Case Report

Laparoscopic Treatment for Retrocaval Ureter

Toshikazu ABE, Masaya OGATA and Yasushi MATSUSHITA*
Department of Urology, Iwate Prefectural Senmaya Hospital
*Department of Urology, Iwate Medical University

We report a teenage boy with retrocaval ureter, which was treated laparoscopically. On September 22, 2001, a 17-year-old boy presented to our hospital with a chief complaint of left flank colic pain. Ultrasonography demonstrated bilateral hydronephrosis. On the left side, ureteral stone was diagnosed and this was spontaneously discharged the following day. On the right side, hydronephrosis with kinked hydroureter, so-called reversed J deformity, was detected on excretory urography. On computed tomography, the right ureter was compressed between the iliopsoas muscle and inferior vena cava. Based on these findings, this patient was diagnosed as having retrocaval ureter. Laparoscopic surgery was performed on 21 November 2001 because of persistent dull right flank pain and the presence of right hydronephrosis. After insertion of guide wire and ureteral catheter, the patient was placed in a modified left lateral position with a foot device and four trocars were placed. After mobilization of the ureter from the vena cava, the right ureter was transected just cephalad to the retrocaval segment. Then the retrocaval segment was pulled anteriorly to the vena cava, end-to-end anastomosis of the upper and lower ends of the ureter was performed laparoscopically. An automatic suture device was introduced and seven 4-0 Vicryl interrupted sutures were made to achieve watertight ureteroureterostomy, then a double J ureteral stent catheter was indwelled. The surgical duration was 7 hour 8 minutes and the blood loss was only 28 ml.

Postoperatively, acute perceptive deafness with left tubal dysfunction occurred, but this was immediately improved with steroid therapy. The patient started to walk and take meals from the second day postoperatively and was discharged on the 15th postoperative day. On the 42nd post-operative day, the stent catheter was removed. Right flank dull pain disappeared after surgery.

The apparent disadvantage of a laparoscopic approach for this disease is the longer surgical duration compared to that in open surgery. With the advances in laparoscopic suture devices and the development of skill, a shorter surgical duration can be achieved and laparoscopic surgery for retrocaval ureter will become the standard method.

Key Words: laparoscopic surgery, retrocaval ureter

Introduction

Clinically detected retrocaval ureter is generally a rare condition. However, the incidence is not so rare as this condition is found about one in 1500 cadavers and it occurs 2.8 times more frequently in males. Symptoms of retrocaval ureter are similar to those of obstruction. Although the lesion is congenital, there are few patients detected in childhood, most patients being found in the third or fourth decade of life. If patients experience symptoms such a flank pain, surgical treatment is required. Recently, the laparoscopic approach has been adapted for various urogenital diseases, because of its minimal invasiveness. Here we report a case of retrocaval ureter in a teenage boy, which was treated laparoscopically.
Laparoscopic Treatment for Retrocaval Ureter

Case Report

A 17-year-old boy presented to our hospital with a chief complaint of left flank colic pain on September 22, 2001. Ultrasonography demonstrated bilateral hydronephrosis. On abdominal X ray, a left ureteral stone measuring 3 mm in diameter was detected. The next day, the ureteral stone was spontaneously discharged. Because this patient had frequent episodes of right flank dull pain, intravenous urography was performed 3 days after the current episode of left flank pain. On excretory urography, left hydronephrosis had already improved but right hydronephrosis with kinked hydroureter, so-called reversed J deformity, was detected (Fig. 1). At the level of the third lumbar vertebra, dilated right ureter shifted medially, while the lower part of the ureter was normal in size and position. On computed tomography, the right ureter was compressed between the iliopsoas muscle and inferior vena cava and the upper part was dilated (Fig. 2). Retrograde pyelography demonstrated tortuous ureter in the shape of an italicized S (Fig. 3). This patient had no prior history of abdominal surgery. Based on these findings, this patient

![Fig. 1 Preoperative excretory urography demonstrates right hydronephrosis and reversed J deformity of the ureter.](image1)

![Fig. 2 Preoperative computed tomography shows the existence of a retrocaval ureter.](image2)

![Fig. 3 Preoperative retrograde pyelogram shows S shaped curve of the ureter.](image3)
was diagnosed as having retrocaval ureter. Therefore, this patient was admitted to our hospital to be treated surgically, because of persistent right flank dull pain and the presence of right hydronephrosis.

Laparoscopic surgery was performed on 21 November 2001. The patient was placed in a lithotomy position using a lithotomy foot device (Mizuho, Tokyo, Japan) under general anesthesia. A 0.89mm guide wire with 5Fr. Ureteral catheter was inserted into the renal pelvis using cystoscopy under flouroscopic guidance. The guide wire and ureteral catheter were tied to a Foley catheter extracorporeally. Then the patient was placed in a modified left lateral position with the foot device and his right leg slightly elevated, which eased intraoperative manipulation of the ureteral catheter. A 2cm open laparotomy was made at the right side of the umbilicus and the first trocar (12 mm) was inserted and pneumoperitoneum was introduced using carbon dioxide with an abdominal pressure of 15 mmHg. Under laparoscopy, an 11 mm trocar and two 5 mm trocars were placed. After placing trocars, abdominal pressure was kept under 10 mmHg.

The line of Toldt was incised, and the ascending colon was reflected medially. After this manipulation, the vena cava and ureter were exposed. The ureter was easily detected with manipulation of the ureteral catheter extracorporeally. Then the ureter was mobilized from the vena cava proximally and distally (Fig. 4). The portion behind the cava was also mobilized. After partial withdrawal of the guide wire and ureteral catheter, the right ureter was transected just cephalad to the retrocaval segment. The retrocaval segment was pulled anteriorly to the vena cava and about 1 cm of the stenotic part of the ureter was resected. The lower end of the ureter was vertically incised about 5 mm to form a spatula-like shape. The guide wire with ureteral catheter was reinserted into the renal pelvis and end-to-end anastomosis of the upper and lower ends of the ureter was performed laparoscopically. Initially, we attempted the conventional laparoscopic intracorporeal suturing method, but it was too difficult and the ureteral wall was frequently torn. Then an automatic suture device (Endo stitch; Autosuture Norwalk, CT, USA) was introduced and seven 4-O Vicryl interrupted sutures were made to achieve watertight ureteroureterostomy. After ureteral catheter
was removed, a 6 Fr. double J ureteral stent catheter was inserted and indwelled by the retrograde method, then the guide wire was also removed. A Penrose drain tube was placed near the ureteral anastomosis. The surgical duration was 7 hour 8 minutes and the blood loss was only 28 ml (Fig. 5).

Postoperatively, the patient complained of impaired hearing in the left ear and he was diagnosed acute perceptive deafness with left tubal dysfunction. With steroid therapy, deafness improved immediately. He started to walk and take meals from the second day post-operatively and was discharged on the 15th postoperative day. On the 42nd postoperative day, the stent catheter was removed. Right flank dull pain had disappeared after surgery, but right hydronephrosis persisted on excretory urography (Fig. 6).

Discussion

Retrocaval ureter is a congenital abnormality in which the right ureter passes behind the inferior vena cava. This anomaly was first reported by Hochstetter in 1893 and was considered a relatively rare condition. Anatomically, it was called retrocaval ureter or circumcaval ureter, but it has also been called preureteral vena cava with regard to development. This condition is classified into two types. Type 1 ("low loop") is the most common, and the dilated proximal ureter assumes a reversed J. Type 2 ("high loop") is rarer. And in this condition, the upper ureter is not kinked but passes behind the vena cave at a higher level, with the renal pelvis and upper ureter lying nearly horizontal before encircling the vena cava in a smooth curve. Our case was in type 1. In this condition, the ureter demonstrated reversed J or fishhook shape on excretory urography and the shape of an italicized S on retrograde pyelography. CT scan shows ureteral compression between iliopsoas muscle and inferior vena cava. When hydronephrosis or a related symptomatic problem appears, surgery is required. Conventionally, in open laparotomy, the position of the ureter and involved structures requires transection of the renal pelvis with transposition and reanastomosis. Recently, laparoscopic surgery has been proposed for this disorder, and its efficacy has been confirmed. Two approaches to the retrocaval ureter have been reported, one was transperitoneal and another was a retroperitoneal laparoscopic approach. Ameda et al., reported two cases of retrocaval ureter that were treated with transperitoneal and retroperitoneal laparoscopic surgery, respectively. They supposed that retroperitoneoscopy repair was much more suitable for this disorder than transperitoneal repair, but port selection for suturing might be limited and anastomosis is difficult in the retroperitoneal approach.

One of the most important advantages of the
retroperitoneal approach is ease of management for urine leakage from the anastomosis site and this is the reason for selecting the retroperitoneal approach. In conventional open surgery, a transperitoneal approach is preferred because of the ease of access to the surgical site. We think it should be selected depending on the skillfulness of the surgeon.

Advantages of laparoscopic treatment for a retrocaval ureter are minimal postoperative pain and a short convalescent period but the apparent disadvantage is a longer surgical duration compared to that in open surgery. Especially in this disorder, detection of the ureter and laparoscopic anastomosis of the ureter to ureter are necessary, and these procedures were time consuming. Several reports indicated that anastomosis of the ureter is the most time-consuming and surgical duration ranged from 3 h 45min to 9 h 20min\(^3\)\textsuperscript{-7}.

In our case, it was very easy to detect the ureter by moving the ureteral catheter extracorporeally which was inserted into the ureter just prior to the surgery, however, the anastomosis of ureter to ureter required considerable time.

Adams et al\(^8\). reported that automatic suture device decreased the time required when compared to conventional laparoscopic intracorporeal suture methods. Polascik et al\(^9\). performed laparoscopic ureteroureterostomy for retrocaval ureter in 3 h and 45min using an automatic suture device. In Japan, Mugiya et al\(^10\). reported that retroperitoneoscopic ureteroureterostomy for retrocaval ureter with the automatic suture device took 5 h.

In our case, initially used a conventional laparoscopic intracorporeal suture technique but it was too difficult and the ureteral wall frequently tore. So we converted to the conventional suture method to automatic suture device, which enabled smooth stitches but the total surgical duration was 7 h and 8 min.

In our case, right hydronephrosis was detected 2 months after surgery by excretory urography. Koff et al\(^9\). have shown that functional ureteral edema after pyeloplasty can persist for 6 months. Therefore, evaluation must also be performed 6 months after surgery.

With the advances in laparoscopic suture devices and the development of skill, a shorter surgical duration can be achieved and laparoscopic surgery for retrocaval ureter will become the standard method.

References