Special Article

URETERIC INJURIES IN GYNAECOLOGICAL SURGERY

DERK CRICHTON, M.B., CH.B. (CAPE TOWN), D.PHIL. (OXON.), F.R.C.S. (EDIN.), F.R.C.O.G., *Professor, and Head of the Division of Gynaecology and Obstetrics, University of Natal and King Edward VIII Hospital, Durban*

Dreams of a gynaecologist about the ureter often take the form of a nightmare in which bad luck, leakage, lament, and litigation vie for pride of place as principal players. Yet there is no shortage of advice in the literature to act as an opiate for such fearful fantasies: indeed, the literature on this subject is vast. It consists predominantly, however, of reviews and the pooled results in small numbers of many surgeons, among whom almost all are urologists. The 'villain' of the play—the gynaecologist—does not come onto the stage, but hides in the wings as witness to relevant acts of urological wisdom and *savoire faire* with which he is repeatedly entertained.

By contrast I present my 'personal' treatment of a large series, no less than 45 cases of ureteric injury to date. The further unusual feature of this presentation rests in my unusual special knowledge of the precise method of causation of the injury in the majority of instances: some followed major pelvic surgery undertaken personally, others followed surgery performed by my staff with whom it was possible to reconstruct the probable mode of injury as soon after the event as possible: and further reconstruction of the sequence of events leading to the ureteric injury was facilitated by having them assist me at the subsequent reparative operations. In few instances only was such detailed information regarding the mode of injury not available, these being cases referred from outlying hospitals.

FREQUENCY OF URETERIC INJURIES IN PELVIC SURGERY

Jacobson[1] observed appropriately that 'it is almost impossible to obtain any reliable figures of the incidence of ureteric injury because a very definite proportion pass unnoticed'. It is not surprising, therefore, that assessments of the incidence of ureteric injury reported in the literature vary considerably (Table I). Yet it is clear that the more meticulous and thorough it has been possible to make a study and follow-up,

TABLE I. INCIDENCE OF URETERAL DAMAGE AFTER HYSTERECTOMY

Author	*Year*	*No. of operations*	*Percentage of ureteral injuries*
Eddy and Miller	1937	200	0·05%
Newall	1939	3,144	0·45%
Wallingford	1941	100	2·00%
Halloway	1950	1,620	0·49%
St. Martin *et al.*	1953	332	2·41%
Falk and Bunkin	1954	6,309	0·08%
Conger *et al.*	1954	2,290	0·57%
Horrox and Conger	1954	200	0·50%
Benson and Hinman	1955	6,211	0·48%
Solomans *et al.*	1960	200	2·50%

the higher has been the discovery-rate of ureteric injuries following upon pelvic surgery.

Unfortunately, it was impossible to assess the precise frequency of ureteric injuries in the present series.

SYMPTOMS

As one's experience of ureteric injuries grows, one becomes increasingly aware that many cases of ureteric injury manifest no specific symptoms whatever in the postoperative phase. Moreover, in those who do experience symptoms, the severity of the symptoms is often minor and their nature unspecific; even the complication of fistula-formation (which eventuates in only 33% of cases) is often unheralded by premonitory typical diagnostic symptoms.

In the present series two facts emerged which are worthy of comment, namely, that oliguria was not apparent in a single case of unilateral ureteric injury, and that renal pain was not the complaint of a single patient in the postoperative period, unless and until the complication of pyelonephritis supervened. Even in the presence of the latter complication some did not complain of renal pain, and many failed to volunteer the presence of renal pain until questioned about this possibility.

POSTOPERATIVE DIAGNOSIS OF URETERIC INJURY

From the foregoing it is clear that the early diagnosis of ureteric injury visits only the mind that is prepared.

To arrive at this early diagnosis it is vital to make a routine of palpating both kidneys daily after pelvic surgery, and to bear the possibility of ureteric injury in the forefront of one's mind whenever there is an unexplained ileus, abdominal distension, or pyrexia of unknown origin—especially if characterized by rigors. A kidney appears non-functioning on intravenous pyelography within hours of complete obstruction of its ureteric drainage, and any suspicion thereof is a clarion call to the urgent performance of intravenous pyelography, followed, if necessary, by cystoscopy and ureteric catheterization. In my experience the general condition of the patient can never be regarded as a contraindication to the execution of these simple atraumatic investigative procedures while hope of the patient's survival is still entertained.

Jacobson[1] described the site of injury as located about 8 cm. above the ureteric orifices, whereas the injury-site usually lay within a couple of centimetres of the ureteric orifice in my experience; but I noted that the degree of ureteric and peri-ureteric fibrosis and inflammation increased proportionately to the delay in arriving at a diagnosis and in instituting reparative surgery. In these neglected cases one is left with the false impression that the original site of injury was far above its true original site.

In view of the vagueness of the symptomatology in ureteric injuries it is desirable that routine postoperative intravenous pyelography be performed on all patients who have undergone major pelvic operations (for instance, radical or difficult hysterectomies) before departure from hospital.

PRODUCTION AND PREVENTION OF URETERIC INJURY AT FEMALE PELVIC SURGERY

The nature of operations associated with ureteric injuries in the present series is listed in Table II. Injuries noted at operation were not included in this presentation.

TABLE II. OPERATIONS ASSOCIATED WITH 45 URETERIC INJURIES

Nature of operation	*Number*
Total hysterectomy	23
Radical (Wertheim) hysterectomy	10
Caesarean section	7
Vaginal operations	5

1. Related to Total Hysterectomy

Production of injury. As precise analysis of the mode of injury of these 23 cases was feasible, it is worth while dwelling on this aspect in brief, for mere generalizations as to the mode of injury which appear in the literature and in textbooks, in my experience, fail to appreciate where the main risk lies, and fail to offer clear-cut advice as to how this should be avoided.

In 4 cases (associated with rupture of the uterus) ureters were included in stitches arresting haemorrhage near the uterine tear which extended down the vagina. In one instance the patient had a double ureter of which the gynaecologist was unaware and he was lulled into a false sense of security after having identified one of these. In the remainder the ureter was injured because the surgeon failed to appreciate that the ureter was puckered-up and adherent to the postero-lateral wall of the uterus, enmeshed in a thickened utero-sacral ligament.

TABLE III. MODES OF TREATMENT OF 45 URETERIC INJURIES

Treatment	*No. of cases*
No surgery	3
De-ligature	2
Uretero-ureteral anastomosis	1
Uretero-vesical anastomosis	36
Uretero-ileo-cystoplasty	3

Prevention. Previous writers about this subject hold the view that the dangers of injuring the ureter exist mainly when the uterine arteries are clamped, and no emphasis is placed upon the type of case which is injury-prone.

I have attempted to depict (Figs. 1, 2 and 3) my personal concept of the locale of main danger as related to clamping the utero-sacral ligament—especially when this is involved in some disease process. The danger of carelessly including the utero-sacral ligament in the grasp upon the uterine vessels (or actually advocating such a technique, as do some authors) is striking from my study. An essential preliminary, therefore, to application of clamps to the uterine arteries at hysterectomy is to palpate the utero-sacral ligaments, wherein any suggestion of thickening is a warning signal that the ureter may lie dangerously close.

As further precautions my staff are taught: (*a*) to obtain an extraperitoneal grasp upon the uterine artery with an antero-lateral as opposed to the conventional lateral or postero-lateral application employed in other hysterectomy techniques (Fig. 4), (*b*) to define the ureteric position clearly by grasping the medial peritoneal leaf of the utero-sacral ligament at its base between thumb and forefinger and to apply upward traction, thus enabling the compressed tissues to slip between the fingers, and to communicate the sudden slight jerk experienced when the ureter escapes from this grasp. Such clear definition of ureteric position is denied the palpating fingers where the utero-sacral ligament is thickened, and in such cases the precise ureteric position must be defined visually by preliminary dissection. This commences by tracing the ureter from an easily definable situation higher up, occasionally as high as the bifurcation of the common iliac arteries.

Doubtless the hysterectomy techniques recommended by other authorities give excellent results in their hands, but my experience of training a large gynaecological and obstetric staff over many years has convinced me that there are very few pelvic operations at which the preliminary identification of the ureteric position can be omitted with safety in the training programme of any gynaecologist.

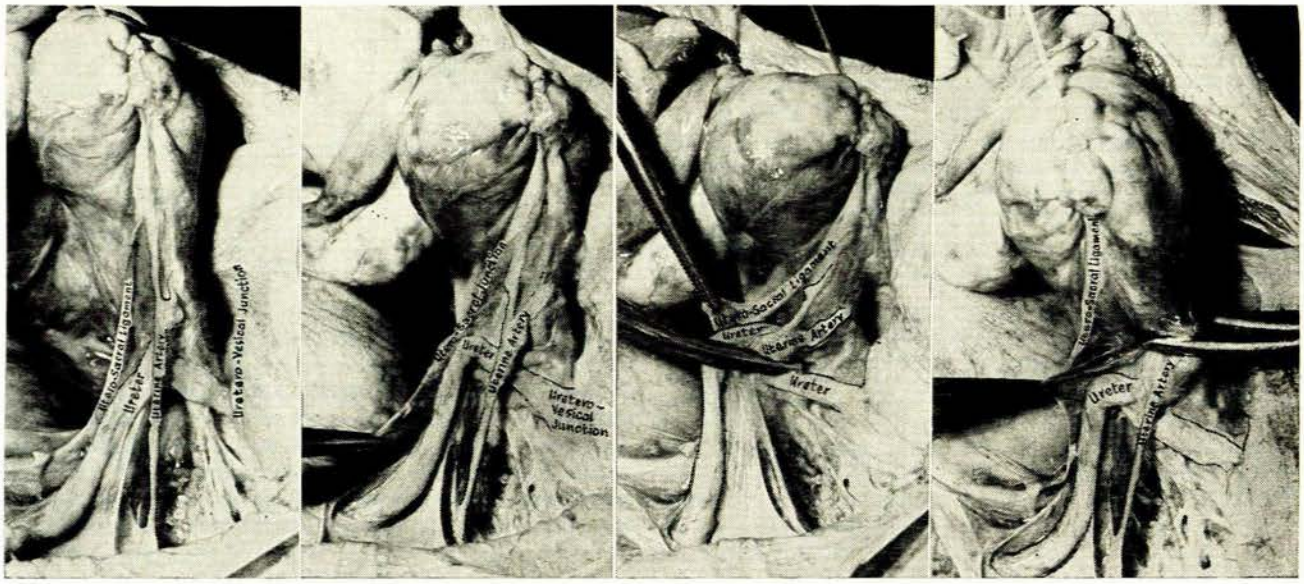

Fig. 1 *Fig. 2* *Fig. 3* *Fig. 4*

Fig. 1. Photograph illustrating average position of ureter, uterine vessels and utero-sacral ligament as they lie when the uterus is drawn up during hysterectomy. *Fig. 2.* Photograph illustrating how fibrosis (or other pathology) in the utero-sacral ligament tends to pucker up a 'knuckle' of ureter. *Fig. 3.* The 'knuckle' of ureter (referred to in Fig. 2) has been included in the clamp grasping the uterine artery, partly because the utero-sacral ligament has been included in the grasp. *Fig. 4.* Photograph illustrating the antero-lateral extraperitoneal grasp of the uterine artery recommended by the author.

2. *Related to Radical (Extended Wertheim) Hysterectomy*

Mode of injury. Of the 10 ureteric fistulae which developed after radical hysterectomy all but one resulted from gangrene near the utero-vesical junction. This is below the site described by other authors and my explanation thereof has already been provided.

Those fistulae which followed my personal radical surgery occurred a number of years ago and resulted from the application of Brunschwig's radical hysterectomy technique[5] to our Bantu, who were found to be unusually vulnerable to ureteric fistulae owing to the high incidence of bilharzia and pelvic cellulitis promoting fibrotic adherence of the terminal ureter to cervix and vagina. The smallness of the average Bantu pelvis (particularly with respect to contracture of the transverse diameter of the brim, associated with beaking of the fore-pelvis) adds to the difficulties of major pelvic surgery in the cases.

Consequent problems were encountered frequently in achieving efficient haemostasis near the lateral vaginal angles which endangered the blood-supply to the ureterovesical junction. There was also inadequate preservation of the integrity of the lateral attachments of the terminal ureter and a tendency to impair the integrity and length of the telescopic insertion of the terminal ureter through the bladder wall (an aspect to which I attach great importance).

Prevention. Two factors were found to be of vital importance: (*a*) the technique of dissection of the terminal ureter, and (*b*) the evolution of an extended Wertheim technique better suited to cope with the special problems already mentioned in the Bantu pelvis. These precautions have permitted me to avoid further ureteric fistulae despite actually extending the radicality of the operation and extent of clearance of the cervical cancer. In the latter connection it is necessary to comment that unfortunately the reason why many surgeons can boast that they do not experience ureteric complications following Wertheim hysterectomy is all too often apparent when one views the operative specimen and appreciates that the extent of the operation has been tailored to the convenience and limitations of the surgeon rather than to the essential requirements of the patient.

The generally accepted emphasis placed upon meticulous preservation of ureteric attachment to the medial leaf of the peritoneum and preservation of a tiny branch of arterial supply from the iliac artery was found to be unimportant. Important only was the meticulous preservation of the antero-, postero- and lateral flimsy attachments of the terminal ureter, and meticulous avoidance of any degree of eversion of the telescopic nature of the insertion of the terminal ureter into the vesical musculature. Other contributors on this subject make no mention of the latter vital precaution.

My radical Wertheim technique consists of the preliminary preparation of the vaginal cuff which is sewn over a pledget of gauze soaked in strong silver nitrate solution and overlies the carcinoma. Further vaginal dissection enters the pouch of Douglas, mobilizes the rectum freely from the base of the uretero-sacral ligaments, and secures haemostasis in the lateral vaginal angles and their parametrial extensions with appropriately placed deep stitches. If the dissection is to include bladder and urethra or rectum, or to necessitate extirpation of the vagina beneath the level of the levator ani, vaginal and abdominal approaches are commenced, but not completed as a synchronous combined procedure, for the vaginal team should conclude their operation long before the abdominal team to permit the latter to complete the final stages of the pelvic dissection with the patient returned to the normal Trendelenburg position.

3. Related to Caesarean Section

Mode of injury. No less than 7 ureters were injured at caesarean section and in each instance the injury occurred during attempts to stitch or obtain haemostasis in a tear extending from the transverse lower segment caesarean section incisions in the uterus down into the vagina. These were cases in which the surgeon employed his 'hand' to disimpact the head 'abdominally' from the pelvic cavity in cases of obstructed labour. The subsequent rotation of his hand (overstretching an already over-thinned oedematous lower segment in order to deliver the foetal head through the uterine incision) was responsible for the serious tear of the lower uterine segment. This usually occurred on the left side undermining the ureter near its junction with the bladder.

Prevention. The proximity of the ureter (especially on the left side) to the lateral extremity of a transverse lower uterine segment incision is not emphasized in standard descriptions of this operation. Yet from our vast experience of caesarean sections (over 1,800 caesarean sections per year in our single unit) it is clear that no effort should be spared to prevent downward tearing of the lower segment at caesarean section.

In short, the foetal head impacted in the pelvis, must be disimpacted from below with a hand in the vagina, *not* per abdomen; and the subsequent delivery of the head through the uterine incision must be undertaken with obstetric forceps or a Murless[3] head-extractor.

4. Related to Vaginal Operations

Mode of injury. Five ureteric fistulae followed vaginal operations. One ureter was transected at a Shauta operation even though ureteric catheters lay within the ureters; another was included in a stitch during a vaginal repair of a vesicovaginal fistula in a case in which the aberrant course of the ureter (enmeshed and distorted in fibrous tissue resulting from previous attempts at repair) was not recognized; and the 3 final injuries occurred as a result of inept buttressing of the urethra during anterior colporrhaphy.

Prevention. The ureter is unusually vulnerable when aberrant and enmeshed in the fibrous tissue which usually surrounds a vesicovaginal fistula. This is especially so if its course has been further distorted by previous attempts at repair.

Mere identification of ureteric orifices should not lull one into any false sense of security that thereby one can be certain about the remainder of the ureteric course. Also worthy of comment is my finding that late renal complications which follow the repair of vesicovaginal fistulae (particularly when there have been previous attempts at repair) are far more common than is reflected in the literature.

Gynaecologists tend to insert their vaginal buttressing sutures unaware of the distortion which they produce thereby in the trigone, for it is rare to find a gynaecologist who has benefited from the revelation of performing a cystoscopy after a 'good' urethral buttressing! Whether such may predispose to ureteric reflux still requires investigation, but certainly blind enthusiasm in stitching can all too easily produce ureteric obstruction, as I have seen on 3 occasions.

TREATMENT AND RESULTS

The 45 ureteric injuries in this series were treated in a variety of ways (Table III):

1. No Reparative Surgery

Three cases received no surgical treatment. Of these, 2 (in whom attempts to pass a ureteric catheter beyond the fistula had failed) refused corrective surgery. The gratifying subsequent spontaneous closure of one of these fistulae was misleading since the disappearance of urinary drainage from the fistula was subsequently found to be due to an autonephrectomy. The other case left hospital with a pronounced hydronephrosis following a pyrexial late postoperative course. The third case, in whom it had been possible to pass a catheter beyond the fistula, healed spontaneously. The patient left hospital, however, with a residual hydronephrosis which we were unable to follow up.

The outcome of these cases lends support to the view that the consequences of leaving a fistula unrepaired for any length of time will probably be that the related kidney will suffer an unacceptable degree of damage, irrespective of whether the fistula closes spontaneously or not.

Even cases which heal successfully over an indwelling catheter demand careful follow-up in case stricture-formation requires timely surgical intervention.

Urgent surgical action, not watchful expectancy, usually spells success in the treatment of ureteric injuries.

2. De-ligation

In 2 cases an encircling catgut ligature (misplaced 5 days previously during urethral buttressing) was removed vaginally, thereby permitting the passage of an indwelling catheter. Complete return to normality was noted at follow-up pyelography on these patients.

3. Ureteric Catheterization

Attempts made to pass a ureteric catheter *per urethram* beyond the site of ureteric injury proved unsuccessful in this series in all but 3 instances (2 following removal of ligatures). Features related to success or failure in this regard have already been discussed.

4. Uretero-ureteral Anastomosis

The ureter was sectioned at the pelvic brim too far from the bladder to permit uretero-vesical anastomosis in one case. Consequently the spatulated extremities of the cut ureter were united over polythene tubing, and the area was drained.

Despite the good results claimed by Weinberg and others with this type of anastomosis, a stricture developed at the anastomotic site, and this single experience is in conformity with that of many others (such as Green *et al.*[4]) who hold the view that uretero-ureteral anastomosis commonly heals with stricture formation and should therefore be avoided if possible.

5. Uretero-vesical Anastomosis

Uretero-vesical anastomosis was performed in 36 instances and among these a Boari bladder-flap[5] was made to compensate for insufficient ureteral length in 4 instances.

The principles of uretero-vesical anastomosis which I have come to regard as important may be of sufficient help or interest to justify slight elaboration. These are: (1) 'Complete' avoidance of tension ('ureteral tug') upon the anastomotic site; (2) secure fixation of ureter to bladder; (3) efficient drainage, and (4) avoidance of ureteral-vesical reflux as a late postoperative complication.

1. *The avoidance of 'ureteral tug' upon the anastomotic site.* In Jacobson's[1] excellent contribution on ureteric injuries he mentioned that many of his uretero-vesical anastomoses had to be undertaken under tension. My own view is that the construction of a Boari bladder-flap,[5] or, if this is insufficient, an interposed isolated ileal segment, is mandatory if any suspicion of tension is likely to exist. It is my experience that tension prejudices not only the security of the anastomosis but also predisposes to a patulous subsequent opening into the bladder through which free uretero-vesical reflux of urine is the rule and prejudicial to the future health of the kidney on that side.

My initial approach at surgery is therefore to mobilize the bladder extremely widely. This compensates for some ureteric length deficiency. Free mobilization of the ureter below and, occasionally above the pelvic brim, also helps; but the bladder should be brought 'up' to the ureter rather than that the ureter be brought 'down' to the bladder. Thus the ureter should not hang taut like a clothes-line in the pelvis at the completion of the anastomosis.

2. *Secure fixation of ureter to bladder.* The security of the uretero-vesical anastomosis is dependent upon freedom from 'ureteral tug', as already described; important too, however, is the method of stitching ureter to bladder which requires meticulous attention:

Three or 4 stitches of 000 chromic catgut are inserted through the spatulated ureteral extremity after the insertion of a ureteral catheter or full thickness of the polythene tubing. This is simple. It is the further insertion of these ureteral stitches into the bladder that demands meticulous attention: The bladder mucosa in these cases is often thickened and oedematous so that the small atraumatic needle attached to the fine catgut can all too easily obtain a perilously flimsy vesical attachment. Indeed it is my conviction that the sole function of the mucosa-to-mucosa anastomosis popularized by Cordonnier[6] must be appreciated as 'protective' to the more important underlying deep stitches through vesical musculature which is denuded temporarily to obtain adequate exposure by deliberate undercutting of the overlying mucosal layer. Whereas the atraumatic needle suffices for the subsequent mucosa-to-mucosa anastomosis, to obtain a secure purchase upon the vesical musculature a strong round-bodied needle must replace the inadequate fine atraumatic needle and the ureter is 'fixed' to bladder by a muscle-to-muscle anastomosis.

The further importance of tying knots ultra-securely in a region which will be subjected to the stresses of ureteric and vesical contractions might appear too simple and mundane to merit mention were it not for the fact that I have so often seen neglect of this feature in comparable situations.

Whether an indwelling ureteric catheter should be employed or not is controversial. The desirability of a catheter inserted as a guide *at the time* of anastomosis, however, is usually ignored in the enthusiasm of the debate, yet without it one often finds (on making the essential final check in this regard) that a pleasingly secure anastomosis has distorted or actually occluded the ureteric lumen.

Ideally, the peritoneal attachment to the ureter is preserved, and the anastomosis obtains additional security and rest by stitching this to the exterior surface of the bladder musculature. Peritoneum or omentum should not be stitched as an encircling band round the ureteral-vesical junctions, for this predisposes to stricture formation at this site; and stitches attaching external surface of bladder to ureter tend to be unsatisfactory, can predispose to fistula or stricture formation at this site, and are entirely unnecessary if the internal anastomosis has been accomplished in accordance with the principles just described.

3. *Efficient drainage.* (*a*) Firstly, 'ureteric' drainage: Even temporary hold-up of urine above the site of anastomosis owing to narrowing of the ureteral lumen near or at the site of anastomosis may have serious consequences upon the subtended kidney. Its avoidance has already been stressed. A longitudinal ureterostomy performed a couple of inches above the level of the uretero-vesical anastomosis acts as a safety-valve, but a stricture forms readily at this site unless drainage is accurate and efficient.

(*b*) Secondly, efficient 'bladder' drainage (to rest the site of the anastomosis) is essential. In the first 24 hours blockage by clots is the main hazard to the indwelling catheter, and this is obviated by ensuring a free flow of urine (we employ mannitol once the uretero-vesical anastomosis is complete) and very frequent bladder-washouts through a closed circuit system, especially in the immediate postoperative phase.

A free urethral egress is ensured by a large-bore urethral catheter which is replaced by one of small bore once the urine has cleared of blood. If there is concern regarding the amount of vesical oozing before closing the bladder, there should be no hesitation in providing supra-pubic bladder drainage as additional to the urethral catheter.

(*c*) Thirdly, 'perivesical and peri-ureteric' drainage. That uretero-vesical anastomoses require extraperitoneal drainage would never be questioned; but insufficient attention is paid to the accurate location of the tip of the drain, and especially to ensuring that it affords very free egress to fluid. Joubert[7] has made a notable contribution in emphasizing these vital considerations in pelvic surgery. The efficiency of any drain depends upon its accuracy of location, its dependency and upon the patency of the conduit 'after' the abdomen is closed and 'after' dressings have been applied, for these final 'finishing touches' can all too easily deliver the *coupe de grace* to a previously efficient drain.

It is my own practice to insert a further intraperitoneal drain for 48 hours (in addition to the extraperitoneal drains which should remain *in situ* for 12 days) since efficient mobilization of the operative areas in these cases is seldom possible without entering the peritoneal cavity, and postoperative oozing of blood (and particularly serous exudate) is not infrequently copious.

4. *Avoidance of uretero-vesical reflux as a late postoperative complication.* That 'ureteral tug' leads to subsequent reflux has already been explained. The further precautionary measure of ensuring that the ureter traverses the vesical musculature as obliquely as possible is also very important in this regard as is a submucosal course of at least 2 cm. The additional construction of a Bishoff[8] mucosal vesical flap to overly the new ureteric orifice may be a further worth-while precautionary measure against post-operative reflux.

The results of these 36 uretero-vesical anastomoses were successful primary union in 34 instances, but failure in 2 instances.

In one instance an indwelling ureteral polythene catheter splint (which had been stitched to the bladder just beyond the anastomoses) was ripped out by the patient. Thereby the uretero-vesical anastomoses was torn apart, and the patient refused immediate further reparative surgery. She subsequently reported to Edendale Hospital where a nephrectomy was found to be necessary. The other failure (the second in my series) was a direct consequence of undertaking a uretero-vesical anastomosis under undue tension. The anastomosis broke down, and an isolated ileal segment was interposed between ureter and bladder with subsequent successful union.

6. *Uretero-Ileo-Cystoplasty*

When ureteral shortening is excessive it is unwise to attempt the construction of a Boari flap of undue length at the possible expense of 'ureteric tug' and excessive reduction of bladder capacity. Cases of this nature are usually neglected cases in which there has been a prolonged delay in providing reparative surgery following upon development of the fistula, or in which the fistula has

revealed itself late after radical surgery has been undertaken following radiation therapy of cervical cancer.

In such cases the gap between the ureter and bladder must be bridged with an isolated ileal segment which is refashioned to produce a hollow muscular tube of greatly reduced lumen. Once again, in my view, a careful attempt must be made to make its transit through the bladder wall as oblique as possible, and its opening into the bladder should be covered by a mucosal flap in an attempt to avoid reflux of urine. These cases are best left with an indwelling ureteric catheter (polythene) for 14 days.

Of the 4 cases handled in this manner all healed successfully.

7. Nephrostomy

Bilateral nephrostomy was performed (in collaboration with the Department of Surgery) upon a severely uraemic patient early in this series in whom both ureters had been ligated while buttressing the urethra for stress incontinence. The grossly neglected general condition had aroused such serious misgivings that bilateral nephrostomy, at that stage of our knowledge of this subject, was preferred to primary reparative surgery. The patient survived, lost one kidney, and suffered serious damage to the other before ureterovesical anastomoses was subsequently effected on the remaining side.

Although the treatment of this case reflected a traditional approach and followed upon extensive consultation, I remain convinced that preliminary nephrostomy has almost no place in the treatment of ureteric obstruction caused by surgical misadventure in the pelvis. In my experience preliminary reparative surgery takes little longer than the preliminary nephrostomy, is a lesser danger to the patient than manipulating highly infected kidneys, and is less likely to leave the patient with permanent renal infection and/or impairment of renal reserves.

SUMMARY

1. A study of the modes of production of ureteric injuries following pelvic surgery in 45 cases is presented, and a number of precautions which could have led to their prevention are gleaned and evolved therefrom.

2. The treatment of these patients was handled personally by the author who advances reasons for departing from the traditional approach in some instances and describes some techniques and surgical precautions employed to achieve the results described.

CONCLUSION

It is obvious from my studies that what I referred to at the outset as a gynaecological nightmare of bad luck, leakage, lament, and litigation should never occur. 'Luck' plays no role in the development of ureteric complications in pelvic surgery.

The hope of cure following ureteric injuries depends upon the rapidity with which the diagnosis is made and the rapidity with which corrective surgery is then instituted. Suspicion and action spell success in the cure of ureteric injury following pelvic surgery.

It is no pipe-dream, indeed, to promise that a better practical knowledge of uro-gynaecology could convert ureteric nightmares into peaceful gynaecological watertight slumbers.

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