

## Case Report

# Laparoscopic ileal ureter: A completely intracorporeal technique

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### Abstract

Ileal-ureteral substitution is a viable surgical procedure to provide a satisfactory solution to the problem of long segment ureteric defect. We attest to the feasibility of a total laparoscopic technique to perform a ileal-ureteral interposition. Laparoscopic harvesting of a segment of the ileum as a substitute for the ureter, followed by ureteroileal and ileovesical anastomoses with pure intracorporeal laparoscopic suturing was performed in a 45-year-old female with extensive ureteric stricture following laparoscopic radical hysterectomy and postoperative radiotherapy for carcinoma cervix. Perioperative serum creatinine, electrolytes, blood gas, and a follow-up intravenous pyelography at six weeks and three months were used to assess the surgical outcome. Urinary drainage was satisfactory and renal function was improved. She did not have symptoms of urinary-tract infection or metabolic acidosis. The results of the present case are encouraging. Other clinical studies with more patients are needed to determine exact role of completely laparoscopic ileal interposition to repair the extensive ureteric stricture.

### Key words:

Laparoscopy, intracorporeal, ileo-ureteral anastomosis, ileo-vesical anastomosis

## Introduction

The long segment loss of the ureter (neither being implanted in to bladder nor anastomosed end to end) presents a challenge to the urological surgeon. Autotransplantation is often the preferred treatment but it may be precluded by extensive peri-renal fibrosis, previous gynecological, renal or ureteric surgery and radiation. Under such circumstances, interposition of a segment of ileum to bridge the gap in the ureter presents another option. The primary indication for ileal ureter replacement is lengthy ureteral injury precluding simple reimplantation or a Boari flap [1,2]. More common causes include multiple stones, surgical trauma, radiation and malignancy. Here, we attest to the feasibility of a total laparoscopic technique to perform an ileal-ureteral interposition as the first time in the literature.

## Case presentation

A 45 year old female presented with dysuria for three

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months, 2 year following laparoscopic radical hysterectomy and adjuvant radiotherapy for carcinoma cervix. Ultrasonography and contrast enhanced computerized tomography scan revealed moderate right hydronephrosis with dilated upper ureter while left kidney, ureter and rest vessels were normal. Urography revealed delayed excretion of contrast and normal parenchyma of right kidney and no filling of palvicalyceal system on right side (Figure 1). As ureteroscope could not be negotiated into distal ureter just proximal to vesico-ureteric junction confirming lower ureteric stricture with significant fibrosis, ureteric reimplantation was planned.

A thorough assessment was done in modified Lloyd-Devis position with our standard five ports that we use in most of the pelvic surgery as shown in Figure 2. There was a dilatation of proximal part of right ureter with dense fibrosed distal half-length and small contracted bladder due to previous radiation (Figure 3) where ureterolysis was not possible. As there was significant loss of long length of the ureter, uretero-neocystostomy, urtero-ureterostomy or Boari-flap was not possible. Psoas hitch was not possible as urinary bladder was small and contracted due to previous radiotherapy (Figure 4).

A vascularised loop of distal ileum with mesentery 20 cm proximal to ileo-caecal junction for interposition was identified and isolated by intracorporeal linear cutter stapler (Figure 5 and 6). Proximal ureter was spatulated and the lumen of ileum was matched by tapering along the antimes-

entric border (Figure 7). End to end single layer uretero-ileal anastomosis was done using vicryl 4-0 (Figure 8). Ileo-vesical anastomosis was done under cystoscopy guidance over 6 Fr feeding tube as stent (Figure 9). Rest bowel continuity was maintained with side to side ileo-ileal anastomosis by linear cutter stapler. Thirty Fr intraabdominal drain placed through right 10 mm port. Total laparoscopic procedure with complete intracorporeal anastomosis was finished in 240 minutes with 50 ml blood loss.

**Figure 1.**



*Intravenous pyelography before uretero-ileal interposition*

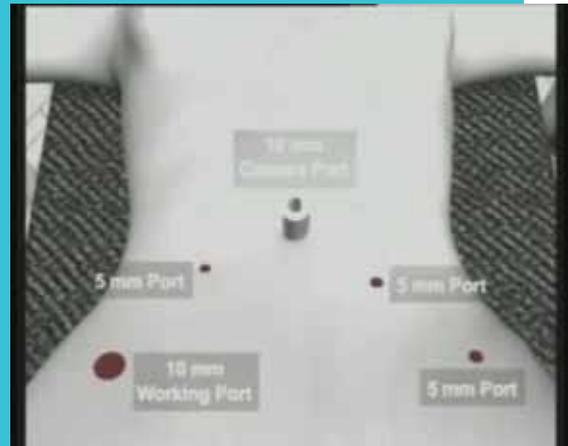
In postoperative period her course was uneventful. Abdominal drain was removed on 4th post operative day and discharged on 5th post operative day. Foley's catheter was removed on 14th post-operative day on follow up when she was asymptomatic. Her regular follow-up was maintained with verified adequate excretion from right renal unit on intravenous urography at six weeks and 3 months (Figure 10). She is on regular follow-up since last one year and did not complain of any urinary-tract infection or metabolic acidosis.

## Discussion

When ureteroneocystostomy, autotransplantation or transureteroureterostomy are not feasible for repair of a diseased ureter, partial or complete replacement of the

ureter by intestine is an effective alternative [3]. To date, laparoscopic reconstruction for urinary diversion with the bowel has used one of the following three approaches: (a) extracorporeal suturing outside the port site; (b) bowel diversion through a minilaparotomy and urinary diversion with intracorporeal suturing and (c) intracorporeal suturing [4].

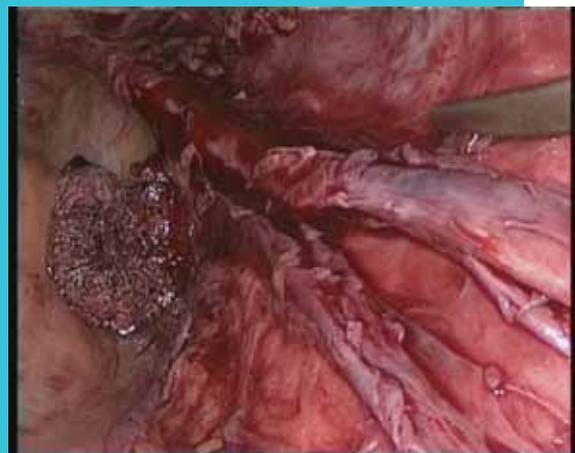
**Figure 2.**



*Port positions*

Laparoscopic completely intracorporeal technique of ileal ureter has been not reported in literature. However, only one case of robotic completely intracorporeal technique of ileal ureter has been reported [5].

**Figure 3.**

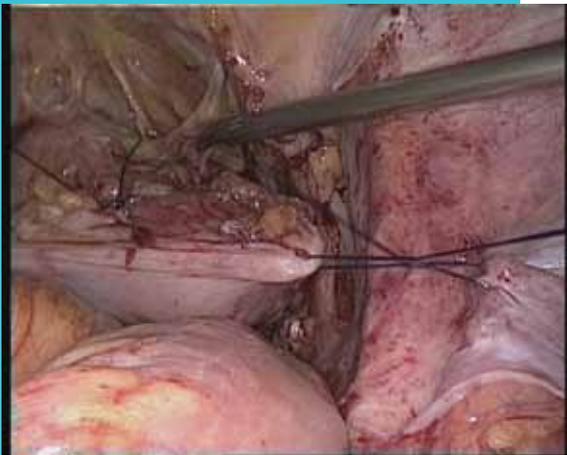


*Ureteral stricture running up to pelvic brim*

Castillo et al. concluded that laparoscopic approach appears to be a safe and effective alternative to open surgery for ileal ureter substitution [6]. However they performed the anastomosis extracorporeally. The most-challenging part of the procedure is the intracorporeal suturing for ureteroileal and ileovesical anastomosis. Although several suturing and tying devices are currently available for laparoscopic use, laparoscopic free-hand

suturing with knot tying is a technique that can gradually be learned through experimental training. Based on our long term advanced laparoscopic experience at our institute in oncosurgery, urology, gynecology and colorectal surgery led us through the surgery efficiently.

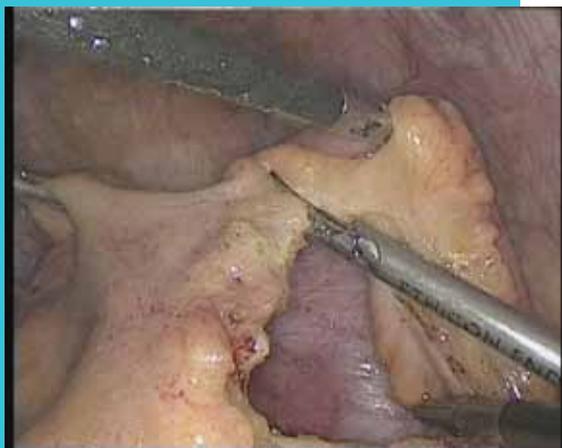
**Figure 4.**



*Small contracted bladder and psoas hitch*

The use of ileum interposed in the ureter, whenever indicated, will preserve the natural vesico-ureteric antireflux mechanism, thus protecting the patient against the problems of reflux with no need for the creation of a new anti-reflux procedure that may lead to undesired sequelae.

**Figure 5.**

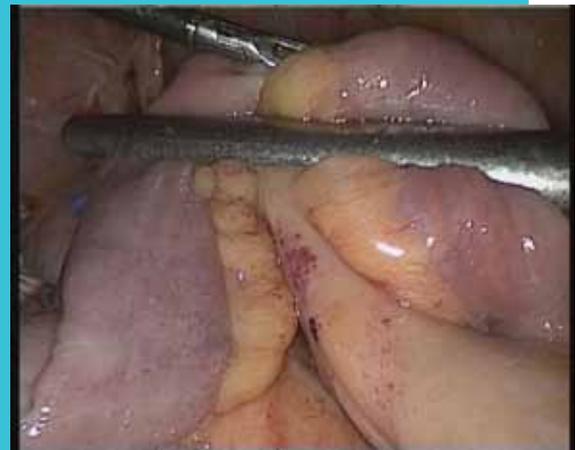


*Ileal loop with mesentery*

Tailoring of an ileal ureter is controversial. Waters et al. found that tailoring had no additional benefits over not tailoring [7]. Moreover it was stated that tailoring may interfere with the peristaltic activity of the ileum because the innervation is interrupted [3]. Conversely, the reduction of ileal diameter by tailoring according to Laplace's law increases the intraluminal pressure and results in more efficient transport. Moreover to determine the effect

of tailoring in a single patient is not feasible. The principle criticism of segmental replacement of ureter is the possibility of ureteric obstruction, mechanically by mucus or functionally by uncoordinated peristaltic activity, thereby impairing propulsion of urine. However, in present case and other studies obstruction was not a problem.

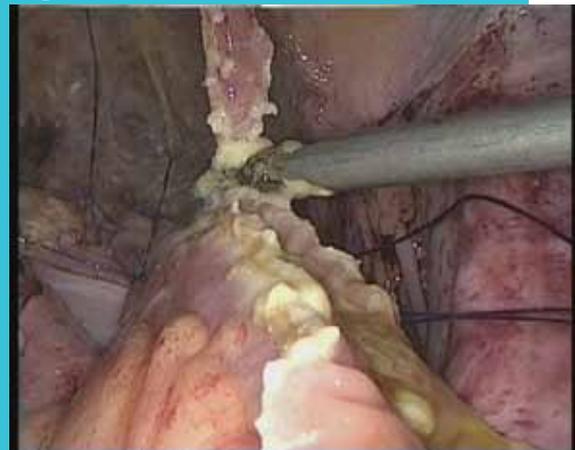
**Figure 6.**



*Ileal loop with stapler*

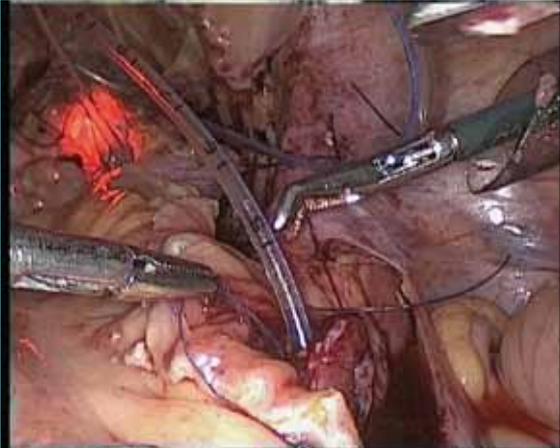
In conclusion, results of the present case are encouraging. Other clinical studies with more patients are needed to determine exact role of totally intracorporeal laparoscopic ileal interposition to repair the extensive ureteric stricture.

**Figure 7.**



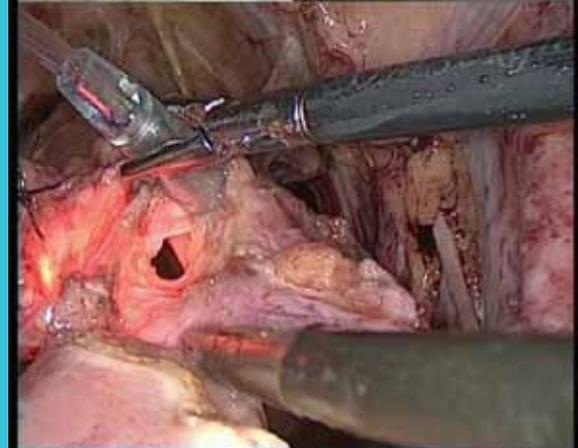
*Trimming of ileum along antimesenteric border*

**Figure 8.**



*Ureteroileal anastomosis*

**Figure 9.**



*Ileovesical anastomosis*

**Figure 10.**



*Intravenous pyelography after uretero-ileal interposition*

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