

Case Report

Incidental diagnosis of asymptomatic unilateral complete duplication of ureter during total laparoscopic hysterectomy

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ABSTRACT

Duplication of ureter is one of the common renal abnormality frequently encountered by gynaecologist during surgeries. It occurs in approximately 1% of the population. We are reporting a case of asymptomatic unilateral (left) double ureter which was incidentally diagnosed during Total Laparoscopic Hysterectomy as it is important to know the developmental anatomy of ureter and its anatomical variants. A gynaecologist should know about the clinical significance of it as well to avoid injury to ureter during hysterectomies which is the commonly performed gynaecological surgery worldwide.

Keywords: Duplication ureter, Double ureter, Developmental anomaly ureter, Laparoscopy

INTRODUCTION

Duplication of ureters or collecting system is a congenital condition in which the ureteric bud, the embryological origin of ureter splits (or arises twice) resulting in two ureters draining a single kidney. It is very common in Caucasians than other population. Duplication may be complete or incomplete, unilateral or bilateral and is often associated with vesicoureteral reflux, urinary tract infections, ectopic ureterocele or ectopic ureter insertion or ureteric obstruction.¹ Among the patients who are asymptomatic, they may be diagnosed during imaging techniques, abdominal pelvic surgeries or sometimes during autopsy.¹

CASE REPORT

A 46 year old lady with BMI 25.4 had excessive flow during periods for 2 years with severe pain during periods and post menstrual spotting for 1 year. She is a P2L2 with

two normal deliveries. Clinically uterus size was 24 weeks. All her blood investigations were normal. Her MRI abdomen and pelvis reported uterus size of about 15.6×7.9×9.9 cms (including fibroid). Endometrial thickness was 7 mm and junctional zone measures 7 mm. 11.1×7.4×8.3 cms large lesion seen (fibroid) in uterine body myometrium and it was indenting the endometrial cavity and it was extending exophytically in to lower level adjacent to cervix with features representing large intramural degenerated fibroid with sub serosal extension. There was no evidence of sarcomatous changes in the MRI.

Endometrial biopsy suggestive of proliferative endometrium and pap smear was normal. She was planned for total laparoscopic hysterectomy (TLH) after 3 doses of Inj. GnRH analogues. Inj. Goserelin 3.6 mg subcutaneously was given monthly 3 doses following which the uterus size came down to 22 weeks clinically. After pre-operative work up, she underwent total

laparoscopic hysterectomy with bilateral salpingectomy followed by prophylactic bilateral ovariopexy. Intraoperatively, while tracing the course of the ureter, double ureter was identified (Figure 1).

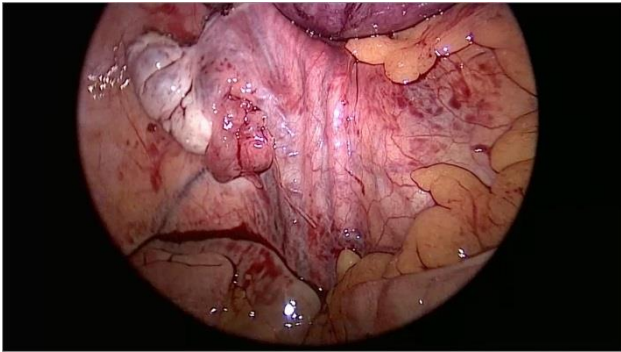


Figure 1: Double ureter seen at the pelvic brim.

The duration of surgery was 165 minutes (2 hours and 45 minutes). Morcellation time was 20 minutes. Blood loss was 40 ml. Specimen weight was 460 grams. Pre-operative hemoglobin was 11 grams%. Post-operative hemoglobin was 10.5 grams%. She was started on clear fluids 6 hours after the surgery and followed by full liquids and soft diet. She got discharged on 3rd post-operative day. Ultrasound done on 3rd post-operative day was normal with no evidence of abdominal or pelvic collection and no evidence of hydro ureteronephrosis on both sides. She was reviewed after a week and then after 3 months. Intraoperatively, right ureter and bladder was normal. Cystoscopy done at the end of procedure shows two ureteric orifices on left side. Since she was asymptomatic at the time of surgery, she was advised that need for intravenous pyelography if symptoms develop in future. Postoperative period was uneventful.

Strategies performed for a successful TLH

1. Screening of abdomen and pelvis

In TLH as soon as we enter the abdomen we inspect thoroughly the abdominal cavity and all viscera and bowel and omentum followed by inspection of pelvis with importance to the size of uterus, location of myomas and both adnexa and any evidence of pelvic endometriosis followed by visualization of bilateral ureters from its entry into the pelvis along the course of it in the lateral pelvic wall in all cases. This as a routine step in our protocol which enabled us to identify the double ureter intra operatively even before we start TLH although radiologist could not see it in MRI as the large left lateral wall myoma was obscuring the ureter (Figure 1 and 2).

2. Anatomical orientation

Although uterine contour and its anatomy was distorted, orienting the surgical anatomy intra operatively, location

of left lateral wall myoma with respect to ureter and lateral pelvic wall anatomy made us to delineate the course of ureter clearly and to proceed further dissection.

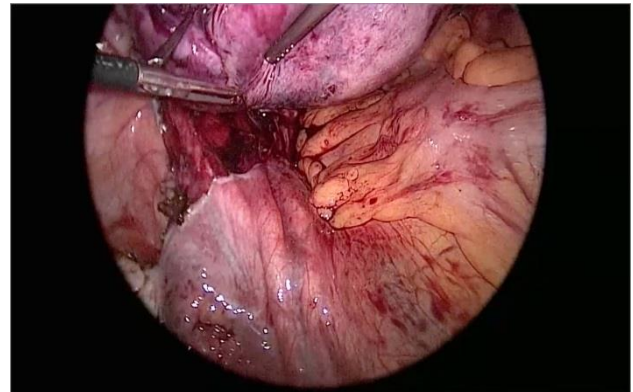


Figure 2: Both the ureters traced until the distal entry point.

3. Careful ureterolysis

By exposing the avascular retroperitoneal space and displacing the ureters laterally.

4. Changing the position of myoma screws

Changing the position of myoma screw often while carrying out the dissection in the lateral pelvic wall made us to proceed further without damage to both the ureters.

5. Caution during posterior and lateral dissection

Carrying out the posterior and lateral dissection was done with utmost caution with camera surgeon showing the view of both left ureters running the same course along the lateral pelvic wall and uterosacral ligament (Figure 2).

DISCUSSION

Duplication of ureter is the commonest renal tract anomaly with incomplete duplication three times more common than complete duplication. It may be discovered in childhood or less frequently in later life or they may be occult and diagnosed incidentally during surgery, sometimes discovered at autopsy.

It is more common in females with an estimated ratio of approximately 1.6:1, however this may be due to higher frequency of urinary tract infection in females leading to higher rates of diagnosis of duplicated ureter.¹ Female patients may present with urinary incontinence, even later in life. Unilateral duplication is six times more common than bilateral duplication.¹ Complete duplication occurs when two ureteral buds arise from the same mesonephric duct with each ureter draining a separate pelvicalyceal system.

In a clinical and gynecologist point of view knowing the anatomy of ureter and its congenital variations and potential complications are very important as it is a well-recognized fact that abnormal organ is more liable to injury than a normal one so that the duplication must be kept in mind while doing hysterectomies. Yusuke Tanaka et al has reported a similar case of incidental diagnosis of partial duplication of right ureter during Total laparoscopic hysterectomy which was also asymptomatic with no other associated congenital anomalies.¹ They have also followed the technique of careful ureterolysis from posterior leaf of broad ligament for its entire course in pelvis to expose it to prevent ureteric injury.

The three commonest complications of complete duplications are vesicoureteric reflux, ectopic ureterocele, ureteropelvic junction obstruction of lower pole.² It may be associated with autosomal dominant polycystic kidney disease or horse shoe kidney.

Anatomical variants or anomalies as well as suboptimal imaging techniques can either simulate or obscure duplication, making diagnosis difficult.² In our case, we have done an MRI abdomen and pelvis pre-operatively to rule out sarcomatous changes, however it was obscured in MRI because of the large 11 cm degenerated myoma in left lateral wall. However, familiarity with the embryology of duplication and awareness of potential pitfalls of excretory urography and voiding cystourethrography and other imaging modalities can help in the diagnosis and thereby avoid associated complications.²

Liapis et al in their study have reported that despite the frequency with which hysterectomy is performed, urinary tract injury is not uncommon given the intimate relationship between the genital and urinary tracts.³ The evaluate study was a 2-part, randomized controlled trial that examined outcomes with laparoscopic hysterectomy versus abdominal hysterectomy and laparoscopic hysterectomy versus vaginal hysterectomy. In both arms of the trial, bladder injuries were encountered in all forms of hysterectomy, though ureteral injuries were noted only after laparoscopic hysterectomy. Laparoscopic hysterectomy was associated with a significantly higher rate of all major complications (including urinary tract injuries) than was abdominal hysterectomy.⁴

In one of the first studies comparing incidence of ureteral injury in a Finnish cohort, incidence of injury was as high as 13.9 in 1000 for laparoscopic hysterectomy, versus 0.4 in 1000 for abdominal and 0.2 in 1000 for vaginal hysterectomies.⁵ However, in a follow-up study, incidence of ureteral injuries was 3.4 in 1000, a significant decrease may be attributable to the learning curve associated with laparoscopic hysterectomy.⁶ Laparoscopic hysterectomy, however, is being performed more frequently due to advantages in minimizing blood loss, reducing length of hospital stay and decreasing postoperative pain and time to recovery.⁷⁻⁹

In a study by Cohen et al in preventing urinary tract injury at the time of hysterectomy they have discussed in detail about the four strategies for success. In that study, they have mentioned that ureteric injuries are very common in cases with anatomical distortion of uterus with large myomas and in cases of congenital anomaly of renal tract and collecting system.

In their strategies, they have mentioned that first strategy as one should possess thorough knowledge of the pelvic and retroperitoneal anatomy and course of ureter in the abdomen and pelvis till it enters ureteric tunnel and its anatomical variations. In our case the technical difficulty was due to large left lateral wall myoma and there was no space in lateral pelvic wall on either side and more the duplication of ureter was also in the left side. Hence identification of the ureter is imperative to minimize risk of thermal injuries as well as transection during gynecological surgeries.

This course in the deep pelvis necessitates isolation and lateralization of the ureter in cases of total or radical hysterectomy to avoid injury. Ibeanu et al has reported that nearly early 80% of ureteral injuries occur near the uterine artery.¹⁰ Cohen et al in their study has mentioned the second strategy as addressing patient-specific risk factors especially in patients undergoing hysterectomy for large uteri or who require resection of adnexal masses who are also at increased risk of ureteral injury.¹¹ This may be related to anatomic distortion and engorgement of the vasculature, which can make identification of the anatomic course of the ureter challenging. Less commonly, ectopic insertion of the ureter or duplication in the renal system puts a patient at increased risk of ureteral injury.¹¹ Although preoperative imaging would aid in surgical planning, such anomalies are often identified intra-operatively and the surgeon should have a high degree of suspicion when dissection reveals an anatomic variant.

Ureteral catheterization prior to hysterectomy has been proposed in high-risk populations and has also been investigated as universal preoperative prophylaxis. In both a retrospective study and randomized trial, use of catheterization resulted in no significant difference in incidence of ureteral injury.^{12,13} In Kuno's retrospective study, all injuries occurred in patients undergoing laparotomy for malignancy or leiomyomata (although uterine size was not disclosed).

They suggest that prophylactic ureteral catheterization should not be a substitute for meticulous dissection, but in an appropriately selected patient it may improve the ability to identify the ureter either visually or by palpation. The decision about use of catheterization should be left to the surgeon's discretion.

Third strategy by Cohen et al is to screen for injury thereby minimizing the risk of intraoperative injury by maintaining visual identification of the ureters and

bladder in relation to the operative target. In our case throughout the surgery we were maintaining the anatomical orientation of course of both the ureter with respect to uterus and its peristalsis was also noted although this alone should not be viewed as confirmation of ureteral integrity as peristalsis may occur despite injury.¹⁴

This also allows early recognition of injury, should it occur. Confirmatory measures for further reorientation include palpation of the ureters and bladder, bladder back-filling, administration of intravenous (IV) dye, cystoscopy, and retrograde pyelography. In our case, we have done cystoscopy at the end of the procedure. Immediately following the procedure, cystoscopy can be used as a surveillance technique to assess both bladder and ureter integrity. It should be noted that visualization of bilateral ureteral jets immediately post-hysterectomy does not guarantee ureteral integrity as this may not reveal thermal injuries, kinking or stricture of the ureters. Despite these limitations, the American Association of Gynaecologic laparoscopists currently recommends that routine cystoscopy be considered at the time of total laparoscopic hysterectomy, although data are insufficient to extend the recommendation to laparoscopic subtotal hysterectomy.¹⁵ Sluggish or absent efflux of urine from the ureteral orifices is often a sign of ureteral injury. They have recommended fourth strategy as to recognize the injury at the earliest possible. Postoperatively, a high degree of suspicion is required to identify patients with urinary tract injuries unrecognized at the time of surgery. Patients may present with a wide range of complaints, depending on the time since the primary surgery.¹⁶

CONCLUSION

Doing total laparoscopic hysterectomy in patients with anatomical distortion of uterus with huge myoma would be technically challenging. With an added risk of location of myoma in lateral pelvic wall in the side where there is complete duplication of ureter. It really needs sound knowledge of developmental anatomy of ureter and its variations and also the surgical anatomy and course of the ureter from abdomen and to pelvis till it enters the ureteric tunnel and its relation to lateral pelvic wall and uterus for a gynecologist so as to avoid ureteric injury in simple as well as complex cases. Urinary tract injury is a known complication of hysterectomy, regardless of route of procedure. Surgeon familiarity and comfort with complex anatomy, as well as preoperative risk stratification, is essential to minimizing risk of urinary tract injury. High anticipation, performing all the risk strategies which were discussed above, meticulous dissection helps in preventing ureteric injuries. Although a useful procedure cystoscopy does not identify all injuries. To conclude we report a rare case of duplicated ureter which was incidentally diagnosed during TLH. In a clinical scenario like this, use of electro-surgical instruments with less lateral thermal spread like harmonic shears for dissection of lateral pelvic wall close to the ureters and use of advanced bipolar energy device like

ligasure or thunder beat to coagulate the tortuous engorged uterine vessels to minimize risk of injury in the setting of compromised anatomic planes.

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