

Hypospadias surgery update; current trends in the correction of penile curvature

Abbreviations: STAGE, superficial tunica albuginea geometric-based excision

Chordee

One of the phenotypic manifestations of hypospadias is penile curvature (chordee) which can be challenging for surgeons. The hypothesis that chordee results from ventral corporeal shortening has been supported again.¹⁻³ Significant penile chordee can often result from corpora cavernosa ventral aspect shortening.⁴ However, the 20th century published literature did not reveal a significant relationship between severe penile curvature and future erectile dysfunction.

The American Academy of Pediatrics Section on Urology had reached an agreement in the treatment of penile curvatures in 1999 as a result of a large survey.⁵ Findings indicate that “significant chordee” is clinically defined as curvature greater than 20 degrees, in that 75% of respondents said they would proceed with further intervention. Placement of plicating sutures was the most common therapy chosen for 20 degrees chordee, with 50% of respondents electing this approach. Consensus was reached at 30 degrees chordee, with greater than 99% intervening at this degree of curvature. At 30 degrees curvature, 48% used an incisional Nesbit procedure. As the degree of curvature increased, division or mobilization of the urethral plate became the most common intervention. With 50 degrees chordee, urethral plate manipulation was used 34% of the time.⁶

Corporoplasty

Nesbit was the first to use dorsal plication for penile curvatures after excising elliptical segments of the tunica albuginea from the dorsolateral aspect of the penis in 1965, since then, it became frequently used in this regard.⁷ This technique has been modified in 1994 by Baskin⁸ who advised to placate the dorsum of the penis at maximum point of bend at 10 o'clock and 2 o'clock without excising segments of the tunica albuginea.

However, in 2000, Baskin⁹ modified his own technique after serial histological investigations to let the penile placating be at 12 o'clock where perforating branches from the dorsal lateral neurovascular bundle do not exist. Moreover, Hayashi et al.¹⁰ made parallel incisions in tunica albuginea after opening the Buck's fascia longitudinally at 12 o'clock and approximated the outer edges of the incisions.

Kuehhas et al.¹¹ 2012 had advocated a novel superficial tunica albuginea geometric-based excision (STAGE) technique based on multiple, small, superficial elliptical tunica albuginea excisions and geometrical principles for correcting biplanar congenital penile curvature. Care must be taken not to penetrate through the tunica. The newly generated tissue defects were closed with three simple, interrupted sutures of absorbable material. The longitudinal incisional corporoplasty technique is based on an inverted Heineke-Mikulicz principle: shortening the longer convex part of the corpora cavernosa by closing horizontally the longitudinal tunica albuginea incisions for equalizing its length to the concave aspect of the corpora.

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On the other hand, in plicational corporoplasty neither is the tunical segments excised, nor is the tunica incised. According to this technique, the convex part of the tunica albuginea is shortened either by simple plicating suture or by double crossover stitching applying non-absorbable stitches grasping deep into the tunica. Disadvantages of this approach are that the sutures can cut through the tunica albuginea during firm erections before complete healing occurs, and that palpable knots are left permanently beneath the penile skin. However, the knots can be buried between the folds of the plication by using an inverted suture technique.¹²

Ventral graft or flap

The idea of applying tissue to the defect in tunica albuginea ventrally is not a new concept in the management of chordee. Based on their earlier experience in Peyronie's disease, Devine et al.^{13,14} described using dermal grafts in 1975 to correct penile chordee. In 1993, Horton et al.¹⁵ did the same to elongate the ventral component of tunica albuginea in children with hypospadias, resulting in complete resolution of penile curvatures in his patients. Ribbeck et al.¹⁶ used a tunica vaginalis free graft in children with penile curvature and were successful, except in one patient. Kajbafzadeh et al.¹⁷ stated the free graft of tunica vaginalis is extremely successful when used in cases of severe penile curvature. However, getting a straight penis under erection test during surgery does not prevent recurrence of the chordee that can occur secondary to corporeal disproportion and/or extensive urethral fibrosis.¹⁸ It was believed that devascularization of the flap can result into fibrosis and re curvature. Hafez et al.¹⁹ found in a rat model that optimal use of tunica vaginalis for correction of chordee is as a flap rather than as a free graft. Grafts were associated with significant necrosis and contracture, of which neither was associated with flaps. In 2005, it was concluded that tunica vaginalis flap patching to the ventral aspect of the penis is safe and technically feasible.²⁰ If penile chordee is severe or the penis is small in hypospadiac patients, lengthening the ventral aspect using a tunica vaginalis flap is likely to expand instead of dorsal plication or ventral graft Braga et al.²¹ reported in 2007 that Dural grafts were associated with a higher risk of recurrent ventral curvature compared to tunica vaginalis flaps.

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Conflict of interest

The author declares no conflict of interest.

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