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Original Research Article

Hypospadias: Different Types and Basic Principles of Repair

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Abstract: A technique based just on the Denis Browne principle of the buried skin strip is presented and considered the treatment of choice for the vast majority of cases of Hypospadias. No perineal drainage or beads and collars are used, but instead 3 layers of resorbable 5/0 sutures on atraumatic cutting edge needles are used. Also variations of the basic principle are described as all techniques have to be adapted to the individual Patient A place must always exist for the knowledge and possible use of other techniques, if they seem to fit better a particular case.

Keywords: Urogenital malformations, Hypospadias.

INTRODUCTION

On close scrutiny, the many techniques used for hypospadias repair represent only modifications of basic surgical approaches. A good example is the "island flap of which the precursor was Des Pre, followed by Hinderer, Hodgson III, Asopa II, Standoli, Scuderi, Duckett,

MATERIAL AND METHODS

Our option is clearly the use of Sir Denis Browne's principle of the "buried skin strip" for urethral reconstruction, although modifying everything else.

No definitive urethroplasty is to be performed unless cordhee or any other component of the malformation (as meatal stenosis, torsion or webbing) has been completely corrected. That may impose a 2 stage procedure.

An erection test should always be made before any urethroplasty

Treatment options:
Group A (mostly one stage operations)
Glanular with intact prepuce = AGM I (one stage)
Balanic = AGM I+ prepuce (one stage)
Anterior penile = AGM II (one stage)
Mid penile = AGM II (one stage)

Groups B (mostly 2 stage operations)
Balanic or anterior penile with cordhee = AGM III (two stages)
Mid-penile, posterior or peno-scrotal with cordhee= AGM III (two stages)
Interscrotal or vulviform = AGM IV (two stages)+AGM (III+V)
AGM V (after routine AGM III)
AGM VI (AGM IV + keeping the prepuce)

Surgical Technique

Our choice (AGM I to VI), is the use of a median strip of mucosa/preputial skin, non tubularized, and buried underneath lateral penile skin flaps, following the Sir Denis Browne principle. The median ventral strip should have a width of 2/3 equivalent to the perimeter of the desired urethral tube, as it is expected that the raw surface of the covering lateral flaps will produce the further third of the neo-urethral tube.

Apart from the general endotracheal anesthesia we inject 1% xylocaine at the base of the penis in order to minimize postoperative discomfort.

AGM I Two parallel incisions are made on the ventral surface of the penis surrounding the existing meatus, but just at its hedge, posteriorly. At the tip of the glans the incisions diverge slightly so that the most distal portion of the median strip will close directly, as a new meatus. The incisions are deepened till the level of the corpora and well into the glans, avoiding excessive

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lateral undermining (only enough to allow easy suturing of the 2 lateral flaps). A catheter of the diameter of the existing urethra is used as a stent, to avoid the danger of narrowing the neo-urethra. 3 rows of a continuous suture are used starting at the proximal end of the wound and ending at the neo-meatus. Incisions joining the two initial ones are carried on the lateral edges of the prepuce, till its corners, mucosa and skin sides are sewed with separate stitches, so reconstructing a normal looking prepuce.

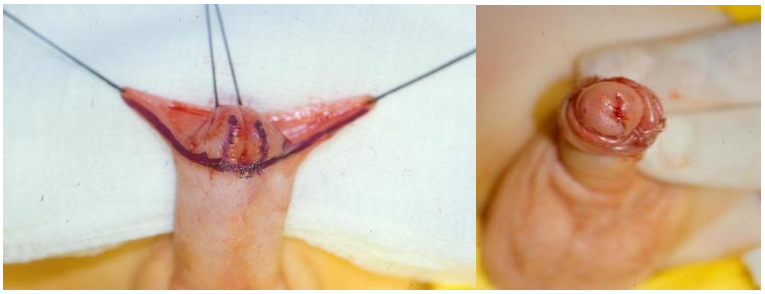

Fig-1: Incisions in the glans, slightly divergent at the tip and incisions in the preputial Edges and final appearance with a glandular meatus

AGM II Again a ventral strip of mucosa is obtained through 2 parallel ventral incisions, deepened till the level of the corpora (as in AGM I) A running suture is started posteriorly, with the knot being placed deep and as far back as possible, the final knot being tied at the end of the glans.

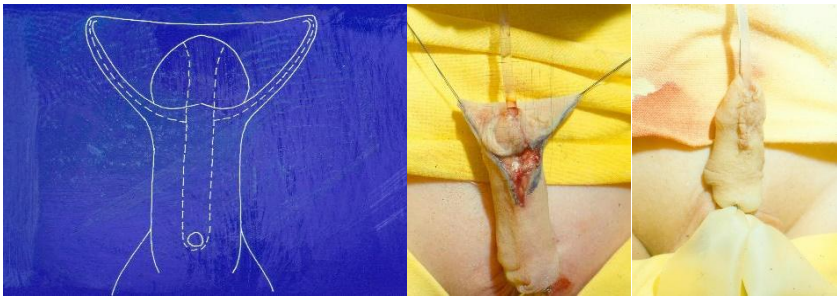

Fig-2: Drawing if incisions with no chordee present, suture stated and catheter in place to assure normal urethra caliber and final appearance with preputial maintenance.

AGM III. We consider a two stage technique essential when there is any doubt about the presence of cordhee. In the 1st stage an incision is made in the preputial lateral edges, crossing transversely the penile shaft, distally to the existing meatus and, if necessary is prolonged proximal in the midline, until it reaches the meatus, which is opened up until a normal corpus spongiosum is obtained. The incisions on the preputial edges are prolonged just to the level required for penile shaft lengthening and only in the more severe forms, reaches the outer corners of the preputial hood.

The fibrous tissues are removed not only ventrally but also along the lower hemy-circumference of the penile shaft, sometimes freeing being even required under the meatus. Some superficial transverse incisions may eventually also be required at the corpora cavernosa for complete straightening of the penis. The midline incision is prolonged distally in the midline to the very tip of the glans, to open it up and thus enlarging its ventral surface, in preparation for the 2nd stage. The preputial skin is then brought medially on either side, to cover the created raw surfaces due to the partial splitting of the glans.

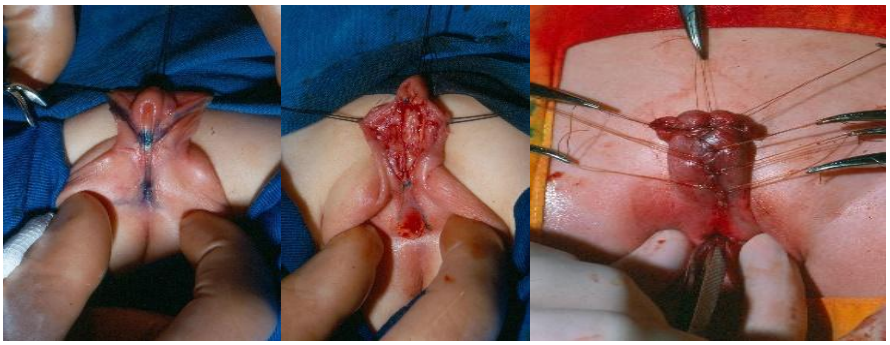

Fig-3: Severe degree of hypospadias imposing previous straightening. Incisions in the preputial edges and in the shaft, till the perineal meatus, removal of all chordee and shaft straightening and final aspect after straightening

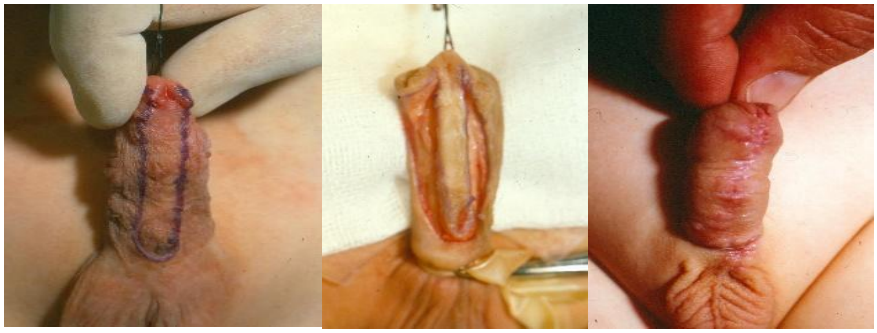

Fig-4: As in Technique II drawing the 2 parallel incisions all along the perineal shaft already straightened, freeing the lateral flaps and final appearance of the straight penis

The 2nd stage is performed like described in AGM II

AGM IV

In the most severe forms of hypospadias, and in which there is a bifid scrotum with the penis inserted between its two halves, there is the need to dorsally transpose the penile shaft, so that it acquires a normal placement. A suprapubic skin bridge is created immediately above the emergence of the inter-scrotal penis, and so wider as the downward displacement of the penile shaft is more marked. The base of the penis is completely encircled and then the penis is transposed upwards, passing through the tunnel created under the pubic skin bridge, to appear above the scrotum through the suprapubic incision. The skin bridge should have a width of no less than half of its length and some fat attached, so as not to compromise its blood supply. Finally a vertical incision is made and sutured between the two scrotal halves to correct the bifidity.

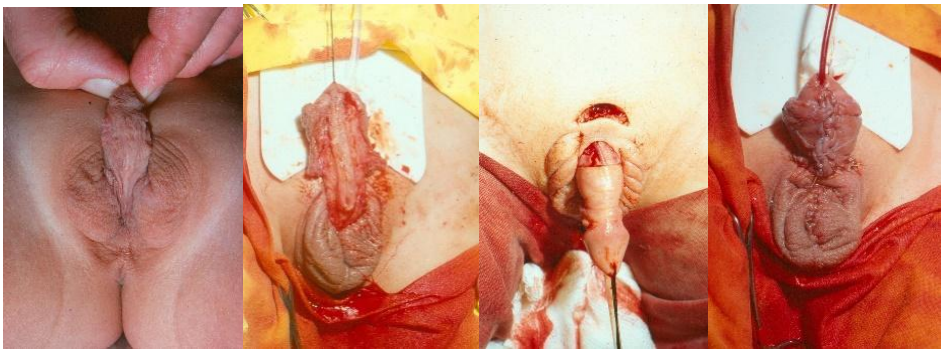

Fig-5: Bifid scrotum and hypospadias, medial skin strip for urethral reconstruction and freeing of the lateral flaps

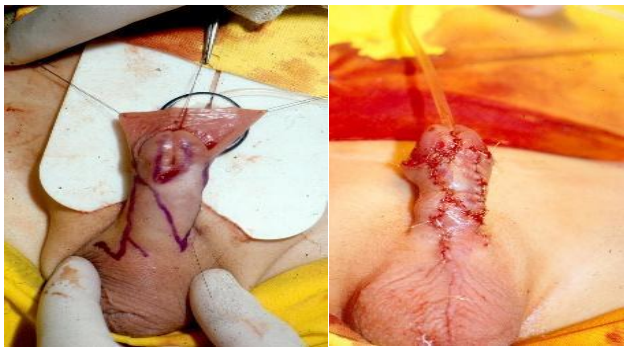

Fig-6: Penis with torsion to the left and after transposing the flaps

AGM V This transposition can be made as a 3rd stage, namely if urethroplasty has already been performed without transposition. In those cases a skin fold remains at the peno-scrotal angle, a sort of peno-scrotal webbing (that at times also happens in minor forms of the malformation) and should be removed. Generally a better correction is obtained by Z plasty and not by simple direct suturing.

AGM VI Exceptionally, if the prepuce has not been used for penile reconstruction and after penile transposition it may still be possible to reconstruct the prepuce, simply by direct suturing.

Careful hemostasis is mandatory. Eventually we place a garrotte at the base of the penis for easier identification of the fibrous tissue of the cordhee. For suturing we use 5/0 Monocryl or rapid reabsorption

polyglactin on an atraumatic, curved, 12 mm cutting needle.

Complementary steps : Penile torsion, always to the left, a rare malformation but more frequent with midshaft hypospadias, needs to be corrected before the hypospadias, using preferably two transposition triangular flaps (that have the extra advantage of being able to moderately lengthen an eventually existing the ventral penile curvature.

Fig-7: Pubic incision and flap to allow for upper transposition of the penis and final result with a normally placed supra-scrotal penis

Fig-8: Meatal appearance and normal micturition of a normal looking penis

Except in the most distal forms we always use urinary diversion through a supra-pubic Cysto-catheter, for 12 days. Immobilization of the child's arms is advisable in order to minimize the chances of accidental pulling out of the bladder catheter.

DISCUSSION AND RESULTS

Hypospadias is certainly one of the most frequent malformation of children, with an incidence of about 3 to 8 cases for 1.000 male births The aims of correction are to obtain a straight penis (for normal sexual function and micturition), a free and controlled urinary flow and an aesthetic appearance as close to normal as possible.

As with all malformations hypospadias should be corrected as soon as it is technically safe. But correction should certainly be completed by school age (no more than 3 years old). We advise 6 months to one year, for the first operation of a two stage technique, followed one year later by the second stage, and 2 years of age if only a one –stage repair is advisable.

A special warning should be made about the need to avoid circumcision (namely as a neonatal procedure).In the rare minor forms with an intact prepuce and a glandular meatus of adequate size, surgery can be avoided if Parents agree. In the more distal and simple forms just a meatotomy may be the Parents Choice. That is the only time in which we accept circumcision (to allow for a more "normal" look of the penis).

We describe the different variations of a technique based on the Denis Browne buried skin strip technique which is conceptually simple and practically adequate for the correction of all types of hypospadias. Unfortunately Denis Browne never wrote that he used to slack the collars and beads after placing them, what led some pejoratively to call his technique the sprinkler method. I cannot understand the advantage of the more recent Snodgrass technique that in fact follows the Denis Browne Principle of the buried skin strip (only making it ventral and not dorsal). Leveuf's idea of a 2 stage operation by initially joining the neo urethra to the scrotum is now only of historical interest.

The most frequent complication of any method of hypospadias repair is certainly fistulas and one famous surgeon, referring to another who said he had never had a fistula in hypospadias repair, only simply commented: "he must not have done many……..!"

Nevertheless, we can say that with the technique we propose, fistulas are exceedingly rare.

We totally disagree that any type of "one stage surgery" should be used, unless a straight penis has already been obtained (having eliminated any existing cordhee). As Snodgrass himself agrees, there is no advantage of the use of a dartos pedicle flap from the preputial hood and dorsal shaft skin transposed ventrally to minimize fistulas.

Although simple in its principles, very few operations require such meticulous evaluation and individualized treatment, skill, delicacy and careful handling of tissues, attention to detail, sound surgical training and experience end even, sometimes, "a touch of luck".

As the severity of the deficiency increases, a downward curvature of the penis becomes apparent, with an excess of scar tissue in the ventral surface of the penis, particularly in its distal portion, near the meatus, becoming more evident on erection.

The prepuce is invariably dorsally placed and represents a basic stigma of the malformation but also one of the best allies for the surgeon. It is not a hemi-prepuce, but a full prepuce that has not fused in the midline, which can allow for total reconstruction in some of the more distal forms of hypospadias, obtaining a totally normal look of the penis instead of a circumcised appearance.

CONCLUSIONS

We describe the different variations of a technique based on the Denis Browne buried skin strip technique which is conceptually simple and adequate for the correction of all types of hypospadias. And we totally believe that any type of "one stage surgery" should never be tried until a straight penis has already been obtained (by the elimination of any existing cordhee).

Disclaimer

The paper is a single author piece and presents no conflict of interests.

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