu group and,  $6.3 \pm 0.8$  days in Snodgrass group ( $P > 0.05$ ). The rate of break down, meatal stenosis, and fistula formation were 10%, 0%, and 5% in Mathieu group and 4%, 8%, and 8% in Snodgrass group respectively ( $P > 0.05$ ). Success rate was 88% in Snodgrass group and 85% in Mathieu group ( $P > 0.05$ ).

**Conclusions:** In spite of some reports about preference for Snodgrass technique, we concluded that both techniques are as acceptable and as effective as each other for hypospadias repairing, regardless of cosmetic outcomes; however, we need further studies and larger sample sizes to determine which is the superior technique.

**Keywords:** Hypospadias, Iraq, Mathieu, Repair, Snodgrass

## INTRODUCTION

Hypospadias is a common congenital anomaly of the penis in which the urethra opens proximal to its normal position at the tip of the glans.<sup>1</sup>

Literature has showed different aims of the surgery, whether for cosmetic or restoration of function. Mills and colleagues questioned the need for a meatus at the tip of the glans, having observed that “if the anatomically normal phallus is the goal of the surgeon and family, then they must be aware of the attendant risks of the techniques that accomplish this goal”.<sup>2</sup>

Different approaches of repair were cited in the literature. Neourethras were first constructed from local skin flaps. This approach had the disadvantage of overlapping suture lines and often required a relaxing incision through the dorsal shaft skin for sufficient mobility to close skin flaps ventrally. Several years later, Duplay reported a second means of repair by cutting a narrower skin strip for the neourethra, he found it easier to close the ventral shaft without a relaxing maneuver.<sup>3</sup> Nevertheless, and today the name Thiersch-Duplay is evoked when local skin is tubularized. In 1896 van Hook was the first to tubularize a pedicle flap of preputial skin.<sup>4</sup> Thereafter, Edmunds introduced splitting the prepuce and transposing it ventrally for later tubularization.<sup>5</sup> Byars added a slight modification, and today the term Byars' flaps describes the first of a two-stage repair.<sup>6</sup> Another school of urethroplasty began with Ombredanne's report of a U-shaped flap, centered on the meatus, which was drawn into a pouch-like neourethra by a single purse-string suture.<sup>3</sup> Mathieu added some refinements, replacing the purse-string closure with parallel suture lines.<sup>7</sup> This “flip-flap” repair subsequently became one of the most widely used operations for distal hypospadias. Snodgrass extended the midline incision technique through the entire urethral plate and realized that the plate could then be tabularized without adding skin flaps.<sup>8</sup>

Considering the high incidence of this anomaly and need for choosing appropriate treatment, the results and postoperative complications and outcome of Mathieu and Snodgrass techniques in patients with anterior distal shaft hypospadias were compared in this study.

## METHODS

In a prospective study from October 2009 to November 2010, forty five boys with the age of ranged from 1 to 12 years with anterior hypospadias, were assigned into two groups to undergo either Snodgrass or Mathieu surgical repair In surgical specialties hospital Medical city Baghdad. Inclusion criteria were anterior and distal shaft hypospadias and age of 12 years or less, and exclusion criteria were association with chordee, history of circumcision, and surgical repair history.

On a randomized basis, 20 patients underwent surgical repair using Mathieu technique and 25 patients using Snodgrass technique. All surgeries were performed by one single surgeon who was experienced enough to do both surgeries, with different supervisors. Surgical instruments, suture materials (5-0 Vicryl) and urinary diversion (urethral Foleys catheter 6 F to 10 F) were the same for all patients.

Data including duration of the surgery, stenting time, duration of hospitalization, and any kind of complications such as break down, meatal stenosis, and fistula formation were collected. Also, success rate was calculated for every single patient. The information related to operation along with findings in follow-ups was recorded in forms and they were compared between the two groups.

Statistical Package for Social Sciences version 19 (SPSS v.19) was used for data input and analysis. Discrete variables presented as numbers (counts) and percents (%). continuous variables presented as mean and standard deviation (SD). T-test for two independent samples used to test the significant of difference between two independent continuous variables. Chi square test for independence used to test the significance of association between discrete variables. Z test for difference in proportion used to test the significance of difference between proportions. Findings with P values less than 0.05 were considered significant.

## RESULTS

Results have shown that there is no significant difference in age between the patients of the two methods ( $P>0.05$ ). It was also observed that there was no significant association between the type of hypospadias and the method used ( $P>0.05$ ). The operation time was significantly longer in Snodgrass method than Mathieu method ( $P<0.05$ ). No significant difference was found in stenting time between the patients of the two methods ( $P>0.05$ ) (Table 1).

**Table 1: Distribution of study sample by selected explanatory variables.**

Variables	Method		
	Snodgrass N = 25	Mathieu N = 20	P
Age (year); Mean±SD	6.7±4.4	6.8±4.5	0.941
<b>Type of Hypospadias; N (%)</b>			
Distal Shaft	17 (68.0)	10 (50.0)	0.078
Subcoronal	6 (24.0)	3 (15.0)	
Coronal	2 (8.0)	7 (35.0)	
<b>Operation time</b> (minute); Mean±SD	106±23	74±26	0.000
<b>Stenting time; Mean± SD</b>	6.3±0.8	5.8±1.1	0.084

There was no significant difference in the success rate between the two methods ( $P>0.05$ ). There was no significant difference in the proportion of the observed complication(s) ( $P>0.05$ ) (Table 2).

**Table 2: Distribution of cases according to method used and resultant complication.**

Variables	Method		P-value
	Snodgrass N = 25	Mathieu N = 20	
Success rate; N (%)	22 (88.0)	17 (85.0)	0.883
Complications; N (%)			
Total	5 (20.0)	3 (15.0)	0.965
Meatal stenosis	2 (8.0)	0 (0.0)	0.571
Urocutaneous fistula	2 (8.0)	1 (5.0)	0.841
Wound dehiscence	1 (4.0)	2 (10.0)	0.841

## DISCUSSION

Hypospadias is a congenital anomaly in which meatal orifice opens to anterior part of penis instead of the glans apex, because of a defect in urethral development. Its incidence rate is about 1 in 300 male live births. About 50% to 70% of hypospadias cases are of the anterior types.<sup>9,10</sup>

Present study showed lower rate of complication compared to previous studies. In Sariyuce and coworkers' study on 52 patients who were operated on using modified Mathieu technique, complication rate was 5.8% and fistula formation rate was 1.9%.<sup>10</sup> While in this study the rate was 5% for fistula and 10% for wound dehiscence. Sariyuce and coworkers' suggests that surgeon's experience is a very important factor in success rate of hypospadias repairing, and they recommend that surgeons should not to change their technique unless they are familiar enough with another technique.<sup>10</sup>

Present study the results showed meatal stenosis (8%), fistula (8%), wound dehiscence (4.0%) which is lower when compared to Holland study on 59 patients using Snodgrass technique, in which glandular meatus, conic form of glans, steady urinary outflow, fistula, and meatal stenosis were reported in 97%, 98%, 89%, 10%, and 5% of cases, respectively.<sup>11</sup> For example, in a study of 56 patients who were operated on using Snodgrass technique and 54 patients were operated on using Mathieu technique, wound dehiscence and flap necrosis were the rare complications and meatal stricture was the most common complication in patients who were operated on using Snodgrass technique.<sup>12</sup>

The success rate in this study was 88 % in Snodgrass and 85% in Mathieu which is higher when compared to success rate of Decter's study who reported a rate of 78.6% in Snodgrass and 77.8% in Mathieu. They concluded that if the urethral plate is intact, Snodgrass

technique will be preferable and if not, Mathieu technique will be much better.<sup>13</sup> In the study by Oswald J et al, these two techniques were compared regarding fistula formation, appearance, and duration of surgery in patients with anterior hypospadias. Operative time was much shorter in Snodgrass technique (75 minutes vs. 110 minutes) ( $P<0.05$ ). Three patients experienced complications in Mathieu technique group.<sup>14</sup>

## CONCLUSION

In spite of some reports about preference for Snodgrass technique, we concluded that these techniques are as acceptable and as effective as each other for hypospadias repairing, regardless of cosmetic outcomes; however, we need further studies and larger sample sizes to determine which one is the superior technique.

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