Cutaneous Ureterostomy

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Cutaneous ureterostomy as a method of urinary diversion has a definite place in the treatment of patients with certain disorders of the urinary tract. Urinary diversion may be indicated either for control of incontinence or for the relief of obstruction. It is in the group of cases with congenital neurogenic bladder lesions in which incontinence is associated with trabeculation and sacculation of the bladder and with gross dilatation of the ureters that cutaneous ureterostomy is the treatment of choice. It has advantages over many of the more widely practised forms of diversion but, at the same time, has well-defined limitations. Cutaneous ureterostomy may be employed as a permanent or a temporary measure; as the indications and technique differ these two groups will be discussed separately.

Permanent ureterostomy will be considered first. Fig 1 shows the type of diversion carried out in 149 patients since 1950. Only the permanent cutaneous ureterostomies are recorded on this diagram. In a group of 31 patients teated at the Hospital for Sick Children, Great Ormond Street neurogenic bladder, usually resulting from a myelomeningocele, accounted for 12 patients; all these were suffering from incontinence associated with grossly dilated ureters. The indications for the operation in the other 19 patients were: Epispadias 1, ectopia vesicæ 9, sacral agenesis 1, bladder neck obstruction 3, urethral valves 3, bladder tumour 1, megaureter 1.

Many of these children had had other forms of urological surgery performed (reconstruction of the bladder, plastic procedures to the bladder neck or resection of urethral valves) and 5 had had other forms of diversion before a cutaneous ureterostomy was carried out. These procedures had, however, failed to relieve the obstruction of the urinary outflow and to produce continence of urine.

The alternative forms of surgical treatment considered in this group of cases were cystostomy or uretero-ileostomy and ureterocolic anastomosis. Cutaneous ureterostomy has the advantage over cystostomy that it provides better drainage and avoids the use of an indwelling tube which invariably produces infection and tends to become blocked with debris. Vesicostomy, although not requiring an indwelling catheter, is associated with stricture formation at the stoma and does not drain dilated ureters as effectively as ureterostomy does. Ureterostomy has many advantages over uretero-ileostomy: The operation is simpler and less traumatic, the peritoneal cavity need not

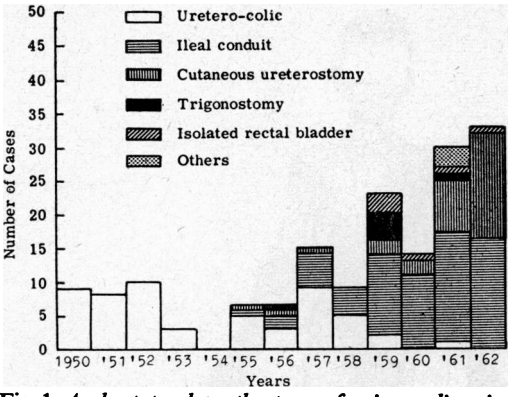

Fig 1 *A chart to show the type of urinary diversion carried out on 149 children since 1950*

be opened and the risks of intestinal anastomosis are avoided. Finally mucus secretion and the absorption of chlorides from the ileal loop, its prolapse and retraction are also avoided. Ureterocolic anastomosis is unsuitable in cases of myelomeningocele as the anal sphincter is paralysed, and in many patients with ectopia vesicae the anal sphincter is too lax to produce continence of urine mixed with fæces.

On the other hand, for the patient's benefit a cutaneous ureterostomy must produce a single stoma on the abdominal wall (Fig 2) to which an appliance can be fitted satisfactorily (Fig 3). For this reason the ureters must be dilated and tortuous (Fig 4), so that a sufficient length can be obtained to bring one ureter across to the opposite side and to produce a well-fashioned projecting nipple. Whereas the earlier cases in

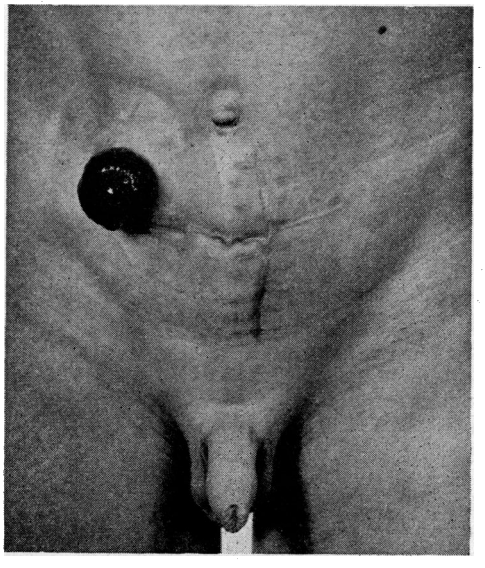

Fig 2 '*Double-barrel*' *cutaneous ureterostomy*

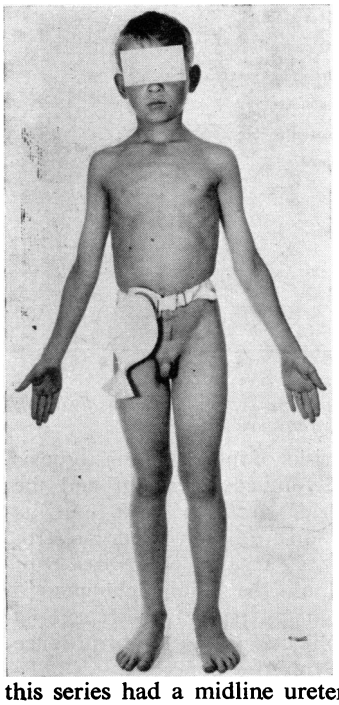

Fig 3 *Same case as* Fig 2, *with bag fitted*

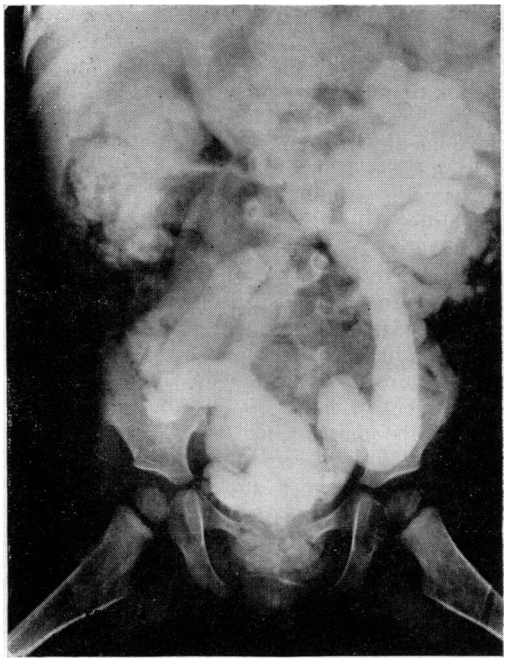

Fig 4 *Cystogram of a child with neurogenic bladder showing dilated and tortuous ureters*

this series had a midline ureterostomy we have found that an opening in one or other iliac fossa is more satisfactory from the point of view of fitting a bag. In a few cases the ureters were too short, although dilated, and a bilateral ureterostomy had to be carried out. The site of the ureterostomy was: Midline 10, iliac fossa 15, bilateral 6.

Operative technique of ureterostomy: A paramedian incision on the side opposite to the proposed site of the stoma is preferable to the standard transverse incision as the scar will interfere less with subsequent fitting of a bag. The site of the ureterostomy must be well away from the anterior superior iliac spine and a circle of skin and external oblique aponeurosis should be excised. The ureters are mobilized extraperitoneally as far down to the bladder as possible and divided, the distal end being ligated with cat-gut. The longer ureter is brought retroperitoneally to the opposite side. In cases of long-standing urinary infection the ureters may become very friable and rigid and will be difficult to dissect out. Mobilization of the ureters must be careful and limited lest the blood supply be endangered. The ureters are brought through the circular incision so that about 2 in. projects beyond the skin, care being taken to avoid tension, twisting or kinking of the ureters. The ureters are sewn together with fine cat-gut, the adjacent walls incised down to skin level and the ureters then everted to form a single spout which is carefully sutured to the skin edge. A bag can be fitted at completion of the operation and no catheters should be inserted. If one of the ureters is almost normal a Y anastomosis can be carried out retroperitoneally to the more dilated ureter which is then brought out as a single nipple.

The complications encountered were: Death 1 (renal failure), gangrene 2, avascular 1, stenosis 2, retraction 1, leak from Y anastomosis (avascular) 1. Most of these are the result either of excessive mobilization with failure of the blood supply or of insufficient mobilization with failure to form a good nipple. There is no tendency to stricture if the nipple has been carefully made.

Children with a cutaneous ureterostomy and a well-fitting bag lead a virtually normal life; they go to normal schools, take part in almost all games and are able to swim.

Temporary ureterostomy is a form of urinary decompression suitable for babies with dilated ureters due to various causes. It is simpler to perform than nephrostomy and avoids the difficulties associated with an indwelling tube in the renal pelvis. It is a more efficient form of drainage than cystostomy which, in babies, is particularly unsatisfactory.

The ureters may be intubated *in situ* with polythene tubes but this method has, in our hands, been unsatisfactory. The tubes become dislodged easily and cannot be replaced without full re-exploration of the ureter. The ureters should therefore be brought to the surface and we have

found a loop ureterostomy simple and effective. The use of a skin flap to hold the ureter up is better than the insertion of a glass rod as the ureter tends to retract once the rod is removed.

The indications for temporary ureterostomy in a series of 11 patients were: Bladder tumour 2, megaureter 3, bladder neck obstruction 2, urethral valves 4. Our observations so far suggest that the grossly dilated ureters will take a very long time before they become smaller in spite of free drainage; cine-radiography carried out three months after the initial operation revealed dilated and quite inactive ureters. On the other hand the defunctioned bladder contracts especially if it was hypertrophied as in cases of urethral valves or bladder neck obstruction, and if re-anastomosis of the ureters is delayed too long a permanently small-capacity bladder will result. We have, therefore, tried to close these ureterostomies within four to six months.

The types of ureterostomy performed in this group were: Intubated *in situ* 2 (failed), terminal 2, loop 8 (one previously intubated). Although stick-on bags can be fitted to collect the urine when so desired the ureterostomies can safely be covered by an ordinary napkin without fear of ulceration. We have experienced no undue difficulty in closing these ureterostomies by resection and end-to-end anastomosis at the same time as carrying out definitive surgery for the urinary outflow obstruction.

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The Topical Use of Cytotoxic Drugs for Bladder Cancer

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This paper is a preliminary report on the treatment of bladder tumours by the intracavitary instillation of a cytotoxic drug.

One of the major problems in bladder tumour therapy is the patient with multiple papillary neoplasms. In the past intracavitary radioactive isotopes were used to treat cases of this type, but the incidence of post-irradiation change in the bladder was high and these techniques were abandoned. More recently super-voltage external irradiation has been used for this type of case and total cystectomy has been employed for extensive recurrences following radiotherapy.

In recent years alkylating agents have been used to treat malignant effusions by intracavitary instillation, and these agents have largely replaced the use of radioactive isotopes for this purpose. This has led us to consider the possibility of using one of these agents by direct instillation into the bladder for the treatment of bladder tumours of the types previously thought suitable for intracavitary irradiation. It was therefore decided to carry out clinical trials with the alkylating agent, thioTEPA, employing the intracavitary principle. Two types of tumour were treated in this way; multiple papillary tumours comprised the majority, and in a smaller number of infiltrating poorly differentiated tumours this method was used in an attempt to control hæmaturia when cystectomy was contraindicated.

Before a specific regime was decided upon two factors required some consideration. The first was the possible effect of an alkylating agent on the normal bladder epithelium. ThioTEPA was selected for initial clinical trials because it was known to be a relatively non-toxic substance which could be injected into most normal tissues and body cavities with few local adverse effects. The normal bladder epithelium is composed of cells with a relatively low rate of mitotic division and it seemed unlikely that thioTEPA would have much effect upon it. Bateman (1955) had already reported the treatment of one patient with an advanced bladder carcinoma with intracavitary thioTEPA and no adverse effect on the bladder was observed.

The second problem was the possibility that some of the drug would be absorbed from the bladder, and in practice this has proved to be so, and has limited the total amount of the drug which we have been able to use.

Absorption of Chemical Substances from the Bladder

The absorptive properties of the bladder were studied by Maluf (1953, 1955), who found that the bladder acts as a poorly permeable membrane, allowing the absorption of some chemical substances by a process of simple diffusion. He found that urea, water and sodium chloride were all absorbed to some extent from the bladder, and sodium iodide was absorbed from concentrated solutions in amounts sufficient to produce pyelograms. Glucose and glycine were not absorbed to a significant extent.

Yeates (1960, personal communication) studied the absorption of various sulphonamide preparations from the bladder. Sulphacetamide was absorbed and could be demonstrated in the blood, while sulphanilamide and sulphasolucin were not absorbed. Molecular size, therefore, determines absorption from the bladder and the substances absorbed have molecular weights of under 200.