UroToday International Journal

#### www.urotodayinternationaljournal.com Volume 3 - April 2010

### Laparoscopic-Extended Pyelolithotomy With Concomitant Pyeloplasty: A Case Report

*Manickam Ramalingam, Mizar G Pai, Kallappan Senthil, Anandan Murugesan* Department of Urology, PSG Institute of Medical Sciences and Research, Coimbatore, India *Submitted January 2, 2010 - Accepted for Publication January 19, 2010* 

#### ABSTRACT

The authors provide the first known report of concomitant laparoscopic-extended pyelolithotomy with pyeloplasty. A 45-year-old male with symptomatic staghorn calculus secondary to pelviureteric junction obstruction underwent concomitant laparoscopic-extended pyelolithotomy and Fenger's nondismembered pyeloplasty. The feasibility and limitations of the procedures are described. The authors concluded that despite its technical challenges, laparoscopic pyelolithotomy with pyeloplasty is a minimally invasive surgical option that provides the benefit of minimal morbidity with correction of the pelviureteric junction obstruction.

#### INTRODUCTION

Management of staghorn calculi has always been complex [1]. Staghorn calculi have been treated using multiple puncture percutaneous nephrolithotomy (PCNL), with or without extracorporeal shock wave lithotripsy (ESWL). Alternatively, staghorn calculi have been removed using open extended pyelolithotomy with nephrolithotomy. Laparoscopic extended pyelolithotomy [2] and anatrophic nephrolithotomy [3] have been less commonly used.

Pelviureteric junction obstruction can predispose the patient to secondary calculi. Occasionally, a staghorn calculus may coexist with pelviureteric junction obstruction. Laparoscopic pyeloplasty is becoming the new gold standard for the management of pelviureteric junction obstruction [4]. It has been reported to be successful even in children [5]. Laparoscopic management of pelviureteric junction obstruction with concomitant secondary stones has also been reported [6,7]. The authors present the case of a patient whose partial staghorn calculus with pelviureteric junction was managed laparoscopically.

**KEYWORDS**: Staghorn Calculus; Pelviureteric junction obstruction; Pyeloplasty; Extended pyelolithotomy; Laparoscopy.

**CORRESPONDENCE**: Dr. Manickam Ramalingam, PSG Institute of Medical Sciences and Research, Peelamedu, Coimbatore – 641004, Tamilnadu, India (uroram@yahoo.com).

**CITATION**: UroToday Int J. 2010 Apr;3(2). doi:10.3834/uij.1944-5784.2010.04.04

#### Case Report

A 45-year-old male presented with a partial staghorn calculus involving the lower calyces (anterior and posterior) and pelvis. He also had a pelviureteric junction obstruction (Figure 1). Because the patient had 2 pathologies, his options were open surgery or laparoscopy. PCNL with endopyelotomy was not considered in this patient due to unsatisfactory results of endopyelotomy in the literature [8].

The colon was mobilized, and the ureter and pelvis were dissected using 5 ports: (1) a paraumbilical 10 mm camera port, (2) a 5 mm port in the subcostal region, (3) a 10 mm port in the left iliac fossa, (4) a 10 mm port in the epigastrium for retraction, and (5) a 5 mm port in the flank for suction (Figure 2). The pyelotomy was planned such that a nondismembered pyeloplasty (Fengerplasty) could also be completed (Figure 3). Extension into the infundibulum and lower calyx was made (Figure 4). The staghorn calculus was entirely removed (Figure 5). Secondary calculi were removed by irrigation, during which a few calculi slipped into the perirenal area. The 10

#### Abbreviations and Acronyms

PCNL = percutaneous nephrolithotomy ESWL = extracorporeal shock wave lithotripsy



# UroToday International Journal<sup>®</sup>

case report

Laparoscopic-Extended Pyelolithotomy With Concomitant Pyeloplasty: A Case Report.

Figure 1. Intravenous Urogram (left) and Plain Computed Tomography (right) Showing Complex Stone Occupying All Major And Minor Calyces With Pelviureteric Junction Obstruction. doi:10.3834/uij.1944-5784.2010.04.04f1.



Stones are visible in the upper right quadrant in the urogram and lower right quadrant (arrow) in the CT scan.

mm port in the left iliac fossa was changed to a 20 mm port to allow removal of the entire staghorn calculus, thus avoiding scattering of fragments during intracorporeal lithotripsy. Nondismembered pyeloplasty (Fengerplasty) was accomplished with 5-0 polyglactin sutures (Figure 6). Subsequently, the remaining pelvicalyceal incision was sutured. An antegrade stent was placed. A nephrostomy was created by passing a 5 mm grasper through the pyelotomy into the middle calyx and then exiting through the abdominal wall. This was done to reduce the chance of sepsis, extravasation, and consequent fibrosis. A drain was placed through the flank port. The operating time was 210 minutes, and the patient's blood loss was approximately 50 mL (as assessed from the suction output). A nephrostogram was performed on the 5th postoperative day, revealing a few secondary calculi outside the renal area. There were also a few secondary calculi, all less than 4 mm, in the lower minor calyx. The calculi in the lower minor calyx were considered insignificant and inaccessible. There was no immediate or delayed surgery-related morbidity. The patient was followed for 6 months. A few insignificant calculi were noted in the lower minor calyx on plain computerized tomography (CT) of the kidneys, ureters, and bladder. The patient was asymptomatic.

#### DISCUSSION

Because the results of PCNL with endopyelotomy are inferior to open surgery [8], open surgery is usually recommended for a staghorn calculus with pelviureteric junction obstruction. During PCNL there is a risk of bleeding, nephron damage, fluid absorption, and potential systemic sepsis due to the release of microbials from the stone. Laparoscopy is becoming an alternative approach to the management of renal stones [9]. Laparoscopic-extended pyelolithotomy aids in removal of the entire calculus, thus reducing the chances of residual fragments. Laparoscopy does not cause the nephron damage seen in multiple puncture PCNL. Robot-assisted laparoscopic-extended pyelolithotomy has been described [10,11]. However, a robot is not available in many institutions. Concomitant laparoscopic management of a pelviureteric junction obstruction and staghorn calculus has not been described previously; this is the first known report of laparoscopic-extended pyelolithotomy with pyeloplasty. Although it is technically demanding, laparoscopic pyelolithotomy with pyeloplasty is a minimally invasive surgical option that provides the benefit of minimal morbidity with correction of the pelviureteric junction obstruction.

# UroToday International Journal®

case report

Manickam Ramalingam, Mizar G Pai, Kallappan Senthil, Anandan Murugesan www.urotodayinternationaljournal.com

Figure 2. Sinus Dissection in Progress. doi:10.3834/uij.1944-5784.2010.04.04f2.



Abbreviations: K, kidney; P, pelvis; U, ureter. Note the narrowing in the pelviureteric junction.

Figure 3. Ureterotomy Extended Into the Pelvis and Major Calyx, Exposing Part of the Calculus. doi:10.3834/uij.1944-5784.2010.04.04f3.



Figure 4. Pyelotomy Being Extended to The Major and Minor Calyces to Help Deliver the Partial Staghorn Calculus. doi:10.3834/uij.1944-5784.2010.04.04f4.



Figure 5. The Stone Maneuvered Out in Toto. doi:10.3834/uij.1944-5784.2010.04.04f5.



Note the spatulated pelviureteric junction segment.

# UroToday International Journal

case report

Laparoscopic-Extended Pyelolithotomy With Concomitant Pyeloplasty: A Case Report.

Figure 6. Closure of the Pyelotomy Incision After Completion of the Fengerplasty. doi:10.3834/uij.1944-5784.2010.04.04f6.



- REFERENCES
- [1] Lingeman JE. Surgical management of urinary lithiasis. In Walsh P, Retik AB, Vaughan ED, Wein AJ, eds. Campbell-Walsh Urology. 8th ed. London, UK: Saunders; 2002:3361-3450.
- [2] Jordan GH, McCammon KA, Robey EL. Laparoscopic pyelolithotomy. *Urology.* 1997;49(1):131-134.
- [3] Simforoosh N, Aminsharifi A, Tabibi A, et al. Laparoscopic anatrophic nephrolithotomy for managing large stag horn calculi. *BJU Int.* 2008;101(10):1293-1296.
- [4] Symons SJ, Bhirud PS, Jain V, Shetty AS, Desai MR. Laparoscopic pyeloplasty: our new gold standard. J Endourol. 2009;23(3):463-467.
- [5] Casale P. A review of pediatric laparoscopic pyeloplasty. *UroToday Int J.* 2009 Feb;2(1).
- [6] Stein RJ, Turna B, Nguyen MM, et al. Laparoscopic pyeloplasty with concomitant pyelolithotomy: technique and outcomes. *J Endourol.* 2008;22(6):1251-1255.
- [7] Srivastava A, Singh P, Gupta M, et al. Laparoscopic pyeloplasty with concomitant pyelolithotomy--is it an effective mode of treatment? *Urol Int.* 2008(3);80:306-309.

- [8] Ost MC, Kaye JD, Guttman MJ, Lee BR, Smith AD. Laparoscopic pyeloplasty versus antegrade endopyelotomy: comparison in 100 patients and a new algorithm for the minimally invasive treatment of ureteropelvic junction obstruction. Urology. 2005;66(5 Suppl):47-51.
- [9] Nambirajan T, Jeschke S, Albqami N, Abukora F, Leeb K, Janetschek G. Role of laparoscopy in management of renal stones: single-center experience and review of literature. J Endourol. 2005;19(3):353-359.
- [10] Badani KK, Hemal AK, Fumo M, et al. Robotic extended pyelolithotomy for treatment of renal calculi: a feasibility study. *World J Urol.* 2006;24(2):198-201.
- [11] Nayyar R, Wadhwa P, Hemal AK. Pure robotic extended pyelolithotomy: cosmetic replica of open surgery. J Robotic Surg. 2007;1(3):207–211.