

Early Diagnosis, Repair and Common Post Operative Complications of Hypospadias

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Abstract

Hypospadias is an abnormality of anterior urethral and penile development in which the urethral opening is ectopically located on the ventrum of the penis proximal to the tip of the glans penis, which, in this condition, is splayed open. The urethral opening may be located as far down as in the scrotum or perineum. The penis is more likely to have associated ventral shortening and curvature, called chordee, with more proximal urethral defects. During the early millennium, the primary treatment for hypospadias was amputation of the penis distal to the meatus. Since that time, many have contributed to development of modern hypospadias repair. Over couple of hundred different types of repairs have been described in the medical literature. Although most reports have been in the last half century, most basic techniques were described over a century ago. With up to date technological application in prenatal medicine, hypospadias can be detected on prenatal ultrasound examination. The prenatal diagnosis may not be made for every isolated fetal anatomical malformation; however, a skilled ultrasound examiner and a family history can optimize prenatal ultrasound diagnosis carried out in third trimester. Modern anesthetic techniques, fine instrumentation, sutures, dressing materials, and antibiotics have improved clinical outcomes and have, in most cases, allowed surgical treatment with a single-stage repair within the first year of life on an outpatient basis. It is clear that repairs that are more proximal are associated with a greater incidence of complications. Older age at surgery and low surgical experience have also been associated with poorer outcomes. With longer follow-up, it is apparent that late complications can occur and most advocate continued evaluation through puberty. In conclusion, among postoperative complication, bleeding rarely occurs and is usually controlled with a compressive dressing. Infrequently, this requires reexploration to evacuate a hematoma and to identify and treat the source of bleeding. Local edema and blood spotting can be expected early after repair and generally do not cause a significant problem. Urethrocutaneous fistulization is a major concern in hypospadias repair. Infection is a rare complication of hypospadias repair in the modern era. Skin preparation and perioperative antibiotics are generally used.

Keywords: Hypospadias, treatment, surgical, techniques, outcome

Introduction

A thorough history and physical examination, including any history of a familiar pattern of hypospadias, any past medical history or comorbidity, and a physical assessment focusing on the meatal location, glans configuration, skin coverage, and chordee can make diagnosis of hypospadias after birth [1]. Prenatal ultrasound examination with the application of the up to date technology in prenatal medicine together with highly trained, skilled ultrasound examiner and family previous medical history can diagnose this congenital anatomical malformation easily in third trimester diagnostic ultrasound examination [15].

During the prenatal ultrasound diagnostic examination a good visualization of genital area and availability of color Doppler enables the urine stream to be detected and therefore possible to make the hypospadias diagnosis as early as second trimester [15]. This early diagnosis can reassure parents and have them consulted with the infantile/pediatric surgeon in order to be on familiar terms with the steps that are followed after delivery.

A physical examination can easily see the dorsal hood of foreskin and glanular groove are evident, but, upon closer inspection, the prepuce is incomplete ventrally and the urethral meatus is noted in a proximally ectopic position. Rarely, the foreskin may be complete, and the hypospadias is revealed at the time of circumcision. If hypospadias is encountered during neonatal circumcision, after the dorsal slit has been performed, the procedure should be halted, and the patient should be referred for urologic evaluation.

Chordee may be readily apparent or discernible only during erection. Proximal hypospadias is commonly associated with a bifid scrotum and penoscrotal transposition, in which the rugated scrotal skin begins lateral to the penis rather than in its normal posterior origin.

Surgery is the only modality of the treatment. The aim of surgery is to achieve a straight penis, with the meatus at the tip, uninterrupted urinary flow, good cosmesis, and self-confidence of the child. Among the choice of procedures for distal hypospadias are plate preservation procedures like incised plate urethroplasty, glans approximation procedures, and MAGPAI whereas for proximal hypospadias is extended application of

incised plate urethroplasty, various flap, and graft urethroplasties in one or two stages. Technically all flaps have a better blood supply than the grafts. The results are better with flap urethroplasties than grafts. Rebirth of two-stage procedures with reduced complication rates has given a wider choice of procedures to the hypospadiologist for repair of proximal hypospadias.

Complications after surgical procedures are not infrequent. Description of over 200 procedures for hypospadias repair suggests lack of uniformity of results of repair and high-complication rates. Acute complications occur within 7-10 days following surgery and require a proper assessment and decision making for management. Mismanagement can result in failure of the procedure. Complication rates are higher in onlay flap or inner prepuccial tube as compared to plate preservation procedures like incised plate urethroplasty and in two-stage urethroplasty as compared to one stage. A proper preoperative assessment and planning is must for good results.

Discussion

Complications after any surgical procedures are possible and these are higher in hypospadias surgery as compared to other reconstructive operations. The reported incidence of complications range from 6 to 30 %, varying with the severity of the hypospadias [1, 2]. Hypospadias repair requires delicate handling of loose and fragile tissue susceptible to edema and infection. Complications depend on the type of hypospadias, surgical technique, size of the penis, age of the child, and experience of the operating surgeon. Plate preservation procedures like tubularized incised plate (TIP) is the procedure of choice in both proximal and distal hypospadias. Fistula and flap necrosis rates are lower and the surgery more convenient with the Snodgrass urethroplasty, with better cosmetic outcome than Mathieu repair [3]. The TIP urethroplasty can be done for hypospadias reoperation provided the urethral plate is supple and previous incision of the urethral plate is not a contraindication. However, TIP repair should be avoided in repeat hypospadias surgery if the plate has been resected or is obviously scarred [4]. The TIP results are better as compared to onlay flap, both functional as well as cosmetic. Inner prepuccial tube repair is technically more demanding and complications are more as compared to onlay flap repair [5, 6]. The most decisive risk factor for complications is the severity of the primary malformation, because a severe malformation *per se* is difficult to treat as it requires a long reconstruction; in addition, the curvature, shortage of tissue, and extensive surgery generally require a staged reconstruction in these cases. Other factors seem to be of much lesser importance [7]. Although various techniques are similar in both pediatric age and adulthood, there is clearly a difference in terms of wound healing, infection, complication rates and overall success in adulthood. A patient undergoing surgery in adulthood should be counseled on all of these variables to avoid unreasonable expectations [8, 9]. There is significant learning curve in hypospadias surgery and results improve with the experience of the surgeon [10, 11]. As such results were poorer in reoperative cases [12] and free graft than in flaps [14] but type of urinary diversion, period of urinary diversion, type of dressing, catheter size and anesthetic regime did not influence outcome significantly [13]

Complications:

It is clear that repairs that are more proximal are associated with a greater incidence of complications. Older age at surgery and low surgical experience have also been associated with poorer outcomes. With longer follow-up, it is apparent that late complications can occur and most advocate continued evaluation through puberty.

Immediate concerns

Local edema and blood spotting can be expected early after repair and generally do not cause a significant problem.

Postoperative bleeding rarely occurs and is usually controlled with a compressive dressing. Infrequently, this requires reexploration to evacuate a hematoma and to identify and treat the source of bleeding.

Infection is a rare complication of hypospadias repair in the modern era. Skin preparation and perioperative antibiotics are generally used. Patients are often maintained on an antibiotic course until any stents are removed, although this has not clearly been shown to be of benefit.

Long term concerns

Urethrocutaneous fistulization is a major concern in hypospadias repair. The rate of fistula formation is generally less than 10% for most single-stage repairs but rises with the severity of hypospadias, approaching 40% with complex reoperative efforts [1, 7, 10, 13]. Fistulas rarely close spontaneously and are repaired using a multilayered closure with local skin flaps 6 months after the initial repair. After repair, fistulas recur in approximately 10% of patients [1, 7, 10, 13].

Meatal stenosis or narrowing of the urethral meatus, can occur. A urethral stent prevents any problems initially, but a fine-spraying urinary stream that is associated with straining to void likely requires operative meatal revision.

Urethral stricture may develop as a long-term complication of hypospadias repair. These are generally repaired operatively and may require incision, excision with reanastomosis, or patching with a graft or pedicled skin flap.

Urethral diverticula may also form and are evidenced by ballooning of the urethra while voiding. A distal stricture may cause outflow obstruction and may result in a urethral diverticulum. Diverticula can form in the absence of distal obstruction and are generally associated with graft- or flap-type hypospadias repairs, which lack the subcutaneous and muscular support of native urethral tissue. The redundant urethral tissue is generally excised, and the urethra is tapered to an appropriate caliber.

Hair-bearing skin is avoided in hypospadias reconstruction but was used in the past. When incorporated into the urethra, it may be problematic and can result in urinary tract infection or stone formation at the time of puberty. This generally requires cystoscopic depilation using a laser or cautery device or, if severe, excision of hair-bearing skin and repeat hypospadias repair.

The techniques of hypospadias repair continue to evolve, the broader future of hypospadias is truly promising. Nontraditional tissue adherence techniques are being developed, including tissue glues and laser-activated soldering techniques that have been shown to improve wound healing and to reduce fistula formation. Urethral substitutes, which may obviate the difficulties associated with severe hypospadias and poor tissue availability, are currently under investigation. These substitutes are generally acellular synthetic or natural matrices that can incorporate the patient's normal urethral cellular components. The embryology of hypospadias is being elucidated, and the understanding of its causes is improving; with new information, an exciting new paradigm shift to hypospadias prevention or antenatal intervention may occur.

Conclusions

With modern surgical infrastructure, and antibiotics, hypospadias repair has become quite successful. Although some earlier studies have been discouraging, these reflect an era with poorer technical outcomes, increased number of operations, and a lack of appreciation for the psychological morbidity associated with intervention at an older age. Long-term studies suggest that despite having decreased satisfaction with their genital appearance, patients having undergone hypospadias repair are more satisfied with their sex lives compared to healthy controls.

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