THE MODIFIED WALLACE TRIGONOCOLOSTOMY IN THE TREATMENT OF VESICOVAGINAL FISTULA*

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Many cases of vesicovaginal fistulae are referred to one of us (K.G.B.) each year at this hospital, caused, in the vast majority of cases, by obstetric trauma. These cases are assessed under general anaesthesia in order to decide which of 3 methods of treatment to adopt, viz. (*a*) primary vaginal repair, (*b*) combined vaginal and transvesical repair, or (*c*) in cases classed as 'hopeless', a method of urinary diversion. Into the (c) group will also fall some cases that have been unsuccessfully submitted to treatment by (a) or (b). It is to be noted that in a certain proportion of the cases we see there is an associated rectovaginal fistula, which introduces further problems in management.

It is with group (c) that this paper is concerned, comprising the cases classed as 'hopeless' owing to gross vaginal stenosis, loss of vascularity of the surrounding tissues, gross loss of tissue at the site of the vaginal fistula, or the unfavourable position of the fistula, e.g. at the bladder neck, where severe damage to the urethra has also taken place. The more experience we gain from seeing these cases and dealing with them, the more confidently can we sort out those we class initially as hopeless and so avoid submitting these patients to repeated operative procedures with eventual failure. We do, however, see group (c) cases that we attempt to repair in the hope that primary vaginal repair or, if necessary, combined vaginal and transvesical repair will result in healing of the fistula. A certain proportion of these, after repeated failures by vaginal repair, we class as hopeless, and urinary diversion must be carried out.

Previously we submitted such cases to bilateral ureterosigmoidostomy, though we were much concerned with the dangers that follow this procedure, viz. ureteric stenosis and ascending renal infection; and we were impressed by a paper published by Wallace[1] in 1961 describing his modification of Maydl's method (1894) of trigonocolostomy[2] for vesicovaginal fistula whereby the ureterovesical sphincteric mechanism is preserved, an idea originally emphasized by Tuffier[3] in 1892. In the original operation as described by Maydl (Fig. 1) the whole trigone was apparently dissected up and implanted into the sigmoid colon. Wallace (Fig. 2) has modified this procedure by leaving the trigone in place and taking the sigmoid colon down to it and making the anastomosis. The operation consists essentially of the following features:

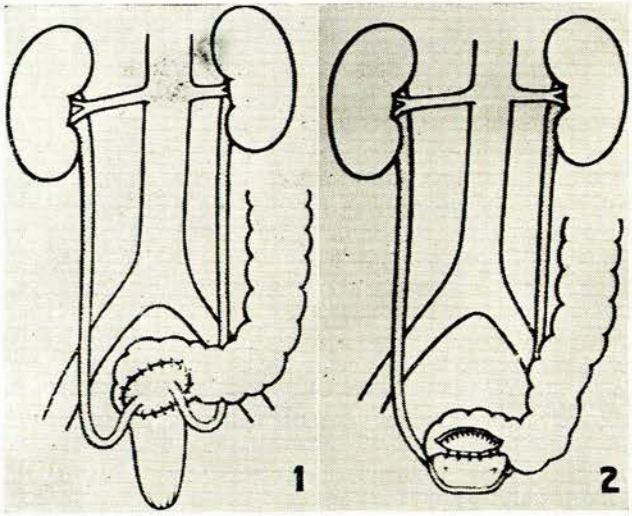

Fig. 1. Maydl trigonocolostomy. *Fig. 2.* Wallace trigonocolostomy (Figs. 1 and 2 reproduced from Wallace, D. M.[1] (1961): *Proc. Roy. Soc. Med.*, **54**, 385)

1. Pre-operative bowel sterilization is carried out with phthalylsulphathiazole and oral streptomycin combined with bowel washouts and a low-residue diet for 5 days before operation. Recently we have used Kantrex capsules with success.

2. A long left-lower paramedian incision is made. The sigmoid colon is inspected to exclude such conditions as, e.g., diverticulosis or short mesocolon (so far these have presented no problems to us). The peritoneum is dissected

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off the bladder in order to preserve peritoneal flaps that can be used for extraperitonealization of the anastomosis at the end of the operation. The vault of the bladder is resected until one is left with the trigone and its ureteric orifices with about 2 inches of bladder mucosa posteriorly (Fig. 3). We have found that it makes the anastomosis easier if the sides of the trigone and its anterior aspect, where the fistula is usually situated, are dissected up for about a $\frac{1}{2}$-inch. The dissection may be difficult at the site of the fistula as a result of extensive fibrosis, but with due care it may be done. The colon is then brought down to the trigone and the anastomosis done, with an outer layer of interrupted thread sutures and inner continuous catgut layer (Fig. 4). Before the anastomosis is completed a rectal tube is pulled up into the middle of it; this tube is placed in position before the operation starts. A medium-sized tube drain is placed close to the anastomosis and brought out through the vagina. We find this an ideal method of drainage; it is dependent, and if there is any leak of urine or faeces this will be immediately apparent at the vaginal orifice. The whole anastomosis is now extraperitonealized by using the original peritoneal flaps. The abdomen is then closed with a small wound drain.

3. The legs are now lifted up and 5 - 6 large interrupted wire sutures are inserted around the introitus of the vagina. These are of No. 0 stainless steel wire, the cut ends of which are left about $\frac{3}{8}$ inch in length, pointing outwards.

4. Postoperative management is fairly straightforward. A Ryle's tube is used with intermittent aspiration and the intravenous infusion through which a variable amount of blood has been given, depending on the patient's preoperative and operative condition, is continued. In most cases the patients are on light diet by about the 4th day; the rectal tube is removed on about the 7th day and then left out during the day but replaced during the night for the next 7 days. The vaginal drain is removed at about 5 - 7 days.

CASE REPORTS

We have now done this operation on 6 cases with 4 successful results and 2 failures.

Case 1. Obstetric trauma 2 months before admission. Assessed as hopeless owing to the size of the fistula and severe vaginal stenosis together with marked loss of local tissue. Modified Wallace trigonocolostomy carried out. Sent home on 14th day completely healed and dry, with excellent rectal-urinary continence. Did not return for follow-up.

Case 2. Obstetric trauma 6 months before admission. A large linear vesicovaginal fistula found, with fibrosed and stenosed urethra. Vaginal repair attempted, but failed completely. Modified Wallace trigonocolostomy performed and wire sutures inserted. Follow-up showed normal blood urea, electrolytes, intravenous pyelogram (IVP) (Fig. 5). Seen again after 6 months, was found to be extremely fit and well, with normal biochemistry. Wire sutures removed. Not seen again.

Case 3. Obstetric trauma 3 years before admission. Vaginal repair had been attempted elsewhere with complete failure. After assessment, vaginal repairs done on 4 further occasions, followed by combined vaginal and transvesical repair, with complete failure. Modified Wallace trigonocolostomy performed with insertion of wire sutures. Satisfactory postoperative course without incident. Follow-up at 3 months showed normal biochemistry, IVP and blood urea. Wire sutures removed. Not seen again.

Case 4. Obstetric trauma 1 year before admission. After assessment vaginal repair twice attempted with complete

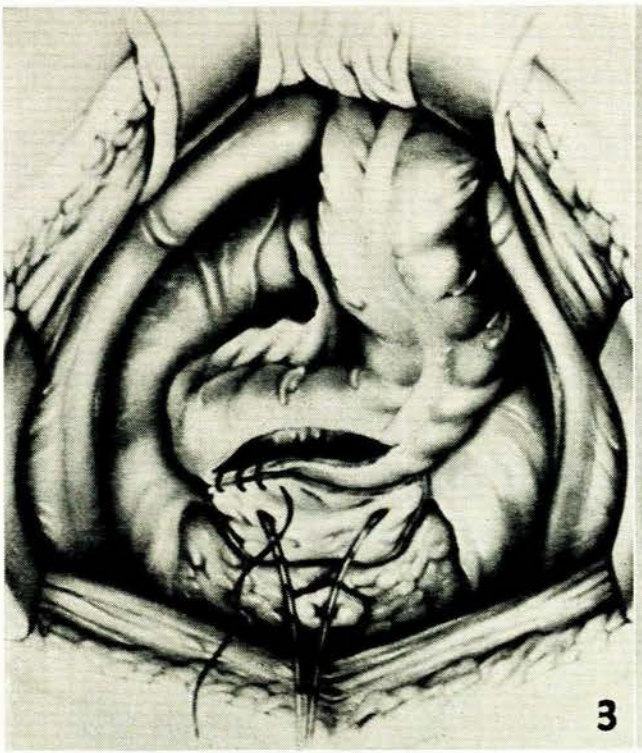

Fig. 3. Showing start of trigone-to-colon anastomosis. *Fig. 4.* Showing last stage of trigone-to-colon anastomosis [Figs. 3 and 4 reproduced from Wallace, D. M.[1] (1961): *Proc. Roy. Soc. Med.*, **54**, 385].

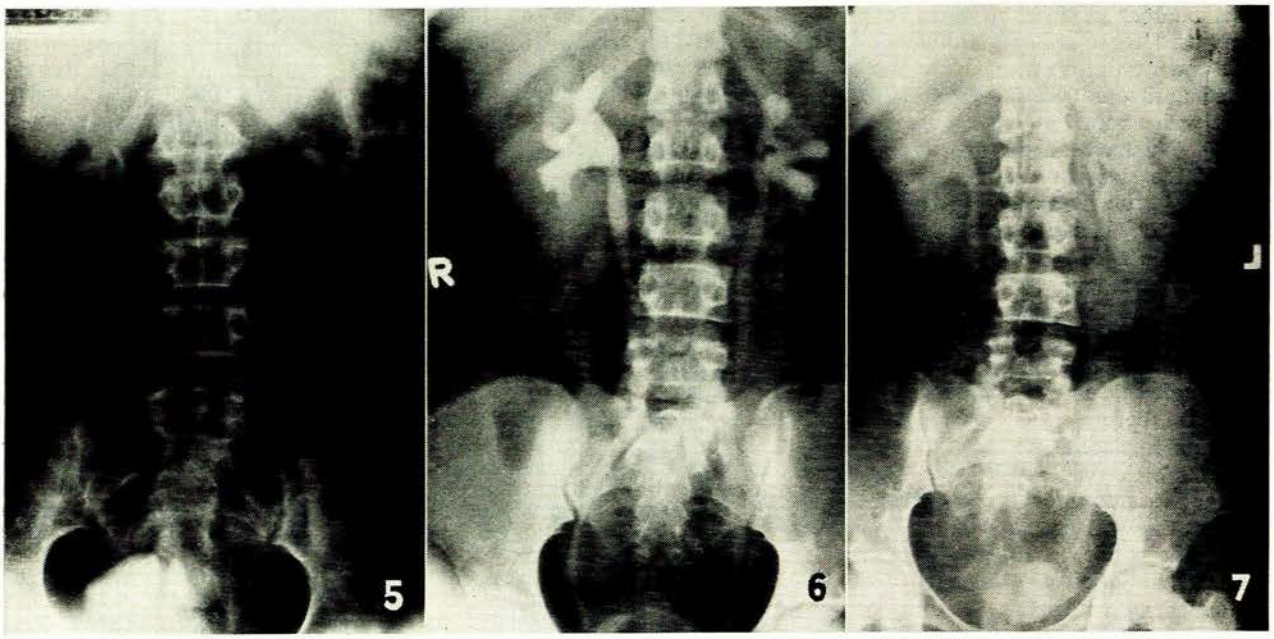

Fig. 5. Case 2. Postoperative 20-min. pyelogram film. *Fig. 6.* Case 4. Postoperative 20-min. pyelogram film. *Fig. 7.* Case 4. 3-months postoperative 20-min. pyelogram film.

failure. Modified Wallace trigonocolostomy performed with wire sutures. Postoperative course complicated by slight urinary leak, but this cleared up completely. IVP at this stage showed bilateral hydronephrosis (Fig. 6). At follow-up at 3 months extremely fit and well, with normal biochemistry and normal IVP (Fig. 7). Wire sutures removed.

Case 5. Obstetric trauma 3 months before admission. Assessed as hopeless owing to gross vaginal stenosis and loss of vascularity of local tissues. (*a*) Modified Wallace trigonocolostomy performed. Early postoperative leak of faeces and urine ensued. (*b*) Defunctioning transverse colostomy performed. Barium enema revealed no obvious defect, but the urinary leak persisted. (*c*) Bilateral Cordonnier transplants of ureters into descending loop of sigmoid colon, after which the whole trigonocolostomy anastomosis was excised and the continuity of the colon reconstituted. (*d*) The temporary colostomy closed. Eventually discharged from hospital fit and well. At follow-up at 6 months fit and well, with normal biochemistry; while the IVP showed slight dilatation of the right ureter compared with the left.

Case 6. Obstetric trauma 3 months before admission. Referred to us after a defunctioning left iliac colostomy had

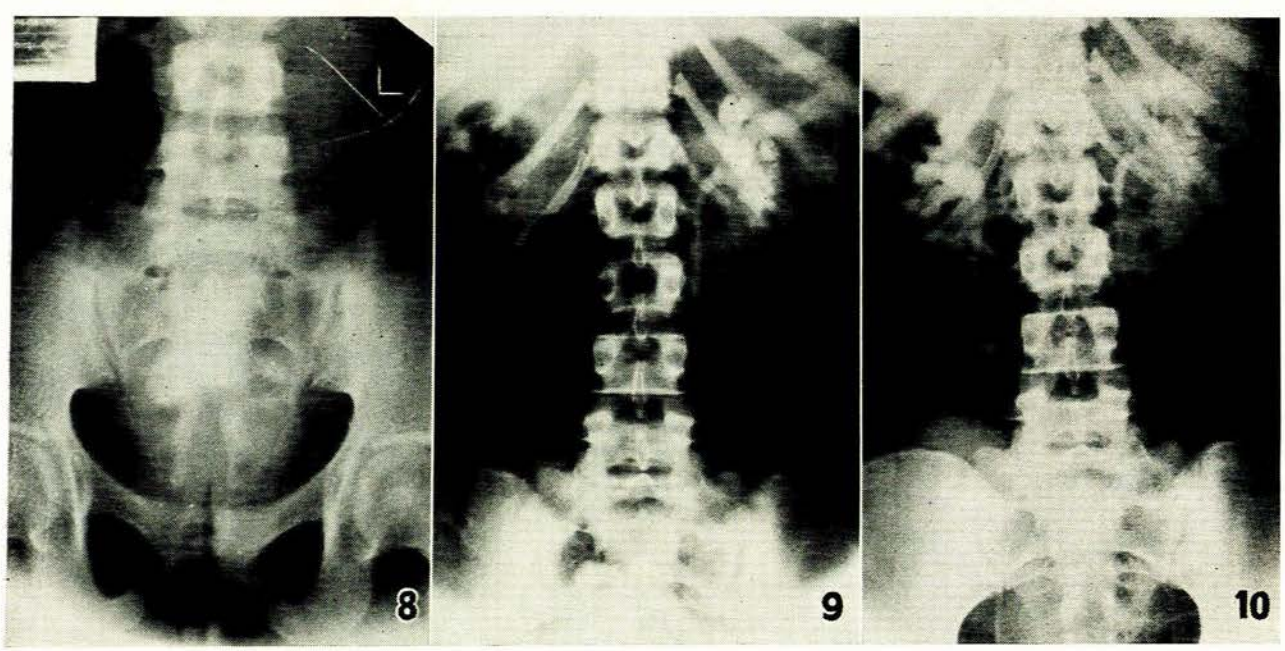

Fig. 8. Case 6. Postoperative 20-min. pyelogram film. *Fig. 9.* Case 6. 1-month postoperative 20-min. pyelogram film. *Fig. 10.* Case 6. 3-months postoperative 20-min. pyelogram film

been performed, followed by successful repair of a recto-vaginal fistula. Assessed by us as hopeless owing to complete absence of bladder neck and urethra, and gross vaginal stenosis. (*a*) Modified Wallace trigonocolostomy performed after resection of colostomy, the colostomy area being used for the anastomosis to bladder. Initial urinary leak, which dried up fairly soon; then after 1 month began leaking again due, we feel, to coital trauma, for no wire sutures were used. (*b*) Examination under anaesthetic revealed no evidence of leak. The IVP we had done (Fig. 8) suggested to us the possibility that the left ureter was the cause of the leak. (*c*) Laparotomy was performed and the whole trigonocolostomy opened, but no evidence of leak was found and so the area was closed and a Cordonnier transplant of the left ureter into the colon carried out. Postoperatively the patient was dry. (*d*) One month later again leaking urine *per vaginam*. Biochemistry was normal; further IVP (Fig. 9) showed right hydronephrosis. Discharged at this stage to await resolution. (*e*) Readmitted about 2 months later demanding further operation. Simple Cordonnier transplant of right ureter to colon carried out. She is now completely dry and satisfied. At follow-up at 3 months extremely fit and well, with normal biochemistry; while the IVP (Fig. 10) revealed resolution of the right hydronephrosis.

DISCUSSION

Without doubt the theoretical concept of preservation of the ureterovesical sphincteric mechanism is ideal when diversion of the urinary stream into the colon is required. In our African population this diversion is essential. The patients are not yet educable enough to manage a permanent urinary ileostomy, in which hygiene and close follow-up hospital management are essential. The follow-up of patients is extremely difficult in general at this hospital owing to the long distances and the high cost of travelling. It is therefore impossible for us to keep a check on them by repeated estimations of blood urea, serum and electrolytes and by intravenous pyelography; so a method of urinary diversion into the colon with safeguards would be the most satisfactory management in such a population.

The method of trigonocolostomy as suggested by Wallace and slightly modified by us has, we feel, solved virtually all our problems as far as we can see at this early stage in our use of this procedure. We should like to use it in more cases, but we feel that unless the fistula is classed initially as hopeless from the point of view of primary vaginal or combined transvesical and vaginal repair we must offer these cases the chance of attempts at repair (repeated if necessary) before they are abandoned as cases for diversion of the urinary stream. This statement agrees in essence with Chassar Moir's remarks.[4] In a series of 250 cases he gives an incidence of 'operation advised' in 5 and 'operation carried out' in 4, i.e. 2%. While our incidence in 76 cases during the past 2 years is 19 (13 ureterosigmoidostomies + 6 Wallace's), i.e. 25%, we feel that the Bantu patient has a different type of connective tissue and a different response to obstetric trauma from those of the Whites in Central Africa. A higher proportion is classed as irreparable in the Bantu even by graft techniques and numerous other vaginal repair techniques.

Wallace[1] suggests that as a first stage in his procedure a defunctioning transverse colostomy should be performed. We feel, however, that this is unnecessary providing our adequate pre-operative bowel preparation is carried out and that the postoperative oral feeding is increased very gradually. We feel that, although preliminary defunctioning colostomy keeps the faeces away from the anastomosis in the postoperative period, it cannot keep the urine away; and this is to our minds an undoubted hazard, because urine, being fluid, will find its way easily through any defect in the anastomosis early in the postoperative period. It is for this reason that we do not make a preliminary defunctioning colostomy, but perform the definitive procedure in one stage.

The operation itself from the technical point of view is fairly straightforward, but nevertheless tedious. In one of our cases the bladder had been opened previously, but this caused no undue difficulty. It makes the procedure easier if the anterior and lateral aspects of the trigonal remnant are freed for about $\frac{1}{2}$ inch; we then find a two-layer anastomosis is possible. We have not used ureteric catheters during the anastomosis, even though most of our fistulae occur in the area where the ureteric openings are situated. The whole anastomosis can in every case be completely extraperitonealized providing suitable peritoneal flaps are fashioned initially before dealing with excision of the bladder. The use of a high rectal tube and the vaginal tube drain to the anastomosis, we feel, are suitable modifications to the original technique.

Reviewing our 6 cases we have had 4 successes (cases 1 - 4) and 2 failures (cases 5 and 6). The successful cases speak for themselves but we feel it would be worth while to analyse the failures. In case 6 we used the initial colostomy area for the anastomosis and this we feel introduced an extra element in the hazards of the anastomosis. The moral is that if there is an associated rectovaginal fistula then it is essential to do a defunctioning transverse colostomy so that the colostomy itself is well away from the pelvic area and will not interfere with definitive surgery in this region. The case itself is a little odd; originally the patient was dry, then leaked on and off a small amount only, and after this cleared up she was dry. Yet she began leaking again while at the same time passing large amounts of urine *per rectum*. In the end we were forced to do separate laparotomies to transplant both ureters into the descending part of the sigmoid colon distal to the trigonocolostomy anastomosis. In case 5 we feel there was a technical fault on our part in performing the anastomosis, because the patient began to leak urine very early in the postoperative period and then this was later followed by the leak of faeces.

In general, these patients at follow-up have been extremely fit and well. It is often very difficult to elicit an accurate history including symptoms of what might be ascending renal infections or attacks of biochemical disturbance, but from what we were able to elicit it appeared that none of these had taken place. The biochemical investigations and the intravenous pyelography proved completely normal; in fact, in case 4 the initial postoperative hydronephrosis had completely resolved by the time we saw her at follow-up examination.

Although we have not compared this series with a series (simple bilateral ureterosigmoidostomies) done before the advent of this procedure, we have included the earlier group in the assessment of our statistics to give an idea of the great number of hopeless vesicovaginal fistulae we see. Our great and insurmountable problem is to get these patients to come for follow-up or even to get them to

attend their local government medical clinics, where at least we could get them seen and the biochemical investigations done and, if necessary, intravenous pyelography. It is quite impossible to use a questionnaire. However, one of us (K.G.B.) has devised a method that forces these patients to attend for follow-up. It is the insertion of the 5-6 large wire sutures (see above) around the introitus of the vagina (known as the BBB—Bland's barbed-wire barrier!). This prevents coital trauma during the post-operative period, and has resulted in our patients' returning to hospital for removal of the sutures (often at the husband's instigation). If the patient travels a long way to see us we admit her to the ward for investigation and then, if we are quite happy that she has completely healed and no further damage can be done by coitus, we remove these large wire sutures. We have used this method on many other types of vaginal or combined transvesical-vaginal repair, and have thus brought patients to follow-up to be checked (one White woman came 500 miles to see us).

Most of the cases of vesicovaginal fistula seen in our hospital are tragically young women with a long life ahead of them, and if only for this reason we must guard them against premature death from the renal failure that results from the well-known hazards of bilateral ureterosigmoidostomy. We realize that the series of cases presented here is still very recent and has allowed little time for follow-up, but nevertheless we felt that we should make a report at this stage in order perhaps to stimulate the wider use of this procedure for the hopeless or irreparable vesicovaginal fistula.

SUMMARY

1. Maydl's trigonocolostomy as modified by Wallace and slightly modified by ourselves is described.

2. The value of this procedure, whereby the ureterovesical sphincteric mechanism is preserved, is discussed with reference to 6 cases of irreparable vesicovaginal fistula. It is suggested that this is an ideal method of urinary diversion in such cases.

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ADDENDUM

Since this report was prepared a further 2 cases of vesicovaginal fistulae have been treated by trigonocolostomy with complete success.

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