

# A comparative study of two-stage versus single-stage repair of severe Hypospadias

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## ABSTRACT

**Background:** The main aim of hypospadias repair is to preserve the urethral plate whenever possible. This study was undertaken to compare the outcome of repair of severe hypospadias with moderate chordee by single-stage Snodgrass with two-stage repair with dermal graft corporoplasty.

**Methods:** This prospective cross-section study was done in the Department of Urology, Chalmida Anand Rao Institute of Medical Sciences, Bommakal, Karimnagar. The selection of the patients the type of surgery was based on the type of case. A total of n=31 patients were operated for severe hypospadias out of which n=14 single surgeries and n=17 two-staged surgeries were performed.

**Results:** N=25 patients were found with a moderate degree of chordee. No complications were found in n=11(78.57%) in single-stage repairs and two-stage repairs n=15(88.23%) were without complications the p values were found to be 0.012 which is significant. HOSE scores Erection correction was better in two staged surgeries as compared to single-stage repairs with p values <0.001 which is considered significant.

**Conclusion:** We can conclude that the repair of severe hypospadias with moderate chordee by two-staged repair showed better outcomes as compared to single-stage repair. The incidence of postoperative complications is also lesser with two-staged repairs. However, the choice of the procedure must be based on the type of hypospadias, choice of patients and economical constraints.

**Keywords:** Hypospadias, Single-stage repair, Two-stage repair

## Introduction

Hypospadias is caused by the arrest of development of urethra between 9<sup>th</sup>-14<sup>th</sup> weeks of gestation. It results in the meatus being located anywhere between the perineum and the glans. The urethral plate is usually more developed the arrest or disruption in urethra growth affects the prepuce, penile shaft, and raphe. Hypospadias constitutes the most commonly encountered anomaly of the male genital tract with a frequency of 0.8 – 8.2 per 1000 male newborns [1]. In most of the cases hypospadias is associated with three anomalies of the penis [2,3]: (1) a ventral meatus located anywhere between the glans and the perineum, (2) ventral deviation of the penis

(chordee) and (3) the dorsal prepuce hood in associated with a ventral deficit of prepuce. However, the second and third abnormalities are not the requirement for the diagnosis of hypospadias. The etiology of hypospadias is multifactorial and appears to be genetic defects or disturbances in androgen balance or androgen receptors [1,4,5]. Some studies have shown that females exposed to progesterone during in-vitro fertilization had a higher incidence of giving birth to males with hypospadias [6,7]. Surgical procedures are undertaken for functional and cosmetic corrections. Functional problems include a ventrally deflected urinary stream, meatal stenosis, and curved penis. Cosmetic indications are related to the psychological well-being of parents and patients [8]. Patients with penile hypospadias which are very distal in nature experience no difficulties with uncorrected hypospadias [9,10]. However increasing demand for aesthetics and often patients are coronally located or distal penile meatus are dissatisfied [11,12]. Although good surgical results are obtained by surgery the explaining of the procedure and possible complications must be clearly explained. We in the present study tried to evaluate the results of surgical corrections of severe hypospadias with single-stage versus two-stage surgeries.

## Material and Methods

This perspective cross-section study was done in the Department of Urology, Chalmida Anand Rao Institute of Medical Sciences, Bommakal, Karimnagar. Institutional Ethical committee permission was obtained for the procedure. Written consent was obtained from the parents of the patients involved in the study after explaining the nature of procedures performed and expected outcomes in the local language. All the cases of severe hypospadias from March 2016 to Dec 2019 were included in the study. Severe hypospadias is the cases with proximal penile, penoscrotal and scrotal opening and a moderate degree of chordee from 30 degrees to 50 degrees [13,14]. Excluded cases were with chordee greater than 50 degrees and perineal hypospadias and those with chordee corrected by the division of urethral plate. The selection of the patients the type of surgery was based on the type of case. The two-stage repair was done with dermal graft corporoplasty for chordee correction. The skin graft was obtained from the non-hairy inguinal skin area. In the first stage, the degloving

of the penis was done with the release of all the tethering tissues around the urethral plate. Artificial erection was performed to measure the degree of residual chordee. If the degree of chordee was between 30 and 50 degrees the urethral plate was divided at maximum chordee angle and the urethral plate was separated proximally and distally from corpus cavernosum. If the degree of chordee was less than 30 degree a tabularized preputial flap was harvested from the inner surface of the prepuce to bridge the defect of the urethral plate. The original urethral plate was tabularized proximally and distally. If the degree of chordee 30 to 50 degrees after urethral plate division the tunica albuginea of corpus cavernosum was exercised at the angle of maximum curvature without injury to the central corpus cavernosum artery to achieve straight penis. Foley's catheter was placed in the meatus for 5 days and a compressive dressing applied over the penis postoperatively. The second stage operation was performed from 6 – 9 months of the first stage. 8 mm width of the urethral plate was positioned and tubularization of urethral plate was performed around 8-Fr urethral stent with 7-0 polyglactin two-layer interrupted sutures. Local flaps were created from the penile tissue to cover the suture line or urethroplasty. A suprapubic catheter was used for 12 days and the urethral stent was placed for 10 days post-operatively. The single-stage repair was performed by tubularized incised plate Snodgrass urethroplasty [15]. The chordee was corrected using

Nesbit's dorsal placcation procedure. The urethral stent was inserted for 7 days after the procedure. The degree of chordee was measured after complete degloving of the penile skin excision of the fibrous tissues surrounding the urethral plate and mobilization of the splayed corpus spongiosum. All the cases received 3rd generation cephalosporin was started one day before the surgery and continued for 7 days. Oxybutynin 2.5 mg was given twice daily postoperatively until the stent was removed. Follow-up visits included calibration of the urethra at 2 weeks, 1 month, 2 months, and 3 months postoperatively, then every 3 months for 1 year to exclude any urethral or meatal stenosis. The HOSE system was used for evaluation of the final results which was done by the single operator to reduce inter-operator bias. All the recorded data was recorded on the MS Excel spreadsheet and analyzed by SPSS version 17 on windows format for statistical analysis.

### Results

A total of n=31 patients were operated for severe hypospadias out of which n=14 single surgeries and n=17 two-staged surgeries were performed. N=25 patients were found with a moderate degree of chordee. Table 1 shows no difference between the two groups concerning the type of hypospadias and degree of chordee before the beginning of treatment.

**Table 1:** Showing the type of hypospadias and mean degree of chordee

| Variable               | Single-stage repair (n=14) | Two-stage repair (n=17) | P values |
|------------------------|----------------------------|-------------------------|----------|
| Type of hypospadias    |                            |                         |          |
| Proximal               | 6 (42.86%)                 | 8 (47.06%)              | 1.032    |
| Penile                 |                            |                         |          |
| Penoscrotal            | 5 (35.71%)                 | 7 (41.17%)              | 0.548    |
| Scrotal                | 3 (21.43%)                 | 2 (11.76%)              | 1.363    |
| Mean degree of chordee |                            |                         |          |
| Proximal               | 34 ± 1.0                   | 36 ± 0.5                | 1.114    |
| Penile                 |                            |                         |          |
| Penoscrotal            | 36.1 ± 1.5                 | 41 ± 1.5                | 0.99     |
| Scrotal                | 40 ± 2.5                   | 43 ± 2.0                | 0.465    |

The mean age at the time of first surgery was recorded in each group the range of age in the single-stage repair was from 9 to 12 months with a mean age of 10 months. Similarly, in the two-stage group, the range of age in months was 9 to 14 months and mean values of 12.5 months. The mean duration for completion of all surgical procedures in single-

stage repair was ranging from 8 to 13 months and a mean of 11.5 months. The two-stage repair mean duration was 16 to 24 months and a mean of 18.0 months. The total duration of hospitalization was 5 to 7 days in a single-stage and two-stage repair, it ranged from 12 to 14 days shown in table 2.

**Table 2:** The mean duration of procedures and hospital stay

| Mean duration of procedures and hospital stay                    | Single-stage repair (n=14) | Two-stage repair (n=17) | P values |
|--|----------------------------|-------------------------|----------|
| Mean age at the time of first surgery (months)                   | 10.0 ± 1.5                 | 12.5 ± 1.0              | 0.1      |
| Mean duration for completion of all surgical procedures (Months) | 11.5 ± 2.5                 | 18.0 ± 2.0              | 0.05*    |
| The total duration of hospitalization (days)                     | 5.5 ± 1.0                  | 12.5 ± 1.5              | 0.02*    |

\* Significant

Table 3 shows no complications were found in n=11(78.57%) in single-stage repairs and two-stage repairs n=15(88.23%) were without complications the p values were found to be

0.012 which is significant. The single-stage repair showed relatively more number of complications n=3 (21.41%) as compared to the two-stage repairs where complications were n=2 (11.76%).

**Table 3:** Complications of surgery in the study

| Postoperative complications | Single-stage repair (n=14) | Two-stage repair (n=17) | P values |
|-----------------------------|----------------------------|-------------------------|----------|
| None                        | 11 (78.57%)                | 15 (88.23%)             | 0.012*   |
| Fistula                     | 2 (14.28%)                 | 1 (5.88%)               | 1.22     |
| Meatal Stenosis             | 1 (7.14%)                  | 1 (5.88%)               | 1.97     |
| Complete dehiscence         | 0.00                       | 0.00                    | 0.0      |

\* Significant

HOSE: An objective scoring system for evaluating the results of hypospadias surgery. The HOSE assessment gave a total score of 12–16 on various parameters. Meatal location: the location of meatus on most distal glandular aspects was given score 4 whereas most medial on the penile shaft was given score 1. The meatal shape with a vertical slit was given score 2 and the circular opening was given score 1. The urinary stream: Single-stream was given score 2 and spray was score 1. Erection

straight was scored 4 and mild chordee < 10 degrees scored 3, moderate chordee 10 – 45-degree scores were 2 and severe chordee angle of > 45 degrees was scored 1. Fistula: No fistula was scored 4 and the complex fistula was given 1 score. Table 4 shows the mean scores with Standard deviations and p values. Of all the HOSE scores Erection correction was better in two staged surgeries as compared to single-stage repairs with p values <0.001 which is considered significant.

**Table 4:** Hypospadias Objective scoring evaluation [HOSE] after surgery

| [HOSE] Evaluation | Single-stage repair (n=14) | Two-stage repair (n=17) | P values |
|-------------------|----------------------------|-------------------------|----------|
| Meatal location   | 3.71 ± 0.47                | 3.76 ± 0.43             | 0.379    |
| Meatal Shape      | 1.21 ± 0.42                | 1.23 ± 0.43             | 0.645    |
| Urinary Stream    | 1.28 ± 0.46                | 1.29 ± 0.47             | 0.480    |
| Erection          | 2.92 ± 0.61                | 3.59 ± 0.50             | 0.001*   |
| Fistula           | 3.85 ± 0.36                | 3.94 ± 0.24             | 0.237    |

\* Significant

### Discussion

Several techniques are available for the repair of hypospadias which includes orthoplasty, urethral reconstruction, glanuloplasty, and meatoplasty, coverage of

neourethra and reconstruction of the penile skin. For distal hypospadias repair techniques with or without urethral reconstructions are used and repair of proximal hypospadias involves one and two-stage procedures. Buccal mucosal grafts are useful as Onlays and inlays in redo hypospadias where normal tissue is unavailable. The severe form of chordee

corrections often requires the use of dermal grafts for augmentation of tunica albuginea, however, there is some reluctance in its use since it tends to violate the integrity of tunica albuginea and venous leakage could lead to erectile dysfunction [16]. Some studies have reported better results for dermal graft than tunica vaginalis graft for chordee correction with severe hypospadias<sup>[17,18]</sup>. Other have described an interpositional dermal grafting in patients with persisting severe chordee of >30 degrees or more after conventional techniques in cases where the penis is short<sup>[19,20]</sup>. In this study, there were no differences between the two groups concerning mean age at surgery, degree of chordee and type of hypospadias. The mean time of surgery for single stage repair was significantly less than the meantime of surgery for two-staged repairs. The total duration of hospitalization was also significantly lesser in single-stage repairs as compared to two staged repairs. The single-stage repair showed relatively more number of complications n=3 (21.41%) as compared to the two-stage repairs where complications were n=2 (11.76%). The incidence of the fistula was n=2 (14.28%) in single-stage repair and n=1 (5.88%) for two-stage repairs. The increased incidence of fistula in the single-stage repair may be due to excess tissue dissection around the urethral plate for the release of chordee. This is not required in the two-staged procedure. In a similar study by ME, Hassan et al;<sup>[21]</sup> found the Incidence of the postoperative urethral fistula was 27 versus 12.5% for single-stage and two-stage repair, respectively our results are in accordance to this study. In this current meatal stenosis was found in n=1(7.14%) of the single-stage repair and n=1(5.88%) of the two-stage repairs. In this study, the patient's outcomes were evaluated with the HOSE system which was designed to reflect the traditional weighting given to a satisfactory functional outcome<sup>[15,22]</sup>. In this study, we found significant chordee correction with two-staged repair as compared to the single-stage repairs. The use of HOSE is essential to assess surgical outcome and will only facilitate the impartial evaluation of operations used in correcting hypospadias. Despite the higher incidence of hypospadias the repair of hypospadias is not routine surgery. It is reconstructive surgery and requires great skill, experience, patience, and enthusiasm to achieve acceptable results<sup>[23]</sup>.

### Conclusion

Based on the results of the present study we can conclude that the repair of severe hypospadias with moderate chordee by two-staged repair showed better outcomes as compared to single-stage repair. The incidence of postoperative complications is also lesser with two-staged repairs. However, the choice of the procedure must be based on the type of hypospadias, choice of patients and economical constraints.

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