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Uretero-intestinal Anastomosis: Observations on Technique and End-results with a Review of 138 Personal Cases [*Abridged*]

PRESIDENT'S ADDRESS

By ARTHUR JACOBS, F.R.F.P.S.Glas.

SHORTLY after the late Professor Grey Turner's (*Brit. J. Surg.* (1929) **17**, 111) description of 17 cases on whom he had performed transplantation of the ureters for congenital defects of the bladder and urethra, there came under my care a boy of 6 who was totally incontinent as a result of a congenital deficiency of the urethra associated with a reduplication of the penis. One ureter was successfully transplanted. At the second-stage operation to implant the other ureter a month later, the boy died under the anæsthetic.

Nearly three years elapsed before my next uretero-intestinal anastomosis, performed on a woman, 42 years of age, who suffered from incontinence due to a urethro-vesico-vaginal fistula which had been acquired two years earlier as a result of an attempt to cure her of stress incontinence. Three unsuccessful efforts to close the fistula had already been made. A two-stage implantation by the Stiles technique was carried out. That patient was followed up for seventeen years (Fig. 1). She died in 1949, five days after a cholecystogastrostomy had been performed elsewhere for relief of an obstruction in the common bile duct due to a tumour originating in the head of the pancreas. Until the onset of that fatal illness she had led a happy life. The post-mortem examination, it was reported, showed that both kidneys had numerous scarred areas on the surface and on section, the appearances being those of old-standing pyelonephritis. The cortex was of normal width and the cortico-medullary marking well preserved. There was no recent inflammation in the renal pelvis and the ureters had an unobstructed entry into the bowel.

In the succeeding years there were 1 or 2 operations yearly until 1940 when 7 were recorded. The numbers dealt with each year thereafter are shown in Table I.

TABLE I.—URETERO-INTESTINAL ANASTOMOSIS

Year	*Number of operations*
Up to 1939	10
1940	7
1941	4
1942	7
1943	9
1944	4
1945	9
1946	15
1947	8
1948	15
1949	14
1950	26
1951 (up to June)	10
	138

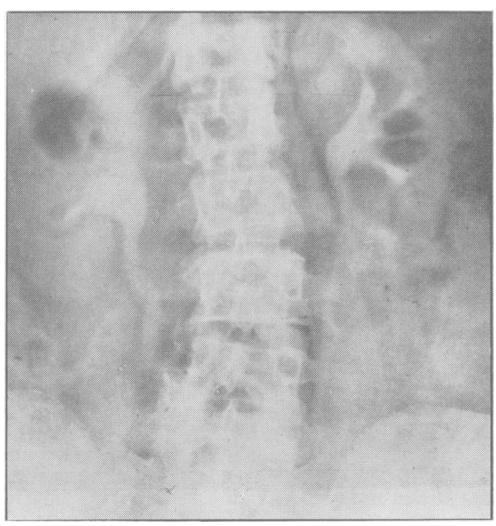

FIG. 1.—Intravenous urogram taken in seventeenth year after uretero-intestinal anastomosis by Stiles' technique. The implantation was performed for vesico-vaginal fistula.

Operative technique.—During the earlier phase of this work, I bore in mind the admonition of Grey Turner to acquire experience in one method of proved efficiency and then adhere to it. This wise advice was given at a time when congenital anomalies were considered to be the main indication for the operation. In the first cases Stiles' technique (Fig. 2) only was used and one ureter at a time implanted. In 1938 the Coffey No. 1 technique (Fig. 3) was employed, also at first as a two-stage procedure. By 1940 a simultaneous implantation of both ureters had become routine except under special circumstances. The simple method of Stiles was not discarded, however. In 1948 the direct end-to-side elliptical anastomosis of Nesbit was tried out for the first time (Fig. 4). This was in a case of bladder carcinoma with ureteral dilatation resulting from back pressure of the tumour which overlay the left ureteric orifice. The undilated right ureter was implanted by the Coffey No. 1 method and the dilated left ureter by the Nesbit method. Intravenous urography eighteen days after the transplantation showed that the dilatation in the left urinary tract had resolved whilst moderate dilatation in the previously normal right side had occurred. That result encouraged me to continue with the end-to-side technique and to date the method has been used for 32 ureters in 30 patients.

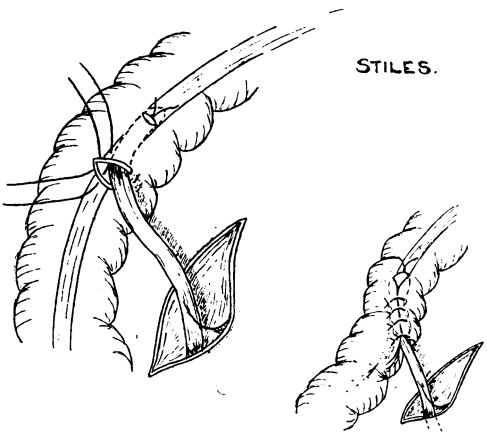

FIG. 2.

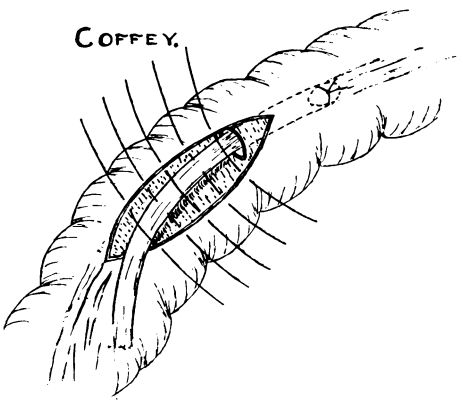

FIG. 3.

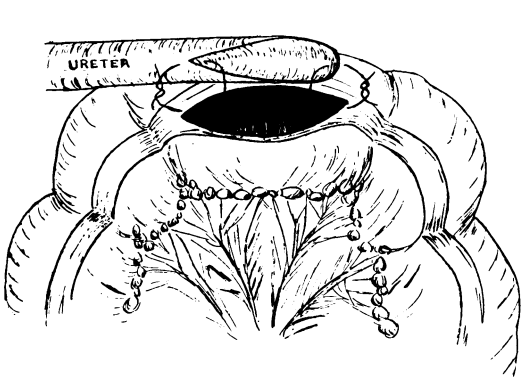

FIG. 4.

FIG. 2.—The bowel wall is approximated over the ureter after the latter has been anchored within the lumen.

FIG. 3.—The ureter lies on the external surface of the mucosa before entering the colon. The sero-muscular edges of the bowel bed are sutured together over the ureter.

FIG. 4.—The edges of the split end of the ureter are directly anastomosed to an opening in the bowel of corresponding size.

Thus aside from occasions when the call of some new suggestion temporarily lured me, these three techniques have been adhered to. I regard the Coffey No. 1 method as my basic procedure. The bowel-bed made is a short one, only one layer of sutures is used to approximate its margins and care is taken to avoid constricting the ureter, particularly where it enters the anastomosis. Stiles' method is simple to perform and quickly accomplished. Because of this and the proof obtained from some of my earliest cases that it gives good results, I have in the last three years often reverted to this method when carrying out transplantation of the ureters and total cystectomy as a one-stage procedure on selected cases of bladder carcinoma, my aim being to complete the whole operation in as short a time as possible. Nesbit's method of making a direct anastomosis between the split end of the ureter and the bowel seemed particularly applicable to the implantation of the dilated ureter and has therefore been frequently used when deviating the urine for tuberculous vesical contracture.

In assessing the relative merits of the different ways of performing uretero-intestinal anastomosis the chief consideration after mortality and immediate morbidity is that of reducing to a minimum the possibility of stricture developing at the site of anastomosis. My experiences to date with the method of direct anastomosis lead me to believe that it is less likely to be followed by constriction, with the inevitable sequelæ of hydro-ureter and hydronephrosis than is a valve-like oblique insertion of the ureter through the wall of the bowel with a ureteral stump projecting into the bowel lumen. The acknowledged causes of stricture formation after implantation are the occurrence of fibrosis in the ureteral stump, infection in the bowel bed with subsequent fibrosis there and constriction of the ureter by the stitches bringing the seromuscular layers over it. Nesbit's method which gives a wide ostium, with no projection of the ureter into the bowel and no tunnel through the bowel wall seems to minimize the possibility of these complications. The question that arises, however, is whether the elimination of a valve-like insertion increases the risk of a direct ascending infection from reflux of bowel content up the ureteral lumen. Investigations carried out in my department have confirmed that reflux up to the kidney can occur after the end-to-side technique (Figs. 5 and 6). It was demonstrated in 2 out of 10 patients who were given diodone enemata at varying intervals after transplantation. It is obvious that good as well as indifferent results may follow any of the recognized methods of uretero-intestinal anastomosis.

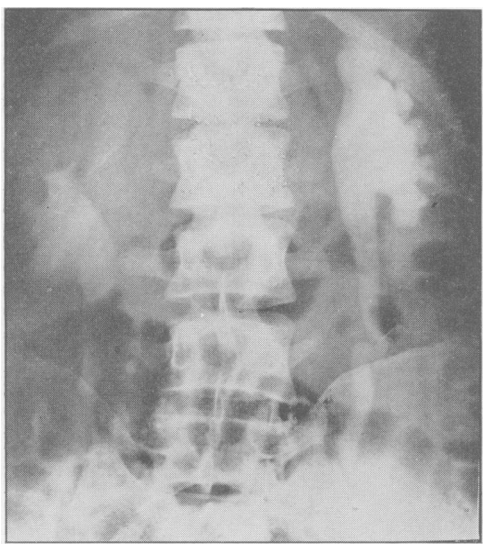

FIG. 5.—Post-operative intravenous urogram following uretero-intestinal anastomosis for vesical exstrophy. The right ureter was implanted by the Nesbit technique, the left by Stiles'.

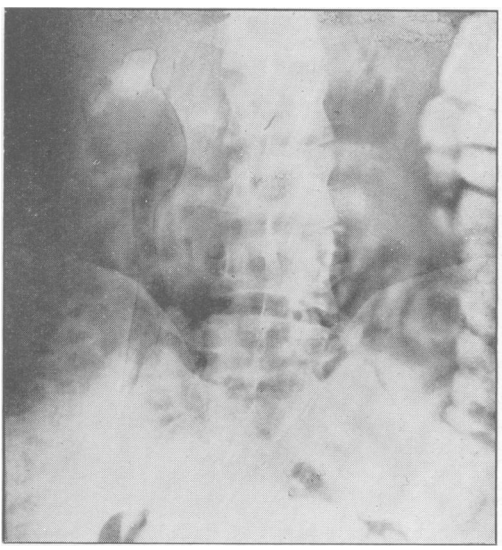

FIG. 6.—X-ray following opaque enema, fifteen months post-operative. Note the pneumopyelo-ureterogram on the right side and radio-opaque fluid in the upper calyces (same case as Fig. 5).

A poor result may not be due to the method itself but to the mode of its performance or to the conditions encountered at operation and the nature of the lesion which necessitated it. The direct methods certainly offer a greater opportunity for gas or fæcal material to pass up from the bowel. This has to be weighed against the greater possibility of ureteral obstruction and consequent dilatation of the upper urinary tract associated with the oblique methods such as the Coffey No. 1. The period of observation by the direct method is too brief to allow of any long-term assessment; only a few of my cases having been operated on more than two years ago. Observations within this period as judged by clinical reaction, pyelographic studies and blood chemical estimations point to a favourable post-operative wellbeing, but no final conclusions can be drawn until the elapse of a further passage of time.

ELECTROLYTE DEPLETION

I am not attempting in this communication to discuss that aftermath of uretero-intestinal anastomosis, acidosis. The problem of determining whether the blood-electrolyte changes are due to absorption from the bowel with subsequent losses through the intestinal mucosa or to renal injury, or as seems most likely, to both causes, is exercising many minds just now. Post-operative biochemical estimations and clinical observations made on 40 patients from my series have so far given no indication that any one particular method of implantation predisposes to the condition more than another. When patients are encountered in an acute phase of acidosis, improvement will generally follow the insertion of a rectal tube for a few days and intravenous infusions, varied according to the biochemical findings. For those who develop chronic acidosis, the simple measures of giving alkalis by mouth with a low salt diet usually suffice to restore adequate equilibrium. It should no longer be considered a matter for congratulation that a patient has a four- to five-hourly diurnal frequency with no nocturnal disturbance for perhaps eight hours. The bowel should be emptied at two- to three-hourly intervals during the day and at least once at night. If these precautions are maintained such drastic countermeasures for acidosis as the establishment of permanent colostomy or of ureterostomy should seldom be required, though acute exacerbations may in some instances have to be dealt with from time to time.

INDICATIONS

The present-day indications for transplanting the ureters can be classified under four headings, namely: (*a*) bladder contracture, (*b*) malignancy, (*c*) trauma and (*d*) congenital anomalies (*see* Table II).

These are mentioned in the order of frequency as occurring in my personal series. The groups will be dealt with in turn, giving the results obtained for each. Any attempt at such a study unless related to the condition for which the uretero-intestinal anastomosis was carried out would have but little meaning.

TABLE II.—URETERO-INTESTINAL ANASTOMOSIS

For bladder contracture ..	57 (46 tuberculous)
„ malignancy	51 (46 bladder)
„ trauma	26 (22 vesico-vaginal fistula)
„ congenital abnormalities	4
	138

(*a*) *Vesical contracture* (tuberculous and interstitial).—With a total of 57 patients, 46 tuberculous and 11 interstitial, this group is the largest in the series.

The usual indication for deviating the urine of these patients is an intolerable frequency due to progressive bladder contracture. In the tuberculous sufferer this is generally associated with some degree of dilatation in the ureter and renal pelvis of a solitary kidney, a nephrectomy having previously been carried out. Sometimes the dilatation in the remaining kidney and ureter though uninfected by tuberculosis is the predominating feature.

TABLE III.—URETERO-INTESTINAL ANASTOMOSIS FOR VESICAL CONTRACTURE (TUBERCULOUS)

No. of patients	46	
Operative mortality	6	
Died within a year	9	
Longevity of remaining 31 *patients*		
Lived 1 to 2 years	2	8
„ 2 „ 3 „	4	
„ 3 „ 4 „	2	
Alive Under 1 year	8	23
„ 1 to 2 years	4	
„ 2 „ 3 „	3	
„ 3 „ 4 „	1	
„ 4 „ 5 „	1	
„ 5 „ 6 „	3	
„ 6 „ 7 „	2	
„ 9 „ 10 „	1	

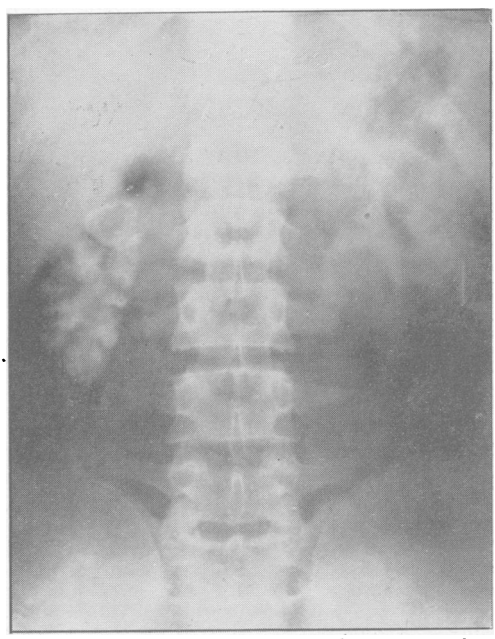

FIG. 7.—Intravenous urogram four years after transplantation of the left ureter by the Coffey No. 1 technique for tuberculous vesical contracture. The right kidney is calcified and functionless.

Uretero-intestinal anastomosis is very much a palliative in the tuberculous sufferer for a large percentage of the patients must inevitably succumb to the systemic infection which afflicts them. Thus in my series, 27 of the 46 had clinically recognizable extra-urinary foci in the form of pulmonary, bone or joint, genital or intestinal lesions or a combination of these afflictions. Moreover in 24 the transplanted ureter was from a proven tuberculous kidney. A nephrectomy had been carried out in 35 of the 46 patients in periods varying from six months to twelve years, the average interval between nephrectomy and transplantation being four and a half years. In 4 patients with established bilateral lesions when first seen, the kidney with the more advanced lesion was removed and the ureter of the contralateral kidney transplanted within a period of three months. Six patients had a calcified and completely functionless kidney on one side so obviating the need for nephrectomy (Fig. 7). One patient had a congenital solitary tuberculous kidney.

With this background of urinary tract and other systemic pathology the results of operation and the post-operative longevity are of interest. The youngest patient was a boy of 15, the oldest a man of 55, the average age being 29. There were 21 females and 25 males. Post-operative deaths were 6 in number. All 6 had tuberculous involvement of the side transplanted and 4 of the 6 had additional clinical extra-urinary foci. A further 9 succumbed within twelve months of operation. An analysis of the longevity of the remaining 31 is given in Table III.

In evaluating the results of uretero-intestinal anastomosis as a method of relief in urinary tuberculosis it must be borne in mind that reported statistics show that about 50% of patients with clinical unilateral renal tuberculosis do not survive five years following nephrectomy and 85% of patients with clinical bilateral renal tuberculosis die within two years. As mentioned, four and a half years on an average had elapsed between nephrectomy and transplantation in my series and in at least 50% the remaining kidney had become infected. From my figures showing longevity after operation I feel justified in saying that following a successful transplantation the life expectancy of a patient with urinary tuberculosis is not diminished. It may in fact be frequently prolonged, by preventing progressive renal destruction due to back-pressure dilatation arising from a contracted bladder or strictured ureter. None will deny the easement of suffering of these generally young people, after a deviation of the urine.

Analogous to contracture of the bladder due to a secondary tuberculous cystitis is that resulting from long-standing, uncontrolled, non-tuberculous infections and from those lesions referred to as interstitial, panmural or parenchymatous cystitis and Hunner's ulcer. Uretero-intestinal anastomosis has been performed on 11 patients with this type of lesion, who, in spite of prolonged and repeated treatments by tidal irrigation, forcible over-distension, multiple fulgurations and pre-sacral sympathectomy, carried out in most instances over a period of years, have remained intractable. Table IV gives the long-term results.

TABLE IV.—URETERO-INTESTINAL ANASTOMOSIS FOR VESICAL CONTRACTURE (NON-TUBERCULOUS)

Number of patients	11		Alive	1 year	4
Operative mortality	4			3 years	
Died 5th year	2	1 from Parkinson's disease 1 following nephrolithotomy		4 „	
				8 „	
7th „	1	(from rectal carcinoma)			

(*b*) *Malignancy.*—Malignancy has been the second indication in order of frequency for deviating the urine, there being 51 patients in this group. 45 suffered from carcinoma and one from lymphosarcoma of the bladder. One female patient had a urethral carcinoma causing retention and another had vulvar carcinoma spreading towards the urethra. Also included are 2 female patients with severe late bladder sequelæ after radium treatment for cancer of the cervix and a male patient who, subsequent to X-ray and radium therapy for penile carcinoma, developed a progressive tissue destruction until finally when he came under my care, the penis was destroyed and the urethral opening was located within a sloughing mass in front of the symphysis pubis.

The youngest patient was 39 years, the oldest 70 and the average age was 56 years. 8 out of the 46 with bladder malignancy were females, one of whom had the lymphosarcoma.

In assessing the results of uretero-intestinal anastomosis in bladder cancer two entirely separate factors have to be taken into account, the bladder lesion and the anastomosis. In 12 of the 46 patients transplantation only was carried out as a deliberate palliative measure. Three died within a week of operation; the others lived for periods of two to six months.

Of 34 patients on whom cystectomy was planned 2 died after the transplantation. 19 had a two-stage transplantation and cystectomy with a mortality of 5, and 13 had a one-stage operation with a mortality of 3. There were thus 24 out of 32 who survived transplantation and cystectomy (*see* Tables V and VI).

TABLE V.—URETERO-INTESTINAL ANASTOMOSIS FOR MALIGNANCY

Bladder		46
Operative mortality	5 after transplantation	13
	5 „ 2-stage cystectomy	
	3 „ 1 „ „	
Extravesical malignancy		5
Operative mortality		2

TABLE VI.—URETERO-INTESTINAL ANASTOMOSIS FOR MALIGNANCY

Longevity of 33 *patients with bladder malignancy surviving operation*

Palliative transplant only: lived or living for 2 to 6 months			9
Transplantation + Cystectomy	Survived less than 12 months		12
„ „	Survived 16 to 40 months		4
„ „	Alive over 12 months: 1 (1-stage)		8
„ „	Alive over 18 months: 1 (lymphosarcoma)		
„ „	Alive over 24 months: 6 (4 had 1-stage)		

Longevity of 3 *patients* with extravesical malignancy surviving operation

1 died at 12th month
1 alive at 8th „
1 „ at 4½ years

Transplantation of the ureters with cystectomy for bladder cancer is a method of treatment that is optimum for only a limited number of the total sufferers encountered and is then applicable to only a specific proportion. It is the best that can be done for a selected group of bladder tumours, the treatment of which by any method remains very imperfect. The melancholy high mortality occurring within a year of operation after this had been accomplished with apparent success is an experience shared by others. There is evidence that the manipulation associated with the cystectomy can cause an exacerbation of the malignant spread. Thus of the 12

patients who survived less than a year after an immediately successful transplantation and cystectomy, 7 at least, as was proved by autopsy or clinical and X-ray examinations shortly before death, succumbed to the malignancy. 5 had pelvic recurrences, 2 associated with infiltration of the bony pelvis and 2 with infiltration of the abdominal scar. Another had metastases to ribs and another to a lumbar vertebra. Some of these patients would undoubtedly have survived longer if a less radical procedure had been employed or indeed with no treatment. Their short survival in most instances was not due to the transplant; it was the result of the malignancy and its possible activation by the operation.

(*c*) *Trauma.*—Of the 26 patients operated on for trauma, 22 suffered from vesico-vaginal fistula. The fistula was of obstetrical origin in 15 and in 6 was a sequel to operation, a hysterectomy accounting for 5 and a colporrhaphy for 1. In the case of a young woman of 20 who had an associated recto-vaginal fistula, the lesion was alleged to have been a sequel to a criminal assault. The optimum treatment for vesico-vaginal fistula is of course a repair of the fistula and deviation of the urine is not justified if this can be accomplished. In the majority repair is possible but a few defy all efforts. It is these particularly difficult cases who ultimately gravitate to the urologist after previous repeated efforts at closure have failed. In the series were 8 patients who had endured their fistulæ for periods of between seven and twenty years. Most had had three to four attempts at repair and 1 had had ten.

The bald figures showing mortality and long-term results (*see* Table VII) tell nothing of many real tragedies behind them. Thus the patient who died eight months after operation had endured a fistula for twenty years. Eight months after the transplantation she exhibited symptoms of intestinal obstruction. The true diagnosis was at first missed and she died from exhaustion the day after operation was finally performed. A solitary thin band between the omentum and the lower end of the abdominal scar was the sole factor responsible for the obstruction which a colleague expeditiously found and divided. The patient who died seven years after the transplantation had had a post-obstetrical fistula for sixteen years. During that period she had borne 4 children in addition to the one whose birth had resulted in the fistula. She was transferred from another hospital where she had had a suprapubic lithotomy for the removal of a massive stone which had been protruding into the vagina. Dilatation in the upper urinary tract was already well established. On the other hand one of the eight-year survivors is now the happy mother of 2 children, one having been delivered by Cæsarean section three years after the transplantation. She is incidentally a patient who had a simultaneous transplantation of 3 ureters, that on the left being duplicated (Figs. 8 and 9).

An earlier paper of mine described 3 out of 44 ureteral transplantations associated with duplicated ureters on one side (*Brit. J. Urol.* (1946) **18,** 1). This patient was one of these 3. In the subsequent 94 patients operated on since that publication, a duplicated ureter has been met with on only one other occasion.

TABLE VII.—URETERO-INTESTINAL ANASTOMOSIS FOR TRAUMA

Vesico-vaginal Fistula 22

Operative mortality.. .. 3
- 1 in 3 days from ileus
- 1 „ 6 „ „ peritonitis
- 1 „ 14 „ „ suppurative nephritis

Short post-operative survival 4
- 1 in 31 days: acute pyelonephritis subsequent to enema
- 1 „ 2 mths: cause unknown (single kidney)
- 1 „ 3 „ subsequent to nephrectomy for fistula
- 1 „ 8 „ subsequent to operation for intestinal obstruction

Survived 7 years 1 (died in uræmia)
„ 17 years 1 (died after operation for malignant pancreas)
Untraced 1

Alive:
- Under 1 year 1
- for 5 years 2
- „ 6 „ 1
- „ 8 „ 3

12
- for 9 years 1
- „ 10 „ 1
- „ 11 „ 2
- „ 14 „ 1

TABLE VIII.—URETERO-INTESTINAL ANASTOMOSIS FOR TRAUMA

(*other than vesico-vaginal fistula*)

No. of patients	4
Died in 2 months	1
Alive:	
18 months	1
39 „	1
11 years	1

TABLE IX.—URETERO-INTESTINAL ANASTOMOSIS FOR CONGENITAL ANOMALIES

No. of patients	4
Operative mortality	1
Alive:	
18 months (exstrophy)	1
7 years (epispadias)	1
11 „ (subsymphyseal exstrophy)	1

Of the remaining 4 patients in the trauma group, 3 were females and 1 male. 2 of the females, 15 and 19 years of age, had been incontinent since injuries received in infancy, the first from a fall astride and the second as the result of a run-over accident. The third female patient suffers from disseminated sclerosis, but has been included in the trauma group for urinary incontinence followed a perurethral resection of the bladder neck performed for the relief of retention. She gradually lost rectal control and fifteen months ago, that is two years after the implantation, a wet colostomy was established.

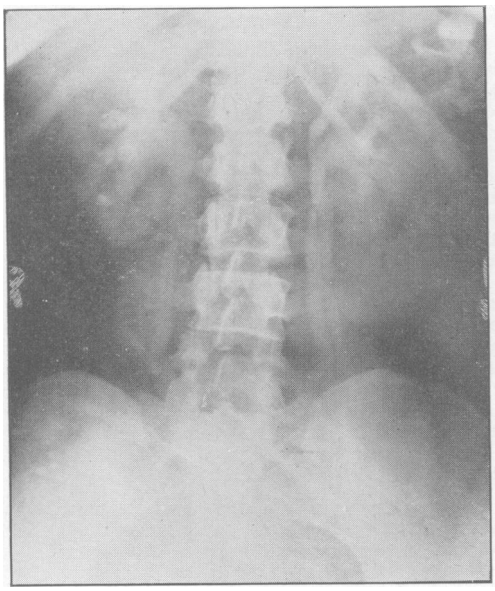

FIG. 8.

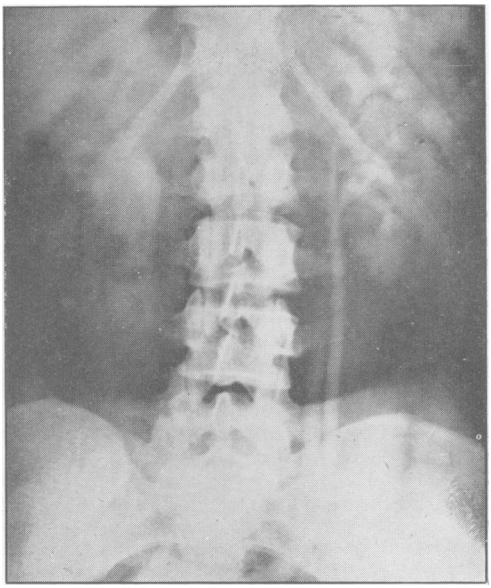

FIG. 9.

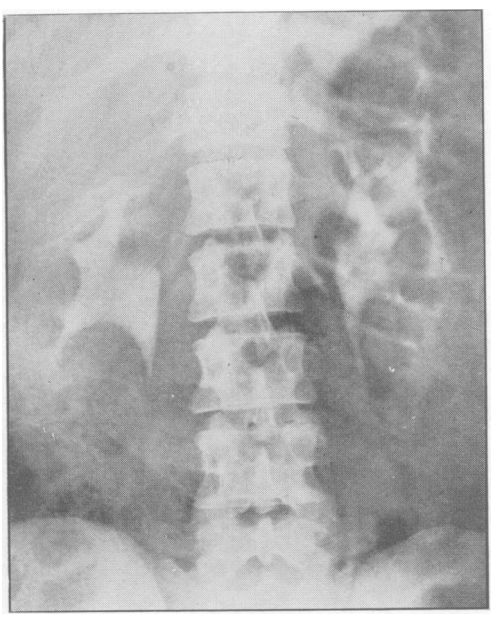

FIG. 10.

FIG. 8.—Intravenous urogram taken during sixth month of pregnancy, three years after a simultaneous transplantation of 3 ureters by the Coffey No. 1 technique. (The left ureter was duplicated.)

FIG. 9.—Intravenous urogram (same case as Fig. 8) eight years after operation.

FIG. 10.—Intravenous urogram eleven years after uretero-intestinal anastomosis by the Coffey No. 1 technique for incontinence due to sub-symphyseal vesical exstrophy.

The male patient sustained a ruptured urethra associated with multiple fractures of the pelvis as a result of being run over after falling from his bicycle. When he came under my care four years later in 1940, he was then aged 22 and in a miserable state with a suprapubic tube which was not watertight, urine leaking from two sinuses on the inner left thigh, and a large branching calculus in the left kidney. Between the base of the scrotum and the anal orifice a stone-like mass of fibrous tissue surrounded and blocked the urethra. A re-establishment of the urethral canal was quickly followed by further contracture and occlusion. Finally the right ureter was transplanted and twenty-four days later a left nephrectomy was carried out. Now eleven years later he remains well and works as a glass polisher (*see* Table VIII).

(*d*) *Congenital anomalies.*—Of the 4 patients in this group 3 were adults, the other being the child of 6 mentioned at the outset of this paper. Table IX indicates the nature of the anomaly and the longevity following transplantation in the 3 adults (*see* Fig. 10).

SUMMARY

The results of uretero-intestinal anastomosis on 138 patients have been surveyed. The operations have been carried out over a period of approximately two decades though about 80% of the total were performed in the last ten years, and 58% in the last five years. The long-term or end-result in all but one patient has been ascertained. The operative mortality has been around 13% even for patients who might be considered good risks, this being the figure for those operated on for vesico-vaginal fistula. The same figure pertains for the tuberculous sufferers though the more recent mortality rate in this group has been reduced to 5%. Mortality in the malignant group for transplantation alone was 10%; when combined with or followed by cystectomy it was more than doubled. Patients with congenital anomalies who had reached adult life before coming to operation seemed to present the least risk but my figures for this group are too small to be of statistical significance.

In the last 50 consecutive operations there were 4 deaths in the malignant group which numbered 26 and included 18 cystectomies. In the non-malignant groups numbering 24 there were 2 deaths. Contributory factors to an improvement in immediate results in recent years is the availability of chemotherapy, which enables amongst its other benefits a near-sterilization of the lower bowel before operation; an increase in the knowledge of water and electrolyte balance and in the requirements of the patient after transplantation; and the use of supportive treatment, particularly blood transfusion for the debilitated subject.

As regards longevity after operation, there are 25 patients who lived or still survive for five years and over. Of these, 6 suffered from vesical tuberculosis and 3 from non-tuberculous vesical contracture; 13 had vesico-vaginal fistulæ and 1 a urethral injury; 2 had congenital anomalies. 7 of the 25 are alive for periods of ten to fourteen years and 1 now deceased as a result of an intercurrent disease lived for seventeen years.

CONCLUSION

Deviating the urine from the bladder by implanting the ureters into the pelvic colon is a serious undertaking associated with immediate risks and possible future morbidity. Nevertheless, following a successful operation, a comfortable normal-like social life can be followed and work with gainful employment becomes possible. The urinary diversion is compatible with a long life-expectancy, this being influenced by the nature of the lesion necessitating the transplantation rather than by the transplantation itself. Whatever the underlying lesion may be, the operation is performed for the assuagement of symptoms ofttimes associated with mental anguish as well as physical suffering, which may on occasions reach a stage hardly to be borne. In these circumstances uretero-intestinal anastomosis should be advised as the way of bringing relief and rehabilitation.

[*November* 22, 1951]

The following **Cases** and **Specimens** were shown:

Fibrosarcoma of the Kidney.—MR. RICHARD A. MOGG.

Papilloma of Renal Pelvis.—MR. R. H. O. B. ROBINSON.

Mesenchymoma of the Kidney.—MR. B. E. C. STANLEY.

Kidney and Double Ureter, with Ureterocœle and Multiple Calculi.—MR. J. P. HOPEWELL.

Occult Chorionepithelioma of Testis with Abdominal and Thoracic Secondaries.—MR. STEPHEN POWER.

X-ray Films of ? Silver Testicle.—MR. ALEX. E. ROCHE.

Chronic Torsion of Spermatic Cord with Secondary Hydrocœle and Testicular Atrophy.—MR. J. SANDREY.

(1) **Rhabdomyosarcoma of the Bladder in Childhood.** (2) **Four Total Cystectomy Specimens and Photomicrographs, &c., of Two Further Cases.**—MR. T. TWISTINGTON HIGGINS (introduced by MR. D. I. WILLIAMS).

Glass Rod in Urethra.—MR. J. A. S. GREEN (introduced by MR. A. W. BADENOCH).

Urethrograms Showing Reflux into the Vas and Seminal Vesicle.—MR. T. L. CHAPMAN.

(1) **Diverticulum of Bladder Containing Multiple Calculi in Association with Adenomatous Prostate.** (2) **Diverticulum of Bladder Associated with Adenomatous Enlargement of the Prostate.** (3) **Diverticulosis of Bladder Associated with Carcinoma of Prostate.**—MR. L. N. PYRAH.

Congenital Obstruction at the Bladder Neck.—MR. EDGAR FRESHMAN.

Contracted Bladder and Bilateral Hydro-ureter due to Abacterial Pyuria.—MR. J. A. RUSSELL JOHNSON.