AN OPERATION FOR THE CURE OF ADULT HYPOSPADIAS

BY

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(WITH SPECIAL PLATE)

Those who undertake the responsibility for the radical cure of hypospadias know that it can be one of the most difficult of all surgical conditions to bring to a successful conclusion. Cabot (1935) points out that the basic requirements of a thoroughly satisfactory operation are that it should overcome the disability and avoid the production of new disabilities such as stricture formation or growth of hair within the newly formed urethra. At the same time it should be sufficiently simple and certain of freedom from post-operative complications, such as fistula formation, to enable it to be carried out with a reasonable prospect of success by a well-trained surgeon.

Technical Problems

The construction of a new urethral canal demands a high degree of technical skill; even then it may fail, because the method necessarily violates some of the cardinal principles of plastic repair, particularly when applied under the disintegrating effect of the urinary stream. There is, in fact, real need for an operation which is reasonably easy to perform and more certain of success than many of those in common use. Apart from associated abnormalities such as hernia or retained testes, the three practical considerations in the hypospadiac are concerned with the redundant dorsal prepuce, the ventral penile curvature, and the absent urethra. Briefly, the dorsal prepuce is disposed of by incorporating it into the ventral length, either by the excellent method of Edmunds (1926) or by the more recently described procedure of Browne (1936). The effect of this is to distribute the available skin equally over the penile surface in such a way that the dorsal excess is transferred to the deficient ventral surface. Straightening of the ventral penile curve is effected by removal of the urethral cord and the remains of the corpus spongiosum. Finally a new urethral canal must be constructed.

There is no particular difficulty in carrying out the first and second of these procedures, chiefly because they are easy to perform, and the suture line is not subjected to the passage of urine over it. It would be generally agreed that the third problem—namely, the construction of a new urethra—is the most difficult step in the necessary series of operations. Certainly the extraordinary number of proposed methods bears this out, and an examination of them will show that while some are practical and feasible others are fantastic and have no possible use.

All of them rely upon one of three different methods of plastic repair—namely, the use of local flaps, tube pedicles, or free grafts. The first is satisfactorily represented by the various modifications of the Marion-Duplay (1886) procedure, Cabot's (1935) modification of Bucknall's (1907) operation, and Ombrédanne's (1923) operation. The second depends upon the use of extraneous tissue transplanted from a distance by means of the Gillies tubed pedicle. Free grafts are made use of in the procedures of Nové-Josserand (1914), Rochet (1932),

and Mayo (1901). While all of these methods have been successfully employed on many occasions, the last—namely, the use of free grafts—has fallen into disuse, and has been generally condemned.

More recently Borchers (1928) and Begg (1935) have recorded interesting experiences with the tunnelling operation, and have suggested modifications in technique. To anyone who has had experience of the great success of the Esser (1917) principle of inlay grafting it would appear that free grafting is the most reasonable method of constructing a new urethra. It can be undertaken with a high degree of certainty without utilizing penile skin and with none of the dangers of breaking down associated with suture lines in this region. In this communication I wish to show that Nové-Josserand's operation, when modified in certain important particulars, is not only feasible but gives in adult hypospadias what I believe to be the simplest and most satisfactory method of producing a new urethral canal.

Principles of the Operation

Nové-Josserand proposed that after the usual straightening of the ventral curvature a tunnel should be bored through the penis from the posterior fistula to the tip of the glans and a catheter covered with Thiersch graft be inserted into the canal. He recommended that the catheter should be removed at the end of eight to ten days and the skin-lined passage be dilated periodically with bougies. Anyone with an intimate knowledge of the behaviour of grafted skin will admit the immediate criticisms that such contraction will occur that the canal would become hopelessly stenosed and periodic dilatation will fail to maintain its patency. This is, in fact, the uniform result of the operation, and explains why it has fallen into disuse.

The modern epithelial inlay demands the introduction of thin, hairless epidermis into a subcutaneous cavity, made larger than the ultimate size required, and maintained in a distended position for a period which exceeds by a considerable margin the contractile phase of grafted skin—namely, three to six months. Under these conditions an epithelial canal can be constructed in which stenosis does not occur.

I was first encouraged to try the effect of a penile epithelial inlay in an adult patient with hypospadias in whom so many operations of a flap type had been performed that the ventral skin of the penis was scarred beyond any hope of making local flaps. After constructing a tunnel through the penis I introduced a skin-covered catheter, and maintained the patency of the new canal continuously for a period of six months. At the end of that time the proximal end of the new canal was anastomosed to the hypospadiac meatus with such a satisfactory result that I have employed the same principle on other adult cases with gratifying results. So far it has not been used for children.

The method, however, has been considerably modified. It would seem a comparatively simple matter to introduce a skin-covered catheter through the penile tunnel. It is, in fact, extraordinarily difficult to do so and at the same time to prevent the graft being rucked off the catheter during its passage along the tunnel. An introducer was therefore devised which overcomes this difficulty and renders the operation extremely easy. The instrument resembles a large suprapubic trocar, except that the handle and the cutting point can be unscrewed, leaving a smooth hollow barrel five inches long and with an internal

diameter sufficient to admit a No. 11-12 English gum-elastic catheter covered with Thiersch graft (Fig. 1 on Special Plate).

Technique of the Operation

The operation is performed three to six months after the usual readjustment of the dorsal prepuce and the straightening of the ventral curvature. A thin razor graft, or Thiersch graft, is cut from the inner side of the arm and carefully applied, raw surface outwards, like a cigarette paper, to a piece of No. 11 English gum-elastic catheter, which just fits in width and length the barrel of the trocar. The graft is tied at either end with a single strand of 000000 catgut. It is then carefully placed in the barrel of the instrument and the cutting point and handle are screwed into position.

With the patient in the lithotomy position a small stab incision is made just distally to the perineal meatus and another at the dimple usually present at the tip of the glans. The trocar introducer is then thrust subcutaneously along the penis from the posterior stab incision until the point emerges at the tip of the penis (Fig. 2). The manoeuvre, while not easy, can be facilitated by introducing a long slender pair of scissors with Mayo points, in order to divide any fibrous bands which may obstruct the onward passage of the instrument. When it emerges the cutting point of the introducer is unscrewed and the end of the skin-covered catheter is gripped firmly with a pair of forceps. The barrel of the instrument is carefully withdrawn through the posterior opening, leaving the catheter in place and its skin covering undisturbed. One-inch gauze tape soaked in mastisol is then bandaged round the penis fairly firmly, so that when the mastisol sets an efficient casing results which maintains the necessary pressure on the graft and prevents erection of the organ. The entire procedure need not take more than twenty minutes to perform. It is advisable to place a catheter in the bladder for forty-eight hours through the posterior meatus, in order to prevent urine coming in contact with the graft.

At the end of ten days the casing is removed, the catheter is withdrawn, and the skin-lined urethra is syringed through with saline solution or half-strength eusol. A fresh piece of gum-elastic catheter is immediately placed in the urethra, and at no time for the next three to six months is this left out for more than the five or ten minutes required to cleanse the canal (Figs. 2, 3). It is necessary to make this point absolutely clear to the patient, for twenty-four hours without the catheter will cause hopeless stenosis of the cavity.

After three to six months the contractile phase should be over, and the catheter can be safely left out. In six months' time end-to-end anastomosis of the posterior end of the new urethra and the hypospadiac fistula is performed over a short piece of catheter. The nearer the perineum this anastomosis can be made the easier it is to perform. Care is taken to see that the knots suturing the tiny lining flaps are drawn into the urethral canal. If there is any difficulty about this Edmunds's method of passing a threaded needle backwards along the urethra in order to catch the knots and draw them through is useful. The external covering flaps are sutured with mattress sutures of ophthalmic silkworm-gut.

Advantages and Difficulties

The advantages of this operation are many. It does not require the diversion of the urinary stream at any time during its performance, and a short piece of catheter is really only required at the last stage of end-to-end

anastomosis. I am not sure whether even then it is really necessary. The introduction of the skin-covered catheter is rendered easy by means of the introducer, and this important stage need take only a few minutes.

As with other types of inlay graft, a perfect take should result in a very high percentage of cases, while continuous dilatation maintained until the contractile phase of the grafted skin is well over prevents subsequent shrinking and stenosis. The appearance from the cosmetic standpoint is much superior to that of any other method, particularly at the meatus, which is placed at its correct anatomical position at the tip of the glans. Thus the urinary stream is likely to be better projected than following operations of the flap type, where the meatus is more ventrally situated and a certain amount of spraying is common. Another important advantage is that hair need not be included in the urethral lining—an all too common result of the flap operation.

The total time taken to make a functioning urethra is, I think, rather longer than with other methods, owing to the prolonged period of continuous dilatation necessary, somewhere about nine to twelve months elapsing from start to finish. On the other hand, the actual period of hospitalization is relatively short—five to six weeks—while between the four operations the patient is perfectly able to conduct a normal life. From the surgical point of view one is freed from the tiresome and irritating business of closing and reclosing the fistulae which so often develop in adult patients along the suture line of the flap operation.

The difficulties of the operation are chiefly concerned, first, with cutting a perfect Thiersch graft, and secondly, performing with considerable refinement of technique an end-to-end anastomosis of the new urethra to the hypospadiac meatus. The first requires constant practice; the latter is made easier because it can be done at a point in the perineum or base of the penis where a substantial mass of tissue can be brought in from the sides to reinforce the internal suture line and so largely diminish the chance of leakage. The only disadvantage of a Thiersch-grafted urethra is that it is not extensible, but this is the fault of all operations for hypospadias.

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The new nurses' home at St. Charles's Hospital, Ladbroke Grove, Kensington, was opened by the chairman of the London County Council, Lord Snell, on Friday, February 12. It was in 1934 that the Council decided to provide a new nurses' home and quarters for five assistant medical officers, the matron, and the assistant matron. The building also contains a training school for nurses. The total cost of the new home and of the new accommodation for the assistant medical officers, matron, and assistant matron is about £38,425. St. Charles's Hospital was erected about 1881, and since its transfer to the L.C.C. on April 1, 1930, it has been "appropriated"—that is, taken out of the scope of the Poor Law, and is available to all residents in the County of London.

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FIG. 1.—Showing introducer containing skin graft on catheter, method of introduction, and graft in place. End-to-end anastomosis of new urethra and hypospadiac meatus.

FIG. 2.—Adult hypospadias after several unsuccessful flap operations.

FIG. 3.—Epithelial inlay after straightening ventral curve and removing scar tissue. The catheter has been constantly *in situ* for six months.

FIG. 4.—Urethra after end-to-end anastomosis admits No. 10E catheter.

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FIG. 5.—Primary adult scrotal hypospadias.

FIG. 6.—Epithelial inlay after Edmunds's straightening operation. Catheter No. 11½ in place for five months.

FIG. 7.—Showing correction of ventral curve.

FIG. 8.—Final result after end-to-end anastomosis. Note normal appearance of meatus.