

URETERO-PLASTY WITH BOARI FLAP OPERATION

Report of Three Cases

by

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Introduction

"Our two specialities cannot remain watertight compartments when it is the patient we are endeavouring to make watertight" Terrence Millin.

A patient with incontinence of urine is a burden to herself and a nuisance to people around because of the uriferous odour emitted, and hence such a patient always avoids social obligations and prefers to stay indoors. Incontinence of urine could be due to weakened or paralysed bladder sphincter, ureterovaginal or vesicovaginal fistulae.

In gynaecological practice ureterovaginal fistula is very often an iatrogenic complication in that it follows not only such operations as radical abdominal and to a lesser extent radical vaginal operation for malignant disease of the cervix but also such operations as total and even sub-total hysterectomy. Ureteral injury is

particularly likely in the operations for broad ligament tumours and cervical fibroids. Ureteral injuries in gynaecological operations occur either in the lower one-third of its pelvic course or in the upper one-third. Only the injuries in the lower one-third of the pelvic course are amenable to relief by Boari Flap operation.

Ureteral injuries by even the most destructive complications of spontaneous labour are uncommon and the obstetrician usually has a hand in such injuries. Even in cases of ruptured uterus direct injury to the ureter is unlikely and attempts at repair or hysterectomy are responsible for the injury. The responsibility of the obstetrician in injuries during forceps extraction, though admittedly rare, is very grave. Ureteral injury is a rare complication of caesarean section when the uterine incision extends too far laterally and the ureter gets involved in attempts at suture. Extraperitoneal caesarean section used to result in ureteral injury in some cases.

In general surgery, ureteric injuries follow such operations as excision of rectum or pelvic colon for

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carcinoma or diverticulitis.

Very rarely uretero-vaginal fistula has been reported to follow radium treatment for carcinoma of the cervix.

The ideal treatment when the lower one-third of the ureter is damaged is to reimplant the healthy proximal end in the bladder and no other operation can give equally satisfying results. But this ideal is not always attainable, and particularly when there is loss of more than the terminal one inch of the ureter, direct implantation into the bladder is physically impossible. (Howkins John — 1961). Straightening out of the pelvic course of the ureter by mobilisation up to and even above the pelvic brim yields a small additional length. (Millins — 1948). It is in such cases that ureterosigmoidostomy has been tried by scores of techniques. But the main hurdles in the form of electrolyte disturbances, progressive renal insufficiency due to obstruction and infection and regurgitation of colonic contents have not been entirely overcome. (Pyrah — 1954). Nesbit (1960) has taken "another hopeful look" at it. Ileal bladder solves some of the problems created by bilateral uretero-vaginal fistulae. It is in cases of unilateral uretero-vaginal fistulae with damaged long length of the ureter that Boari's operation offers a chance of relief.

The problem of finding suitable tissue to bridge the gap between the end of the proximal healthy ureter and the bladder has always tickled imaginative minds and various conduits from blood vessels, tubes of mesentery, tubes of peritoneum and fallopian tube, to metallic tubes have

been tried and found useless. (Melnikoff — 1912). The use of a flap of the bladder itself is, therefore, a logical possibility.

History

Spies et al (1933) tried to evolve an operation for the reconstruction of ureter from a bladder flap, utilising the same principle as that of modified Janeway's gastrostomy. On reference to the literature, they found that it was Boari, an Italian surgeon, who did this operation first on a dog in 1894. The dog remained alive and well for four years after operation. No postmortem was done on the dog after death.

It is claimed that Van Hook (1893) employed a similar technique on a cadaver in 1893.

Baiden (1926), a German surgeon, replaced the lower two-thirds of the ureter in a patient who had lost this segment of the ureter due to a fistula and stenosis following a pelvic operation. No details are available about the operation.

It is claimed by Ockerblad (1947) that he was the first to do it on a human being. Maximum length of a ureter replaced by the bladder flap is 14 cms., by Conger and Rouse (1955).

Indications for Boari Operation

Boari operation is done

- (1) When the ureteral injury is too high to prevent re-implantation of ureter into bladder;
- (2) When a long length of a ureter is narrowed due to stricture with or without ureterovaginal fistula. The ureteral lesion necessarily has

- to be organic and irreversible;
- (3) Idiopathic dilatation of the lower end of ureter. Takayasu and Sato (1961).

Whatever the indications for the operation, kidney function must be fairly within normal limits.

The operation is contraindicated when

- (a) there is marked diminution of kidney function on the affected side;
- (b) more than two-thirds of the pelvic length of the ureter is damaged, as technically it is impossible to prepare a bladder tube of this long length. Even in spite of preparing the tube, sutures are bound to be under tension;
- (c) the bladder capacity is markedly reduced.

Pre-operative Investigations

Before undertaking the operation, certain pre-operative investigations are necessary.

- (1) Blood urea and non-protein nitrogen estimation gives a rough estimate of the kidney function.
- (2) Urine culture and sensitivity — to decide the choice of antibiotic to be administered before and after operation.
- (3) Cystogram gives an estimate about the size of the urinary bladder.
- (4) Excretory pyelography outlines any dilatation of the ureter or the pelvis of the kidney. This gives a rough estimate of kidney function and degree of obstruction.

- (5) Cystoscopy and retrograde ureteric catheterisation. The ureteric catheter should ideally be of Chevassu bulb type. This catheter prevents leakage of the dye from the ureter into the bladder and hence delineates the length of the narrowed ureter and the site of the fistulous communication.

Operation

Patient is operated under general or spinal anaesthesia. A midline suprapubic incision is made and the peritoneal cavity is opened. Extra-peritoneal approach has been suggested by Kimchi and others (1953). Ureter is identified at the pelvic brim and is separated with a flap of peritoneum, Basu Mallick (1961). The ureter is transected where it appears normal and no attempt is made to dissect the ureter below the level of transection.

The bladder is distended with sterile fluid which is injected through the Foley's catheter which is already introduced in the urinary bladder. A rectangular flap is marked out on the urinary bladder with base directed postero-laterally, and the free edge of the rectangle being situated on the dome of the urinary bladder. Fig. 11. According to C. Scot Russel (1947), it does not seem to matter as to how bladder flaps are made nor just where the base of the flap is located nor yet the direction the flap may take. The width of the flap depends on the diameter of the ureter, but usually a flap with a width of 2.5 cms. is quite sufficient. A narrow flap tends to contract and produce a tube of small diameter which will

obstruct the ureter, Scot Russel (1947). The width of the flap at the base should be half an inch more than the width at the free edge of the flap. The length of the flap should be 1 cm. longer than the gap to be bridged. The flap is cut and haemostasis is secured. The ureter is laid in the centre of the flap so that it lies about 1 cm. in the bladder tube. Fig. 1-3. Vermooten et al (1934). The urethral edge is fixed to the mucosa of bladder flap by three or four interrupted 4° chromic catgut sutures on a atraumatic needle. No. 320 polyethylene tube is introduced into the ureter proximally for a distance of about 6-8 cms., and distally into the urinary bladder so as to let it project about an inch into the urinary bladder (as done in the first case). However, one can bring out the polyethylene tube per urethram (as done in the second and third case). The polyethylene tube is fixed to the bladder mucosa by a catgut stitch. The tube of the bladder flap is completed by suturing the mucosa with 0000 chromic catgut in a continuous stitch. The muscle and serosa are sutured with 00 chromic catgut using interrupted sutures. The free edge of the tube is fixed to the serosa of the ureter by few interrupted sutures. Fig. 1-4. The bladder is closed by a double layer of chromic catgut stitches. The bladder mucosa is not sutured separately.

The peritoneal flap is sutured back. Intraperitoneal drain is introduced through a separate stab incision.

Abdominal incision is closed in layers.

The polyethylene tube, if brought out per urethram, is tied to the

Foley's catheter by a thread. Both the tubes are connected to separate bottles under strict aseptic precautions.

Post-operatively, the patient is given the anti-biotic of choice according to the urine culture and sensitivity report. The time for removal of the polyethylene tube and Foley catheters varies with various authors. But in our cases, polyethylene tube was removed on the 12th day of the operation and the Foley catheter on the 15th day of the operation. If the polyethylene tube is kept projecting into the urinary bladder as in case (1) below, it has to be taken out by using a Braasch Cystoscope.

Follow up Studies: Urine culture and sensitivity tests, excretory pyelography and cystograms are the investigations required to be done after the patient is discharged from the hospital, usually a month after the operation.

Case Histories

Case No. 1:

Mrs. G. V. was admitted in K. E. M. Hospital for carcinoma of cervix stage II and a Wertheim total hysterectomy was done by M.R.N. At operation satisfactory excision was performed. The preoperative intravenous pyelography showed normal appearances.

On the 8th day the patient complained of pain in left loin and had temperature up to 100°F., and on the 11th postoperative day started leaking urine per vaginam. The operation wound healed satisfactorily by 12th day and intra-venous pyelography, one month after operation, showed hydro-ureter and hydronephrosis on the left side, Fig. 2 and extravasation of the dye in the pelvic outside the bladder. Fig. 3. Right side was normal. The patient was observed for one week and there was no sign of decrease in the leakage of urine.

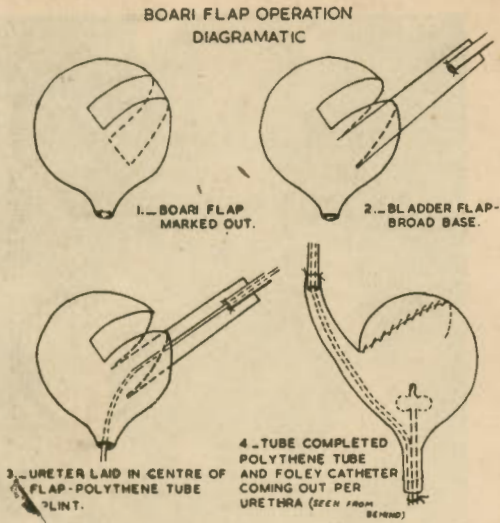


Fig. 1
Steps of Boari Operative (diagramatic).

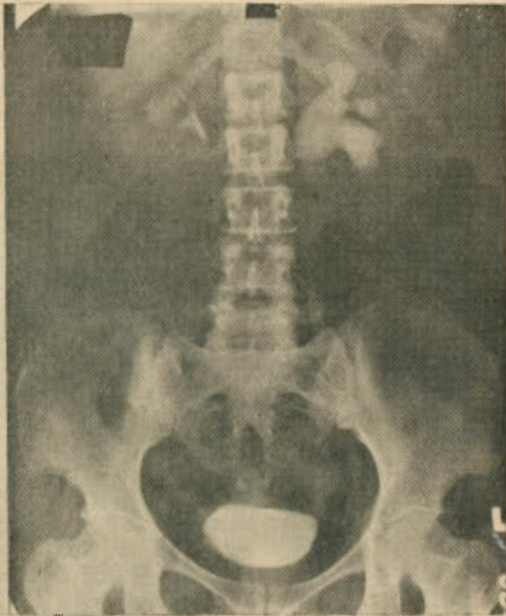


Fig. 2
Preoperative I.V.P. of case No. 1.

Urine showed *B. Proteus* infection which was treated with streptomycin. Cystoscopy was done and ureteric catheterisation attempted but ureteric catheter of even 3

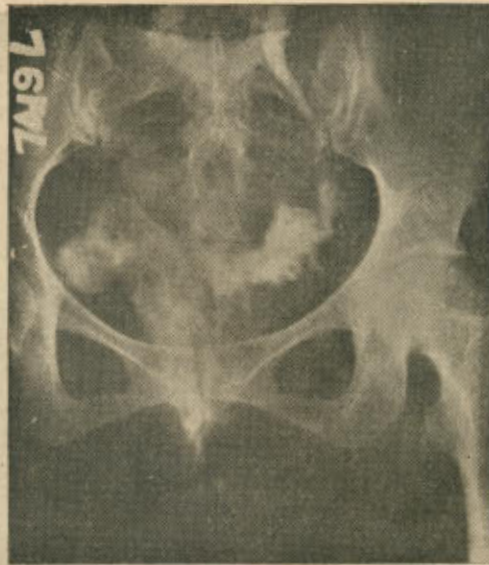


Fig. 3
Preoperative I.V.P. of case No. 1 showing extravasation of the radio-opaque dye.

French Charriere size could not be passed on the left side.

Boari Flap operation was done — 5 weeks after the first operation. At operation there was no evidence of recurrence of growth but the ureter below the pelvic brim was narrow and scarred. The ureter above the pelvic brim was dilated. A tube 8 cms., long was prepared from the bladder flap.

Postoperative course was satisfactory. Postoperative intravenous pyelography 3 months after the operations showed normally functioning left kidney with persistence of slight dilatation of the pelvis and ureter, the bladder tube well marked out and no evidence of obstruction. Fig. 4.

Two months after the postoperative pyelography, the patient was re-admitted with massive recurrence in the pelvis involving even the pelvic bone and expired 2 months later.

Case No. 2:

Mrs. I. P. R., aged 37 years, was admitted to J. J. Hospital for continuous leakage of urine per vaginam. She had been operated for menorrhagia and a total abdominal

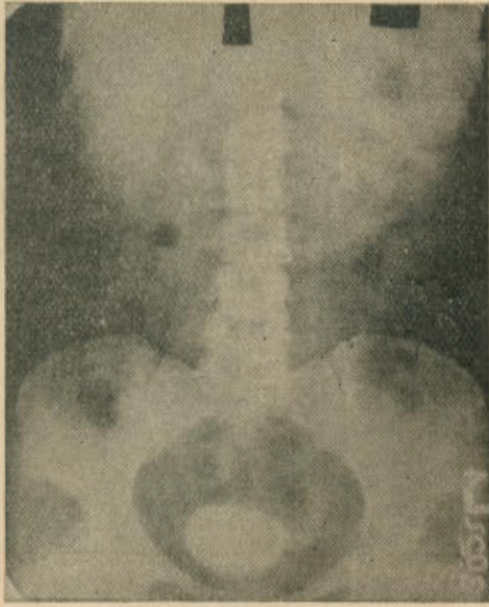


Fig. 4

Post-operative I.V.P. case No. 1 Boari flap tube well seen in continuity with ureter and bladder.

hysterectomy was done in another hospital. Patient was discharged on the 10th day after the operation and was re-admitted in the same hospital on the 13th day for high temperature with rigor and marked pain in the left renal region. She started leaking urine per vaginam on the evening of the day of admission. Temperature settled down but the urinary leakage continued. The gynaecologist in charge introduced an indwelling urethral catheter for a period of two weeks. A month after the operation, intravenous pyelography was done.

Urine culture showed growth of staphylococcus pyogenes infection.

An attempt was made to pass a ureteric catheter at the time of cystoscopy. The catheter went up to a distance of 1½ c.m. and all the radio-opaque dye injected re-gurgitated into the bladder.

Intravenous pyelography showed a definite obstruction in the ureter with hydro-ureter and hydronephrosis. Fig. 5.

Boari flap operation was performed by G.H.T. 6 weeks after first operation and the length of the tube prepared from the bladder flap was about 6 cms. long.

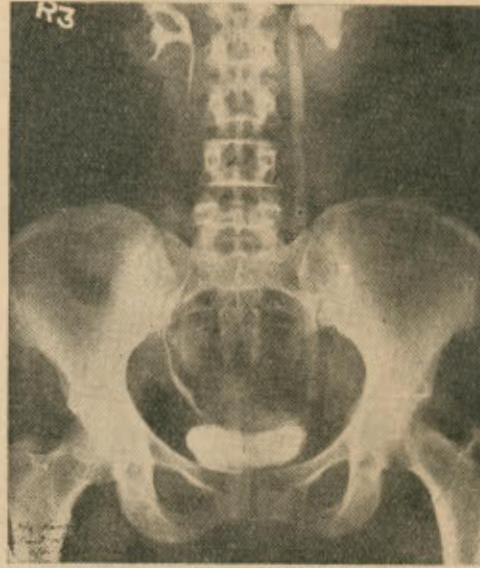


Fig. 5

Preoperative I.V.P. of case No. 2.

Follow-up studies done a month after the operation showed (1) no growth on urine culture, (2) complete subsidence of

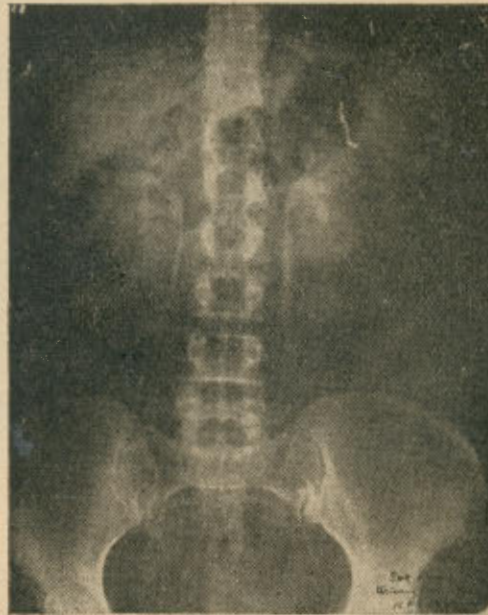


Fig. 6

Post-operative I.V.P. of case No. 2.

hydrourter and hydronephrosis on pyelography. Fig. 6, (3) reflux of dye up the bladder tube on cystogram studies, Fig. 7.

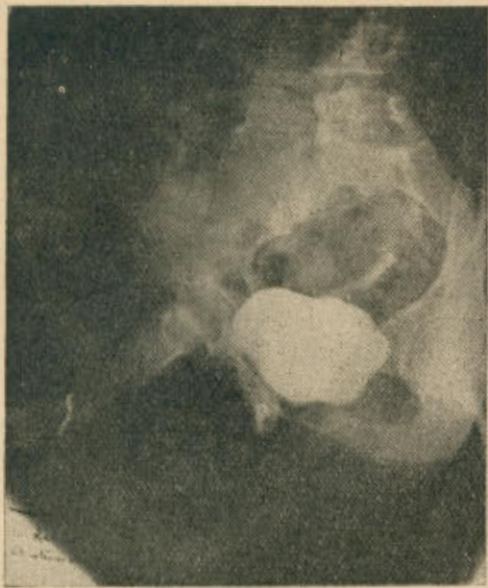


Fig. 7

Post-operative cystogram case showing bladder flap tube filled.

Case No. 3:

Mrs. A., aged 55 years, was admitted in the gynaecological department, J. J. Hospital, for carcinoma of cervix grade II and a Wertheim's radical hysterectomy was done by J. D. It was found at the operation that the growth was adherent to the left pelvic wall. During the post-operative period, there was wound infection and hence the patient was detained in the hospital. On the 18th day after the operation, the patient started leaking urine per vaginam. Intravenous pyelography showed hydrourter and hydronephrosis on the left side. Fig. 8. Urine culture showed B proteus infection. Cystoscopy was done and a Chevassu bulb ureteric catheter was passed in the left ureter. Retrograde injection of the radiopaque dye showed a narrow irregular long ureteric segment. Fig. 9. A Boari Flap operation was done by G.H.T. and 7½ cms length of the ureter was replaced by a blad-

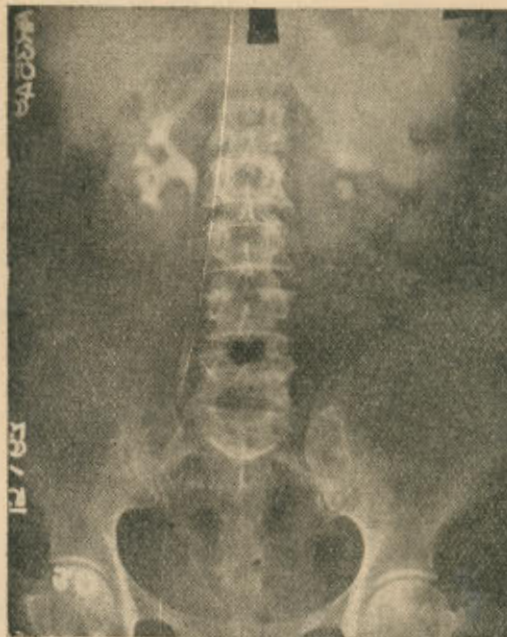


Fig. 8

Preoperative I.V.P. case No. 3.

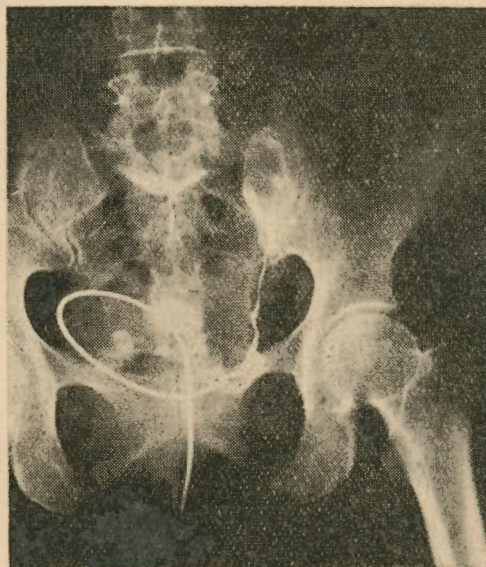


Fig. 9

Retrograde ureteric catheterisation showing narrowed ureter case No. 3.

der tube. There was no evidence of recurrence at the time of operation.

Unfortunately, the patient died on the evening of the operation due to coronary thrombosis. No postmortem examination was done as the relatives refused permission.

Summary and conclusions

Boari Flap Operation is a good technique for cases in which more than an inch of the pelvic part of the ureter is strictured with or without a fistula.

A brief history of the operation is given.

Steps of the operation are described and illustrated.

Case histories of three patients with ureterovaginal fistula are given along with the results of pre and post-operative investigations.

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