REVIEW

Dorsal Penile Curvature in Children: A Review

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Purpose: To review the current literature on dorsal penile curvature (DPC) in children, including its etiology, diagnosis, and principles of treatment.

Materials and Methods: A literature review was conducted on DPC in children, focusing on its etiology (e.g., skin tethering, corporal disproportion), association with other conditions such as hypospadias and epispadias, and surgical treatment methods.

Results: DPC is a rare condition, often associated with neonatal circumcision, hypospadias, or epispadias. The etiology includes skin ties, fibrotic tissues, and asymmetric corporal development. Spontaneous resolution can occur, especially in cases following circumcision. Surgical correction is typically considered for curvatures of 30° or greater that are functionally concerning. Common surgical techniques include ventral plication, wedge resection (Nesbit procedure), and grafting.

Conclusion: While mild DPC often requires no intervention, surgical correction should be considered for significant curvatures ($\geq$ 30°) to prevent future functional issues. Cases that develop after neonatal circumcision may resolve spontaneously.

Keywords: estrogen receptor; spermatogenic failure; non-obstructive azoospermia; oligozoospermia; meta-analysis

INTRODUCTION

Penile curvature (PC) is a condition frequently seen in children with hypospadias, characterized by the angulation of the erect penis.[1-3] Although PC is common in children with hypospadias, it can also be found in those with a normal meatus. While the incidence of hypospadias in the general population is approximately 1 in 300 children, PC is found in about one-fourth of these cases.[4] Ventral penile curvature (chordee) is reported to be the most common type encountered by pediatric surgeons and urologists. However, there is limited information in textbooks and publications about dorsal penile curvature (DPC) (**Figure 1**).[2]

ETIOLOGY

Snodgrass mentioned that ventral penile curvature in children is congenital and most commonly associated with hypospadias. He also emphasized that dorsal or lateral congenital curvature resulting from asymmetric corporal development can occur without foreskin or urethral anomalies.[5] In a large series of congenital penile chordee cases without hypospadias, the etiology was attributed to skin tethering, fibrotic dartos and Buck's fascia, and asymmetric corporal development. In this series, 84% of the 87 patients had ventral curvature, while only 11% had DPC.[6] DPC can occur in cases with and without hypospadias.[5] The incidence of DPC is lower in the absence of hypospadias, and the majority of these cases are associated with epispadias (5%). True congenital DPC in boys has been associated with a long phallus and is recommended for correction if it causes functional disorder.[7] DPC may result from a deficiency of skin and subcutaneous tissue, which can be caused by short dorsal penile skin, scarring from previous penile surgery, or corporal disproportion.[3]If DPC develops after circumcision, it is most likely secondary to scarring. Although some cases have been reported to resolve spontaneously, surgical correction is recommended when the curvature exceeds 30° and/or is associated with hypospadias.[2,8] DPC has also been reported in a 10-year-old patient with a congenital prepubic sinus. In this case, the accessory urethral meatus was located dorsally and was associated with DPC, along with a defective dorsal foreskin. The accessory urethral meatus was not connected to the normal urethra or bladder. Correction of the DPC was achieved through circumcision, complete excision of the 4 cm prepubic sinus on the dorsal side, and removal of the fibrous cords.[9] A similar case was reported in a 14-year-old boy with incomplete epispadias, urethral duplication, and DPC. After an artificial erection test, an elliptical incision (wedge resection) was made in the tunica albuginea on the ventral side of both corpora cavernosa. The tunica was then sutured intermittently using 4/0 polyglactin, successfully correcting the DPC.[10]

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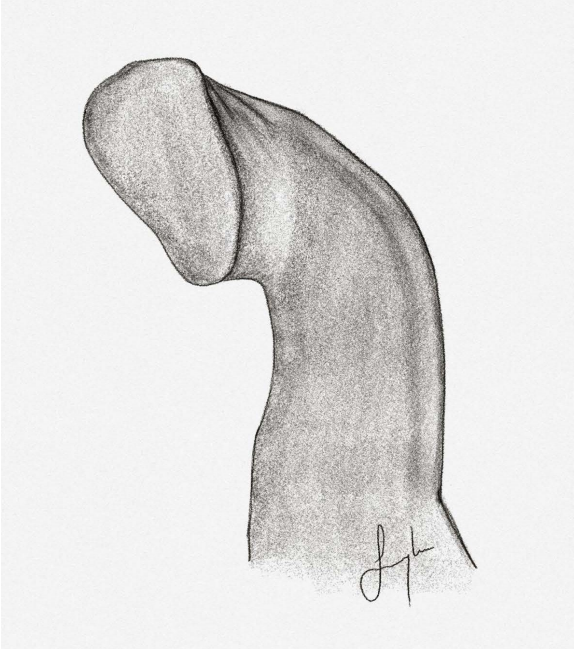

Figure 1. Schematic view of dorsal penile curvature.

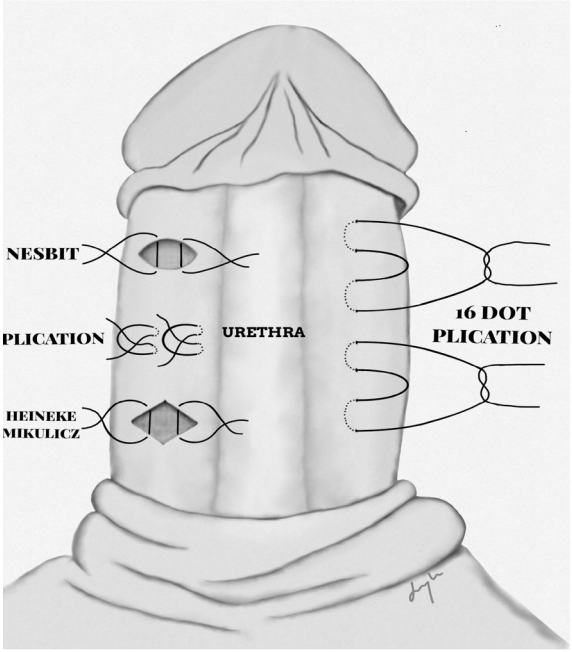

Figure 2. Schematic representation of the main surgical methods that can be used in the treatment of dorsal penile curvature.

TREATMENT

Studies on DPC remain limited, and its treatment often follows the plication principles used for ventral penile curvature. In one study involving 33 pediatric patients with >30° DPC, a normal penis, and an intact urethra, treatment was performed. Following a circumcision incision, the penile skin was dissected down to the penoscrotal junction, and any subcutaneous adhesions or scar tissue were removed. An artificial erection was then induced, and the point of maximum curvature was marked. Polypropylene 5-0 sutures were placed in the tunica albuginea at the 5 and 7 o'clock positions, just lateral to the corpus spongiosum and urethra, ensuring these structures remained undamaged. The DPC was successfully corrected using this ventral plication method (**Figure 2**).[3] In this series, the 33 patients had a mean age of 38 months (range, 7 months to 15 years). A common finding was that all patients who underwent DPC repair had been circumcised during the neonatal period. Severe DPC (> 60°) was observed in two patients. Recurrence occurred in five patients after ventral plication; however, no additional intervention was needed in four cases, as the residual curvature was minimal (<30°). The fifth patient underwent successful reoperation using the same technique.[3] In 1980, DPC was described in a 14-year-old child with proximal hypospadias and was reportedly corrected using the Nesbit procedure, which involved elliptical tissue excision from the corpus cavernosum (**Figure 2**).[11] Krueger and Churchill also reported a case of DPC in a patient with megalourethra and posterior urethral valves.[12] Similarly, Redman incidentally identified DPC in a series of six patients aged 6 months to 4 years, including two with proximal hypospadias. He performed a ventral Nesbit procedure on four of these patients.[13] Spiro et al. later used the same technique to treat seven patients with DPC and distal hypospadias.[8] Another etiological factor is disproportion in the corpora cavernosa. If the curvature persists after the penile skin is dissected and scarred tissues are removed, this corporal disproportion should be addressed. The shorter side of the corpora can be lengthened using the Heineke-Mikulicz principle or by incising the tunica albuginea and applying a dermal or tunica vaginalis graft (**Figure 2**). Grafting is advantageous as it eliminates the risk of penile shortening. The other option is to shorten the long part of the corpus via plication. Although postoperative penile shortening can occur, plication sutures reduce the extent of dissection required and avoid incisions that could damage the nerves and blood vessels surrounding the corpora.[3] Adams et al. reported a series of 16 boys with severe congenital DPC, with a mean age of 34 months. Eight presented for curvature correction and eight for hypospadias repair. They noted that these children generally had a thinner and longer penis, with a length $\geq$ 2 standard deviations above the mean for their age. In 14 patients, corporal disproportion was identified as the underlying pathology. Surgical correction was performed in 14 of the 16 patients; the remaining two newborns experienced spontaneous resolution within the first year. In eight of the surgical cases, wedge resections were performed on the elongated ventral tunica albuginea to correct the DPC. The authors linked the curvature to abnormalities in corpus cavernosum and urethral plate development.[14]

Belman stated that DPC may not interfere with sexual function and that the curvature can change spontaneously with age. As a result, he recommended waiting until puberty for treatment unless the patient reports sexual dysfunction.[15] However, it is well known that a DPC greater than 30° is likely to cause discomfort or dysfunction. Therefore, a more aggressive approach is advocated for severe cases, and surgical correction is considered necessary for DPC associated with epispadias.[3,15] In one study, penile curvature was observed

in 29 (24%) of 118 boys with a hypospadias variant and megameatus. Of these, 23 (19%) had DPC. Cases with a curvature of ≥ 30° were classified as severe, and surgery was recommended. Ventral plication was performed in 20 of the 23 children with DPC, while in three cases, the curvature was corrected by simply degloving the penile skin. The ventral plication procedure involved placing a single stitch on both sides of the urethra (**Figure 2**).[16] In another case involving a young adult with 90° DPC, correction was successfully achieved using a 16-dot plication technique without degloving the foreskin (**Figure 2**).[17]

CONCLUSIONS

In most cases, dorsal penile curvature is mild and does not require intervention. However, if the curvature is 30° or greater and causes functional discomfort, surgical correction should be considered. When DPC develops after neonatal circumcision, it is important to note that spontaneous resolution may occur within the first year.

SUMMARY

Dorsal penile curvature, an upward bend of the penis, is a rare condition in children. Mild cases may not need treatment, but surgery is considered for bends over 30° to ensure normal function. Some cases that develop after circumcision may resolve on their own.

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

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