Laparoscopic Dismembered Pyeloplasty of a Retrocaval Ureter: Case Report and Review of the Literature

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1. Introduction

Laparoscopic dismembered pyeloplasty is rapidly becoming the standard of care for the treatment of ureteropelvic junction obstruction (UPJO). The minimally invasive approach has led to equivalent results compared to open surgery, with decreased convalescence and analgesic requirements [1,2]. The performance of laparoscopic dismembered pyeloplasty in the setting of a retrocaval ureter leads to added challenges, including extensive caval dissection both lateral and medial to the vena cava. Despite these challenges, this procedure can be done optimally performed via a minimally invasive approach. We present below a case of retrocaval ureter treated with laparoscopic dismembered pyeloplasty.

2. Case report

A 49-yr-old Hispanic female presented at an outside hospital with a 20-yr history of intermittent right-side flank pain. A computed tomography scan (CT) revealed right hydronephrosis with subcentimeter nephrolithiasis. The patient was referred for extracorporeal shock wave lithotripsy (ESWL), two sessions of which were unsuccessful in clearing her stone burden. Because of the suspected UPJO, the patient was referred to us for consideration of laparoscopic dismembered pyeloplasty. Repeat CT scanning suggested the presence of a retrocaval ureter (Fig. 1), causing an obstruction of the right kidney. A mercapto-acetyl triglycine (MAG-3) renal scan confirmed the diagnosis of right-side obstruction with obstructive parameters and a split
function of 44.2% on the right. Following informed consent, the patient elected to undergo laparoscopic dismembered pyeloplasty.

Using a standard four-port transperitoneal approach, the right kidney was identified, and the renal pelvis was dissected medially to the vena cava, where it began to dip posteriorly. The ureter was then identified in the interaortocaval region and dissected caudally. Vessel loops were placed around the interaortocaval portion of the ureter and the renal pelvis to facilitate further dissection (Fig. 2). The renal pelvis and the ureteropelvic junction area were dismembered at the lateral border of the vena cava and mobilized medially (Fig. 3). The horizontal, retrocaval portion of ureter was completely released, inspected, and determined to be scarred and atretic (Fig. 4). The ureter and renal pelvis were spatulated laterally and reanastomosed with running 4-0 polyglactin sutures. Prior to the completion of the anastomosis, a glidewire (0.035-inch diameter) was introduced in an antegrade fashion down the ureter into the bladder, and a 4.7 French 26-cm double-J stent was passed along the wire (Fig. 5), with its distal curl in the bladder. The wire was removed, the proximal curl of the stent was placed into the renal pelvis, and the anastomosis was completed in a tension-free fashion (Fig. 6). A Jackson-Pratt drain was placed. Blood loss was minimal. Total operative time was 3 h.

The patient had an uneventful postoperative course, with return of bowel function commencing on postoperative day one and discharge on post-

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operative day two. The drain and double-J stent were respectively removed at 1 wk and 6 wk postoperatively. At the 6-mo follow-up visit, a MAG-3 scan revealed no evidence of obstruction of the right kidney. The patient remained symptom free at last follow-up.

3. Discussion

A retrocaval ureter is a rare anatomical anomaly. The embryologic event that precipitates it is the abnormal persistence of the subcardinal vein on the right side [3]. The anomaly usually becomes symptomatic in the third or fourth decade of life [4], and the performance of dismembered pyeloplasty is the accepted treatment modality. The treatment of this clinical situation, despite the need for an increased amount of dissection around the vena cava, is well suited to the minimally invasive approach. In its initial description, laparoscopic dismembered pyeloplasty for retrocaval ureter was beset with a long anastomosis time [5]. In our procedure, anastomosis was completed in 30 min and, from a technical standpoint, was no more difficult than the anastomosis for a standard pyeloplasty. The results in the literature of laparoscopic pyeloplasty for retrocaval ureter are summarized in Table 1. All procedures had the benefit of minimal blood loss and no reported complications; however, the operative time reported was quite variable, ranging from 130 min to 560 min.

From a technical standpoint, there are other important points to mention. In many ways, the performance of this procedure is more straightforward than performing a standard laparoscopic dismembered pyeloplasty for nonretrocaval UPJO. We found the section of ureter that was medial to the vena cava fairly easy to mobilize laparoscopically, with the dissection facilitated with a vessel loop used for traction purposes (Fig. 2). In fact, the completion of a tension-free anastomosis was easier in this case than in many routine pyeloplasties, probably due to more redundant length of ureter due to its tortuous path behind the vena cava. Also, the placement of the double-J ureteral stent from an antegrade approach

<table>
<thead>
<tr>
<th>Study</th>
<th>Cases</th>
<th>Approach</th>
<th>Blood loss, cm³</th>
<th>Operative time, min</th>
<th>Complications</th>
<th>Follow-up, mo</th>
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<td>Laparoscopic assist with extracorporeal anastomosis</td>
<td>50</td>
<td>130</td>
<td>None</td>
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</table>
obviated the need for a potentially difficult endoscopic retrograde stent placement due to the tortuous course of the ureter under the vena cava. In our case, the retrocaval section of ureter appeared atretic, which could have complicated retrograde stent passage through the ureteral lumen.

4. Conclusions

Given the good track record, quick convalescence, and relative technical ease, laparoscopic dismembered pyeloplasty for retrocaval ureter is a procedure that should be considered as a first line treatment for this anatomic anomaly.

Conflicts of interest: Inderbir S. Gill is a consultant for Hansen Medical.

EU-ACME question

Please visit www.eu-acme.org/europeanurology to answer the below EU-ACME question on-line (the EU-ACME credits will then be attributed automatically).

Question:

What is the embryological anomaly that leads to the formation of a retrocaval ureter?

A. Persistence of the supracardinal vein.
B. Persistence of the subcardinal vein.
C. Abnormal ureteric bud formation.
D. Situs inversus.

References