Ileal Interposition for the Treatment of a Long Gap Ureteral Loss

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Abstract

We retrospectively reviewed 10 patients (7 males and 3 females) who were treated with ileal interposition for long gap ureteral loss between 1989-1995. The mean patient age was 42 years old (35-52), mean ureteral gap was 18 cms (10-25). The etiology of ureteral loss included : 4 retroperitoneal fibrosis, 2 recurrent stone, 2 after pancreatitis and its complication and 2 after ureteral injury. The mean follow-up was 4 years (2-7). The post operative course was uneventful with no immediate and long term complications detected and there was no metabolic problem. Only asymptomatic bacteriuria in 5 cases (50%) was noted but it was not clinically significant.

Key word : Ureter, Injury, Ileal Interposition

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The loss of a long segment of the ureter presents a troublesome for urologists. Autotransplantation is preferred if no adhesion is found around the affected kidney, and nephrectomy can provide a kindly vascularization(1). Transureteroureterostomy can be used for the loss of the middle third of the ureter, while loss of the distal one third can be managed by Boari's flap or Psoas hitch ureteroneocystostomy(2). In the case of perirenal fibrosis from previous surgery or poor function of contralateral kidney, the affected kidney has to be preserved. Under such circumstances, interposition of a segment of ileum into the gap of ureteral loss is another option(1-3). However, report of the success of this procedure after a long term follow-up is rare. In this report the experience of ileal interposition with long term follow-up is presented.

MATERIAL AND METHOD

Between 1989-1995, segments of ileum were used to interpose the long ureteral defects of seven men and three women with a mean age of 42

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Table 1. The causes of ureteral loss.

No	Sex	Age	Side	Cause of ureteral loss
1	male	35	Right	retroperitoneal fibrosis
2	male	39	Left	ruptured pancreatic pseudocyst
3	male	42	Right	retroperitoneal fibrosis
4	female	43	Right	retroperitoneal fibrosis
5	male	41	Right	missed ureteral injury
6	female	43	Right	retroperitoneal fibrosis
7	male	44	Left	pancreatitis
8	male	41	Right	recurrent stone
9	male	40	Right	recurrent stone
10	female	52	Right	ureteral injury

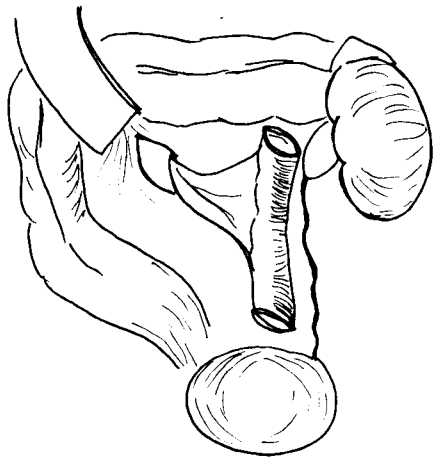

Fig. 1. Shows the ileal segment to replace left ureter.

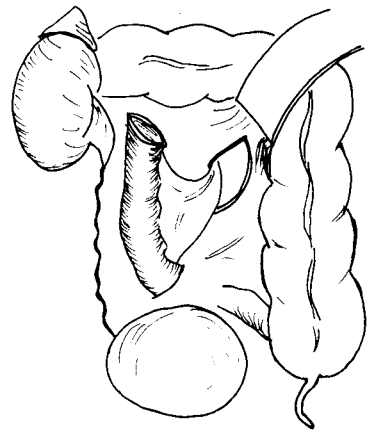

Fig. 2. Shows the ileal segment to replace right ureter.

years (range 35-52 years old). The causes of the ureteral loss are shown in Table 1. Right ureters were interposed in eight cases and left were interposed in two cases. The mean ureteral gap was 18 cms. (range10-25 cms.). Before the operation a percutaneous nephrostomy or open nephrostomy was done in all patients to drain the affected kidneys. Antegrade pyelography combined with retrograde pyelography were done and the ureteral gap was assessed. Laborarory investigations were serum BUN, creatinine, electrolytes (Na, K, CO_2 and Cl). Urine examination and urine culture were done on the day of the operation. Arterial blood gas was performed in room air environment before general anesthesia.

The patients were put in the supine position and general anesthesia by endotracheal intubation was used in all cases. After the laparotomy incision, the retroperitoneum of the affected side was explored. Renal pelvis and proximal ureter were identified and mobilized with intact blood supply. The distal ureter was identified and mobilized. The ureteral gap was assessed. If the distal end could not be identified, the gap was measured from the renal pelvis to the bladder base. The ileal segment was harvested with the vascularized mesenteric pedicle. The length of the ileal loop was equal to that of the ureteral gap. Ileo-ileal anastomosis was done by the conventional technique. When the left ureter was to be replaced, the descending colon was mobilized medially and the ileal segment was placed retroperitoneally through a window in the mesentery (Fig. 1) For right ureteral replacement, it is necessary to rotate the mesentery 90 degree to make the segment

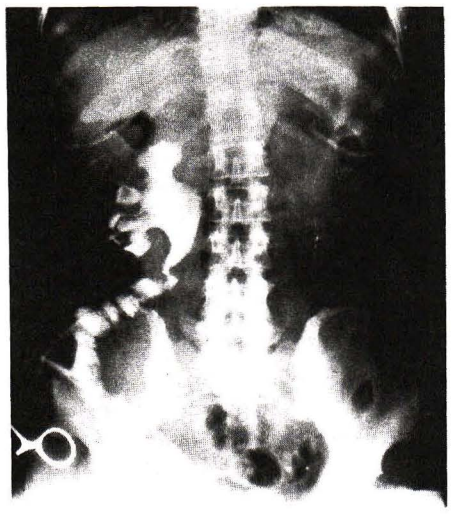

Fig. 3. Shows antegrade pyelogram.

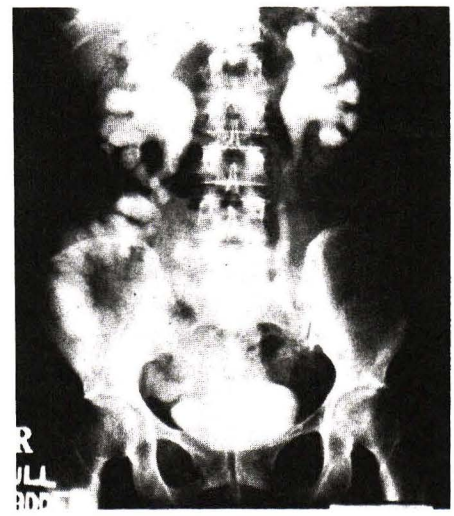

Fig. 4. Shows IVP at three months post operation.

isoperistaltic (Fig. 2). The proximal end of the ileal loop was anastomosed end to end with the dilated proximal ureter or renal pelvis and ureteral end to ileal side when the proximal ureter was not dilated. The distal end of the ileal loop was anastomosed with the distal ureter with end to side technique or re-implanting directly to bladder using the nipple valve technique. No tailoring of the ileal segment was done. The anastomosis was stented by double J catheter for 14 days. Antegrade pyelography was under taken after the stent removal. The nephrostomy tube was removed after good drainage from the kidney *via* ileal segment was seen by antegrade pyelogram. (Fig. 3)

The mean follow-up was 4 years (range 2-7 years). IVP or renography was done in the third post operative month (Fig. 4). Annual blood chemistry, urine examination and arterial blood gas were routinely done.

RESULTS

The post operative courses were uneventful in all except one patient who suffered from prolonged bowel ileus. The mean hospital stay was 13 days (range 10-18 days). Up to now all renal function are normal with no change of creatinine and metabolic problem. There has been no diarrhea. There were five asymptomatic bacteriuria.

DISCUSSION

Although the capacity of the ureter to regenerate and heal is good when the continuity is maintained, fibrosis and stricture often results in renal damage[2]. Repair of an upper ureteric defect with the loss of a long segment that precludes end to end anastomosis poses a surgical problem. Techniques described for this entity include autotransplantation[1], renal lowering with or without vascular transposition[4,5] and ureterocalecostomy[1,2]. Transureteroureterostomy is appealing from the stand point of its simplicity, but it can not be safely applied to the correction of defects involving the upper one fourth to one third of the ureter[2]. Replacement of the ureter by the ileum[6-8], appendix [9] and colon[10] has been reported in some cases. Fenger is credited with the first written proposal for reconstructing the ureter with the small bowel in 1894[2]. Since then reports of the usage of the ileum to replace the ureteral gap with long term follow-up have been rare. The indication for intestinal replacement of the ureter include recurrent calculi, extensive ureteral injury, retroperitoneal fibrosis, ureteral stricture, ureterocutaneous fistula, tuberculosis, ureteral carcinoma in solitary kidney and urinary undiversion[1-3,6]. In some conditions replacement of the ureter by using the ileum can cause metabolic

problems such as renal insufficiency and hepatic dysfunction[11]. In the case of normal renal function and the ileal segment being less than 100 cms., no metabolic problem will be seen and there will be no diarrhea due to steatorrhea[11-14]. If some patients suffer from steatorrhea, they can be treated with cholestyramine. The anastomosis of the upper end of the ileal segment can be performed by all layer interrupted technique with absorbable sutures[15]. It can be anastomosis end to end with renal pelvis or dilated upper ureter or end to side with non-dilated upper ureter. The distal end of the ileal segment can be anastomosed end to side with distal ureter or re-implanted to the bladder base using the nipple valve technique to prevent urinary reflux[15]. No tailoring of the ileal segment is needed[15]. Nephrostomy is recommended for proximal diversion but the stent is not necessary in most of the cases[15]. Asymptomatic bacteriuria can be found in some cases but it is not clinically significant[1,2,6-8,15].

SUMMARY

Ileal interposition to the long ureteral gap can be safely used to preserve renal functions with good long term results. Selection of the patient and surgical technique are also crucial for a successful operation. The ileal ureter can be selected as an option for the treatment of a long gap of ureteral loss.

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ผลของการใช้ลำไส้เล็กไอเลี่ยมทดแทนท่อไตที่ตีบหรือขาด

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ได้ทำการศึกษาย้อนหลังผู้ป่วยที่มีปัญหาท่อไตขาดหรือตีบ เป็นระยะทางยาว จำนวน 10 ราย ระหว่าง พ.ศ. 2532–2538 เป็นผู้ป่วยชาย 7 ราย หญิง 3 ราย อายุเฉลี่ย 42 ปี ท่อไตที่ขาดหรือตีบเฉลี่ย 18 ซ.ม. สาเหตุของการสูญเสียท่อไตประกอบด้วย พังผืดหลังช่องท้อง 4 ราย เป็นนิ่วซ้ำ 2 ราย ดับอ่อนอักเสบและอาการแทรกซ้อน 2 ราย จากอุบัติเหตุ 2 ราย ไม่พบอาการแทรกซ้อนจากการผ่าตัดนำลำไส้ไอเลี่ยมมาต่อแทนท่อไต และหลังจากติดตามผู้ป่วย 2–7 ปี (เฉลี่ย 4 ปี) ยังไม่พบความผิดปกติในแง่ของการทำงานของไต การระบายปัสสาวะจากไตสู่กระเพาะปัสสาวะผ่านทางไอเลี่ยม รวมทั้งสมดุลย์กรด – ด่าง ในร่างกาย พบว่า 5 ราย (50%) มีแบคทีเรียในปัสสาวะแต่ไม่ปรากฏอาการของการติดเชื้อ และไม่ได้ให้ยารักษา

คำสำคัญ : ท่อไต, ภยันตราย, การใช้ลำไส้เล็กไอเลี่ยมทดแทนท่อไต

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