

Ureterovaginal Fistula after Use of Harmonic Scalpel in Total Laparoscopic Hysterectomy: Possible Causes and Successful Management

¹De Arpita, ²Archana Sharma

ABSTRACT

We report a case of a woman presenting with continuous dribbling of urine since her total laparoscopic hysterectomy with harmonic scalpel three months back. A clinical examination, three swab test and IVP confirmed a left sided ureterovaginal fistula. A ureteroneocystostomy was done and she recovered full bladder control. In this case we try to find the reasons and the finer points of harmonic use to prevent such an injury.

Keywords: Harmonic scalpel, Total laparoscopic hysterectomy, Ureterovaginal fistula.

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INTRODUCTION

In the last one decade, there has been extensive use of harmonic scalpel (HS) in total laparoscopic hysterectomy (TLH) instead of the conventional bipolar grasper and scissors. They are expensive but consume less time and have made TLH simpler, faster and safer. The incidence of ureteric injuries with HS is very low. The chances are more likely in big uterus, huge adnexal tumors, prior surgeries, ureteric abnormalities, endometriosis, etc.¹ Yet, there have been few case reports on ureteric injuries in uncomplicated laparoscopic cases with HS.^{2,3} We will try to explore the possible mechanisms of the fistula in such a patient, how to diagnose, manage and prevent them.

CASE REPORT

A 40-year-old woman presented three months after TLH, with history of continuous dribbling of urine since her discharge. Her previous records were reviewed. She had

been operated for intractable menorrhagia and had a 6 weeks adenomyotic uterus. TLH had been done with the use of harmonic scalpel. Perspeculum examination revealed a fistula of about 3 mm at the left corner, high up in the vaginal vault. All routine investigations including renal function tests were normal except hemoglobin of 6 gm%. On doing a three swab test, the deepest placed swab was soaked in clear urine with no dye in any of the swabs. IVP was normal on the right and showed mild left sided hydroureter and hydronephrosis. Left side ureter could be traced to around 0.8 mm proximal to the bladder. Diagnosis of left sided ureterovaginal fistula was made. Blood was transfused, urinary tract infection was ruled out and cystoscopy with ureteric stenting was planned. However, stenting was abandoned as it could not be negotiated through the left ureter. Subsequently laparotomy was done. Left ureter was traced till its distal limit, which was flimsily attached to the vaginal vault. Ureteric reimplantation was done submucosally into the bladder and a ureteric stent was left behind. A suprapubic tube and a Foley's catheter were placed. After 15 days the Foley's catheter was removed and the stent was removed after 6 weeks. The patient regained full bladder control. She has been under regular follow-up for 3 months now and latest sonography shows resolution of the hydroureter and hydronephrosis as well.

DISCUSSION

The ultrasonically activated scalpel (Harmonic-Ethicon Endo Surgery INC—Johnson & Johnson) is based on the application of ultrasound within harmonic frequency range to tissues. This allows three effects—coagulation, cutting and cavitation to act synergistically. This makes HS a sole coagulating, cutting and dissection device.² It generates a much lower temperature compared to other electrosurgical devices (100°C vs 300-400°C) thus decreasing the lateral thermal spread. HS can be safely used beyond 3 mm of vital structures when level 3 is used less than 10 seconds and level 5 is used less than 5 seconds. This decreases the chances of ureteric and bladder injuries. There is also less postoperative pain as it is associated with decreased amount of tissue necrosis.³

^{1,2}Assistant Professor

^{1,2}Department of Obstetrics and Gynecology, GMERS Medical College, Patan, Gujarat, India

Corresponding Author: De Arpita, Assistant Professor, Department of Obstetrics and Gynecology, GMERS Medical College, Dharpur Patan-384265, Gujarat, India, Phone: 09899864949, e-mail: arpitade07@gmail.com

Then what could be the cause of ureteric injuries after use of HS, as reported by a few studies. In a 10-year retrospective study of 1209 hysterectomies by Trivedi et al, there were no ureteric injuries in AH, VH, TLH with bipolar, but there were five cases of ureteric injury with harmonic and vessel sealing devices in TLH.⁴ Another interesting case report by Vetere et al demonstrated the versatility of HS to do a salpingo-oophorectomy of a complex ovarian mass on one side but it caused a ureteral fistula while doing salpingo-oophorectomy on the normal side in the same patient.⁵

HS related ureteral injuries are usually energy induced or by devascularization. It can lead to ureterovaginal fistulas or strictures in the lower 1/3rd of ureter. The chances of injury depend on the proximity, duration and energy setting used.⁶ In our case, one reason could be disruption of arterial supply to an area on the ureter which had preexisting underdeveloped vascular anastomosis. This would lead to ischemia, focal necrosis and ultimately fistula. Another reason could be because of 'abuse mode' of HS. According to the demo CD provided with HS, one should not fire the shears with closed blades when no or small amount of tissue is present. This is the 'abuse mode' which results in very high temperatures on the blade and subsequent thermal injuries. In our patient, if the distal part of the blade was holding tissues and the proximal part was holding thin peritoneum, then at higher levels of firing (level 4 or 5) the distal tissue got separated much before the separation of the peritoneum (which takes a longer time). This led to activation of abuse mode in the distal part leading to subsequent thermal injury. Thermal injury could also be because of superheated water vapor created by the cavitation effect. This vapor may have dissected tissue planes and traveled to the ureter.⁵

Prior ureteric catheterization may help in preventing injuries in high risk cases, but it may not be easy in cases like in big myomas. Side effects like lower backache and hematuria occur frequently in most patients.⁷ There is however no difference in incidence of ureteric injuries if prior stenting is done in all routine cases.

Diagnosis of ureterovaginal fistula is confirmed by a three swab test, IVP and if required cystoscopy.

The management is usually surgical. Results are best if injuries are diagnosed during surgery. In suspected cases of intraoperative energy induced damage, ureteric stenting for 6 weeks suffices. Few weeks after stent

removal a CT or IVP should be done to rule out a ureteric stenosis. Otherwise if there is silent ureteric stricture, patient may develop silent renal atrophy.⁶

If diagnosed after the surgery, delayed repair after 6 weeks is advocated. In cases of ureterovaginal fistula as in this case, ureteroneocystostomy is done. The principles of repair include debridement and spatulation of the ureter and tunneling in the bladder wall superior and medial to the native ureteral orifice. Here the bladder wall is less mobile, decreasing the chances of ureteric kinking. The repair should be stented (for 6 weeks) and a suprapubic tube and urethral Foley's catheter placed. A CT or IVP should be done few weeks after stent removal to rule out silent ureteric stenosis.⁶

This case therefore emphasizes that one should be careful about the liberal use of HS. Injuries could result from failure to skeletonize the uterine vessels, use of a very wide vaginal cup for fornical delineation,⁸ use of HS in abuse mode or with wrong power settings. Vessels upto 5 mm may be sealed in 4-6 seconds (max 10 seconds) at power level 3 while cutting may be better done with max 5 seconds at power level 5. In high-risk cases, prior ureteric catheterization may help. A ureterovaginal fistula is diagnosed by a 3 swab test and IVP. It is repaired by ureteroneocystostomy after minimum of 6 weeks.

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