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Research Article

## A COMPARATIVE STUDY OF THE TWO PROCEDURES MATHIEU REPAIR AND SNODGRASS REPAIR FOR THE REPAIRING OF THE ANTERIOR HYPOSPADIAS

<sup>1</sup>Dr Sohail Jamil, <sup>2</sup>Dr Faiza Yasmeen, <sup>3</sup>Dr Fatima Numeri, <sup>4</sup>Dr Ejaz,  
<sup>5</sup>Dr Khurram Jamil, <sup>6</sup>Dr Farhat Minhas

<sup>1</sup>Arar Central Hospital Arar Northern Border Zone KSA; <sup>2</sup>Ameer Abdul Aziz Bin Mosaed Hospital Arar Northern Border Zone KSA; <sup>3</sup>Mayo Hospital Lahore; <sup>4</sup>Services Hospital Lahore; <sup>5</sup>Mughal Eye Trust Hospital Lahore; <sup>6</sup>Avicenna Medical College Lahore

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### Abstract:

**Background:** The aim of this research work is to compare the time duration of operation and the frequency of difficulties in the procedures of the Snodgrass and Mathieu for the repairing of initial anterior hypospadias.

**Methods:** The duration of this study was from March 2014 to February 2018 in Arar Central Hospital Arar Northern Border Zone KSA. 80 patients were the participant of our study with primary anterior hypospadias and the children's which were included in our study was from 2 to 10 years of age. In our study only those patients were to be included who had never repaired their hypospadias and all those patients who had repaired their hypospadias previously were to be excluded from this study and also all those patients were also excluded from our who had significant chordee. All the patients are to be distributed in two groups in which one group had Mathieu and group II is Snodgrass procedure (Tabularized incised plate (TIP), Urethroplasty). By frequent irrigation the stent was kept patent. Operative time duration for both the procedures was calculated and after the procedures completed, patients were to be follow up for the complications.

**Results:** In this study we have studied 80 patients. We have divided the patients into two groups, group I was Mathieu repair procedure and Group II was Snodgrass repair procedure, so the Mathieu repair procedure were performed in 40 patients and the Snodgrass procedure were performed in the remaining 40 patients. In the Snodgrass repair the cosmetic results were very good with a normal cut looking like meatus. In both the procedures wound breakdown and meatal stenosis was equal however in Mathieu procedure the proximal stricture and urocutaneous fistula were frequently seen. Meatal stenosis and wound breakdown was equal in each group whereas urocutaneous fistula and proximal urethral stricture were seen more frequently in Mathieu group.

**Key Words:** Urethral, Proximal Stricture, Mathieu repair, Tubularized Incised Plate urethroplasty, Snodgrass procedure, Cosmetic

### Corresponding author:

Dr. Sohail Jamil,

Arar Central Hospital Arar Northern Border Zone KSA.

QR code



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**INTRODUCTION:**

Hypospadias is a congenital defect due to incomplete tubularisation of the urethral plate leading to abnormal location of the meatus anywhere along the ventral aspect of penile shaft and down on to the perineum. In the majority (over 80%) of cases the meatus is located distal to the mid-shaft. The aim of surgery in hypospadias is to achieve a functional penis with a normal cosmetic appearance. The commonest repairs to correct distal hypospadias are the Thiersch-Duplay, Mathieu, Mustarde, meatal advancement and glanuloplasty (MAGPI) and tabularized incised plate (TIP) urethroplasty. Both these procedures (Mathieu and Snodgrass repair) have been practiced widely. But after experiencing both the procedures, Snodgrass repair procedure is to be preferred method because it creates a vertical cut like a normal meatus, rather than rounded and horizontally oriented meatus which had happened after the Mathieu repair procedure. The construction of neourthra from the current urethral plate without adding more skin flaps is possible through this procedure. This method is very versatile and appropriate mostly for all types of distal injuries. In our study we compare both the procedures and calculate the operative time and frequency of complications

**MATERIAL AND METHODS:**

Total 80 patients were participated in our study in which 40 patients were underwent through the Mathieu repair procedure and 40 remaining patients underwent through the Snodgrass repair procedure. A general anesthesia was provided to all the patients before the operation and the patients were operated under the anesthesia like adjunctive caudal or penile block. For maintaining the bloodless field, the tourniquet was applied. A straight penis was required so for that an artificial erection procedure was carried out Repair over a stent was performed in three layers. Polyglycolic acid interrupted sutures were used for repair, keeping the knots inside the urethral lumen.

For Snodgrass repair, a U-shaped incision was made extending along the edges of the urethral plate to healthy skin 2 mm proximal to the meatus. Flaps

mobilized for a tension free repair. The urethral plate was then incised in midline from the hypospadiac meatus distally. Incised plate was then tubularised over a 6 Fr or 7 Fr stent using interrupted polyglycolic acid (vicryl no. 7/0) sutures. Neourethra was then covered with a vascularized dartos flap harvested from subcutaneous tissue of dorsal prepuceal skin. All the patients were given the antibiotic prophylaxis and the stent was removed after the seven days. Follow up of the patients was carried out for six months to 1 year.

Time of operation was calculated for both the repairs and for the observation of the complications the patients were also followed. In the subsequent layers for both the procedures the polyglycolic acid 7/0 and tubularisation 6/0 was used. Repair was performed over a stent (feeding tube Fr. 6 or 7). Circumcision was performed in all those patients who were uncircumcised, and the fascia of the dorsal hood used to cover the neourethra.

**RESULTS:**

In this study total 80 patients were examined in which group I which were underwent through Mathieu repair procedure (n= 40) and Group II which had Snodgrass repair were (n=40). For this study range of the age were selected between 2 to years with the mean of 4 years. Mostly patients were between the age of 3 to 5 years range. In the study we have found out that the coronal hypospadias was detected in 30 patients (35.5%) and the presence of the distal penile was in 50 patients (55.5%), and the 13 patients (14.6%) were already circumcised. Mathieu repair procedure was carried out in 40 patients (50%) and the Snodgrass procedure (Tubularized Incised Plate (TIP) urethroplasty was carried out in the remaining 40 patients. In all the patients urethral plate was found healthy. For Mathieu procedure the time range for operation were 30 to 70 minutes (mean = 50) and the operative time for the Snodgrass repair procedure were 60 to 120 minutes (means = 90). And after conducting the operation the duration of the hospital stay for Mathieu repair procedure was 72 hours to 6 days (mean = 4 days) and time range for Snodgrass repair was 24 hours to 3 days (mean = 2 days)

**Table-1: Complications in the Two Groups**

Complications	Group I: Mathieu (n=45)	Group II: Snodgrass (n=45)
Wound breakdown	1 (1.1%)	1 (1.1%)
Fistula	6 (6.6%)	2 (2.2%)
Meatal Stenosis	4 (4.4%)	4 (4.4%)
Stricture	2 (2.2%)	2 (2.2%)

Wound breakdown was observed in both the procedures (n=1) and in Mathieu group the urocutaneous fistula was 6.6% (n=6) and in Snodgrass group it was 2.2% (n=2), these wounds were later repaired locally by a rotational flap. The presence of the meatal stenosis was observed in 4.4% (n=4) in each group which was late treated with meatotomy and meatal dilatation. In Mathieu group the presence of the proximal urethral stricture was observed in 2.2% (n=2) and 2.2% (n=2) were in Snodgrass group Stream abnormality was seen only in those having meatal stenosis which improved with meatal dilatation or meatotomy. Wound dehiscence was equal in both the procedures i.e. 1.1% (n=1) each. Cosmetic results were excellent with Snodgrass repair with a normal looking slit like meatus.

### DISCUSSION:

Hypospadias is a common clinical problem with an incidence of 0.6-6.2 per 1000 live male births. In maximum patients the abnormal meatus is placed in the glanular, coronal or distal part of the shaft. The goal of repair is a functionally and cosmetically normal penis. In the history of hypospadias, in the last 125 years more than 200 methods have been introduced. Earlier most of the distal lesions were repaired with meatal-based flap procedure (Mathieu repair). Although this repair produced a glanular meatus, the opening was often rounded, in contrast to the slit like appearance of a normal meatus. This method was first introduced by Mathieu in 1932 for distal hypospadias using a meatal based flap. And later the first experience of this method was reported by Wacksman in 1981. After that the Mathieu repair procedure was used by Robinowitz in 1987. Subsequently in 1987, Rabinowitz described catheterless repair using the Mathieu repair. Although 1 and 2-layer neourethral anastomoses have demonstrated satisfactory results, the two-layer technique has produced lower complication rates.

Careful preservation of the vasculature of the flap and avoidance of overlapping suture lines produce a watertight closure with minimal risk of postoperative fistula formation. Mathieu repair also provides good functional results but cosmesis is more preserved in Snodgrass repair. Minimal complication rate has been reported even with stentless repair. Even now, Mathieu procedure is considered as the standard by some surgeons, for distal hypospadias. Rich et al incised the urethral plate in the midline to improve cosmesis of a hypospadias repair in 1989.

Later, in 1994, Snodgrass advanced this concept by extending the incision of the urethral plate from the

meatus to the tip of the glans. This maneuver allowed construction of a new urethra from the existing urethral plate. It was suggested that healing may occur through epithelialization of the relaxing incision without obvious scarring, allowing the incised edges to remain separated.

Today TIP urethroplasty has become a preferred method for repairing distal hypospadias because of its versatility, to correct different meatal variants, the simplicity of the operative technique, low complication rate and reliable creation of a normal appearing glanular meatus. Severe chordee and unhealthy urethral plate are the two limiting factors for this procedure. Fistula can be avoided by interposition of a vascularized dartos flap between the neourethra and overlying skin. Recently Cheng et al have suggested a two-layer closure of the neourethra to minimize the fistula rate. Meatal stenosis is mostly the result of technical error; not confining the dorsal midline incision to the urethral plate. Other complications such as urethral stricture, diverticulum, and wound breakdown are infrequent.

Excellent cosmetic results have been reported with 0.5% meatal stenosis, 1% urocutaneous fistula and rate of re-operation 1.5%. The complication rate reported by Rabinowitz in stentless Mathieu repair was 13.5%. Rabinowitz has reported the complication rate of 13.5% in stentless Mathieu repair. Hakim et al compared the results of the Mathieu procedure with and without a catheter and reported complication rate of 2.7% in stented and 3.6% in unstented repair. However, Buson et al noted a significantly higher complication rate of 18.9% in stentless versus 4.6% in stented cases. In our study there is a significantly high rate of fistula formation with Mathieu repair than in Snodgrass repair (6.6% vs 2.2%). Other complications like wound breakdown and meatal stenosis are equally frequent in both the procedures. Stricture formation is also slightly more common in Mathieu group (2.2% vs 2.2%). These results are comparable with other similar studies.

In one similar comparative study wound dehiscence and flap necrosis have been seen more frequently with Snodgrass repair group with no difference between groups regarding fistula formation. And total success rate similar (78.6% in Snodgrass repair and 77.8% in Mathieu repair group). In another study the mean duration of surgery was found significantly lower for Snodgrass procedure than for Mathieu repair (75 vs. 115 minutes.  $P < 0.05$ ) with urocutaneous fistula more frequently in Mathieu repair and meatus being slit like in Snodgrass repair and rounded and horizontal in

Mathieu repair. In yet another study both the procedures were combined to avoid the risk of devascularisation of the neourethral flap. Another study has shown the comparison and it has been concluded that the operative time and complication rate was less than Mathieu repair and had better cosmetic results producing a slit like normal looking meatus. In our study the same findings have been observed

### CONCLUSION:

In the conclusion of this study we have found out that due to the less operative time and also low rate of complications the TIP urethroplasty is a very favorable method for the anterior hypospadias rather than the Mathieu repair procedure. Furthermore, this procedure is also suitable for the cosmetic appearance of the meatus. But if the healthy plate is not available then the Mathieu repair procedure should be carried out.

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