

Internal Urology

KEYWORDS: Uretero-vaginal Fistula, Ureteric Injury, Ureteric Reimplantation.

IATROGENIC URETERIC INJURY: MANAGEMENT OF URETERO- VAGINAL FISTULA AND URETERIC INJURY IN A SINGLE CENTER: A CASE SERIES



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**ABSTRACT:****Introduction:**

Injury to ureter is a risk to any pelvic or lower abdominal surgery. Gynecologic surgery remains the most common cause of ureteric injury. Most cases of ureteric injury present as uretero- vaginal fistula with continuous incontinence with normal voiding after several days of primary surgery.

Aims And Objectives:

The objective of the study was to evaluate management of iatrogenic ureteral injuries including those Uretero- vaginal Fistulas after elective or emergency gynecologic surgeries.

Methods:

22 patients of iatrogenic ureteral injuries after operative procedures were evaluated from May, 2015 to January 2021 by retrospective data collection and prospective observation. The diagnosis of Uretero- vaginal fistula was based on clinical features, CECT scan with urography, cystoscopy, Retro Grade Pyelogram depending on clinical situation.

Results:

Among 22 cases, 20 cases were from gynecologic operations in which 14 cases were Elective Hysterectomy, 4 cases were Emergency Hysterectomy due to intractable PPH, and 2 cases were ovarian cystectomy. In 14 cases of Hysterectomy 12 cases were Abdominal Hysterectomy (4 were laparoscopic and 8 open) and 2 cases were Vaginal Hysterectomy. In remaining 2 non gynecologic surgeries were due to ureteric injury during URSL. 3 cases presented with B/L ureteric injury, one from elective and two from emergency hysterectomy with anuria and sepsis managed with B/L PCN, later by B/L open ureteric reimplantation. 2 cases of URSL and 5 cases of Hysterectomy were diagnosed as ureteric injury during primary procedure and double J Stent was inserted on table. Another patient underwent RGP f/b stenting on Right side, but on Left, PCN was done, f/b antegrade stenting. 3 patients presented with pyonephrosis after 2 weeks of primary surgery, managed with PCN,

f/b ureteric reimplantation. In remaining 8 cases RGP was done f/b double J Stenting in 3 cases (presented within 10 days of injury) and in 5 cases (which shows complete cut off in RGP) open ureteric reimplantation was done. All reimplantation was extravesical, refluxing (Leich- Gregor technique) and stented; among them 8 in open method and 3 laparoscopically. Follow up were done on post op 6 weeks, 2 month, 6 month and after yearly up to 2 year. In total 11 reimplantation there was reflux and hydronephrosis in 2 cases in imaging studies and all patients were asymptomatic. Only 1 patient managed by antegrade stenting showed lower ureteric stricture in 1 year follow up – later managed successfully with laparoscopic extravesical ureteric reimplantation.

Conclusion:

Earliest intervention within 10 days of injury gives best result even with endoscopic intervention of least morbidity. The cases which present as uretero- vaginal fistula after 2 weeks of injury are best managed by open or laparoscopic extravesical non refluxing ureteric reimplantation.

INTRODUCTION:

Injury to ureter is a risk to any pelvic or lower abdominal surgery. Gynaecologic surgery remains the most common cause of ureteric injury. Most cases of ureteric injury presents as uretero- vaginal fistula with continuous incontinence with normal voiding after several days of primary surgery. Total Abdominal Hysterectomy is the operation most commonly responsible for a ureteral injury^[1] Other rare causes are secondary to cervicopexies both pubic or vaginal, ovarian surgeries, and uterine aspiration^[2] The overall incidence of ureteral injury varies between 2% and 10%. Analysis of 13 published studies concluded that the following procedures contribute to iatrogenic ureteral injuries: hysterectomy (54%), colorectal surgery (14%), ovarian tumour removal (8%), transabdominal urethropexy (8%), and abdominal vascular surgery (6%). The total incidence of ureteral injury after gynaecological surgery is reported to be 0.5% to 1.5%, and after abdominoperineal colon resection, it ranges from 0.3% to 5.7%. Currently, the reported rate of ureteral injury varies between 0.5% and 14% after laparoscopic hysterectomy presently, laparoscopic assisted vaginal hysterectomy is the most common cause of iatrogenic ureteric injury worldwide. However, in developing, countries open gynaecological surgeries still remain the most common cause. Risk

factors for the development of ureterovaginal fistulae include endometriosis, pelvic inflammatory disease, radiation therapy and pelvic malignancy. Except for those malignant cases where a segment of ureter is deliberately excised, many ureteral injuries are likely due to technical or iatrogenic factors.^[3] The morbidity associated with such injury results in increased hospital stay, compromise of the original surgical outcome, secondary invasive interventions, potential loss of renal function, and loss of the patient's quality of life. Loss of continuity of the ureter may result from ischemic necrosis related to clamping, ligation, or damage to the blood supply of the ureter.^[4] Ureterovaginal fistulas have been repaired by ureteroneocystostomy, laparoscopic or open.^[5] Endourological techniques are also used in treating early post hysterectomy ureteral injuries.^[6]

AIMS AND OBJECTIVES:

The objective of the study was to evaluate management of iatrogenic ureteral injuries including those Uretero- vaginal Fistulas after elective or emergency surgeries in RGKMCH.

MATERIALS AND METHODS:

Study Population:

Patients of iatrogenic ureteral injuries in RGKMCH after operative procedures were evaluated from May, 2015 to January 2021.

Sample Size:

22 patients of ureteric injuries were evaluated in total in 5 year period.

Study Method:

Retrospective data collection and prospective observation. Diagnosis and follow up of Uretero- vaginal Fistula was based on clinical features, CECT urography, cystoscopy, Retro Grade Pyelogram depending on clinical situation.

Study Period: May 2015 to January 2021.

Study Technique:

22 patients of iatrogenic ureteral injuries after operative procedures were evaluated from May, 2015 to January 2021 by retrospective data collection and prospective observation. The diagnosis of Uretero- vaginal Fistula was based on clinical features, CECT scan with urography, cystoscopy, Retro Grade Pyelogram depending on clinical situation.

Inclusion Criteria:

- Patients who had Uretero- vaginal Fistula after pelvic and gynaecological surgeries in RGKMCH.
- Individuals who gave consent to be a part of the study.

Exclusion Criteria:

- Individuals who refrained from being a part of the study.
- Patients with haemodynamic instability and uro- sepsis who needs urgent active life saving medical intervention.

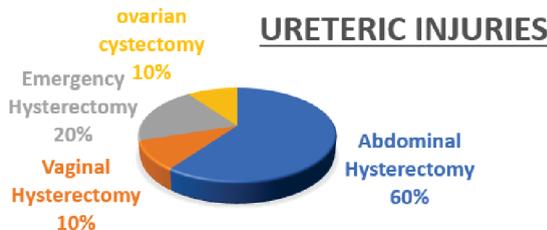
Plan for Data Analysis:

Collected data was analyzed by using standard statistical techniques.

RESULTS:

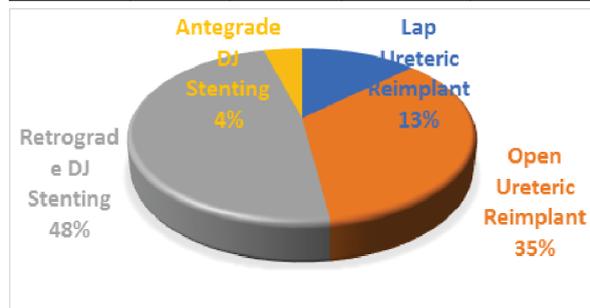
Among 22 cases, 20 cases were from gynecologic operations in which 14 cases were Elective Hysterectomy, 4 cases were Emergency Hysterectomy due to intractable PPH, and 2 cases were ovarian cystectomy. In 14 cases of Hysterectomy 12 cases were Abdominal Hysterectomy (4 were laparoscopic and 8 open) and 2 cases were Vaginal Hysterectomy. In remaining 2 non gynecologic surgeries were due to ureteric injury during URSL. 3 cases presented with B/L ureteric injury, one from elective and two from emergency hysterectomy with anuria and sepsis managed with B/L PCN, later by B/L open ureteric reimplantation. 2 cases of URSL and 5 cases of Hysterectomy were diagnosed as ureteric injury during primary

procedure and double J Stent was inserted on table. Another patient underwent RGP f/b stenting on Right side, but on Left, PCN was done, f/b antegrade stenting. 3 patients presented with pyonephrosis after 2 weeks of primary surgery, managed with PCN, f/b ureteric reimplantation. In remaining 8 cases RGP was done f/b double J Stenting in 3 cases (presented within 10 days of injury) and in 5 cases (which shows complete cut off in RGP) open ureteric reimplantation was done. All reimplantation was extravascular, refluxing (Leich- Gregor technique) and stented; among them 8 in open method and 3 laparoscopically. Follow up were done on post op 6 weeks, 2 month, 6 month and after yearly up to 2 year. In total 11 reimplantation there was reflux and hydronephrosis in 2 cases in imaging studies and all patients were asymptomatic. Only 1 patient managed by antegrade stenting showed lower ureteric stricture in 1 year follow up – later managed successfully with laparoscopic extravascular ureteric reimplantation.



Primary Management:

Primary Procedure	PCN	B/L PCN	DJ STENTING	ANTEGRADE DJ STENTING
Lap AH	03		01	01
Open AH	01	01	06	
Vaginal Hyst.	02			
Emergency Hyst.		02	02	
Ovarian Cystectomy	02			
Others			02	



Management Of Uretero- Vaginal Fistula:

Definitive Management:

Primary Procedure	Lap Ureteric Reimplantation	Open Ureteric Reimplantation	Retrograde DJ Stenting	Antegrade DJ Stenting
Lap AH	03		01	01
Open AH		Unilateral - 01 Bilateral - 01	06	
Vaginal Hyst.		02		
Emergency Hyst.		02	02	
Ovarian Cystectomy		02		
Others			02	
Total Cases	03	08	11	01

Follow-Up:

In follow- up, among total 11 reimplantation there were reflux and hydronephrosis in 2 cases as per imaging studies, though all patients were asymptomatic.

One patient managed by antegrade stenting showed lower ureteric stricture in 1 year follow up – later managed successfully with ureteric reimplantation.

DISCUSSION:

Among 22 cases, 14 were Elective Hysterectomy, 4 after Emergency Hysterectomy, and 2 ovarian cystectomy. In 14 cases of Hysterectomy 12 Abdominal Hysterectomy (4 laparoscopic and 8 open) and 2 Vaginal Hysterectomy. 3 cases presented with B/L ureteric injury f/b anuria and sepsis managed with B/L PCN, later by B/L open ureteric reimplantation. In 5 cases of Hysterectomy, where ureteric injury were diagnosed during primary procedure, DJ Stent was inserted on table. Another patient with B/L ureteric injury, underwent RGP f/b stenting on Right side, but on Left, PCN f/b antegrade stenting done. 3 patients presented with pyonephrosis after 2 weeks of primary surgery, managed with PCN, f/b ureteric reimplantation. Among 8 cases of Uretero-Vaginal Fistula, in 3 cases RGP f/b DJ Stenting (presented within 10 days of injury) and in 5 cases primary PCN f/b ureteric reimplantation was done. Gynecological procedures account for majority of the injuries, and the most common location is the lower ureter.^[8] The injury or fistula may become apparent either immediately or much more commonly, in a delayed fashion several days to weeks after surgery. Constitutional symptoms may result from hydronephrosis secondary to ureteral obstruction or urinary extravasation into the retroperitoneal space. The clinical history of ureterovaginal fistula is usually straightforward. Typically, a gynaecologic procedure, such as hysterectomy, is involved. Poor intraoperative exposures, coupled with heavy bleeding at the operative site, are often the risk factors. The presence of normal upper tracts on imaging essentially rules out ureteral injury; however, the finding of partial ureteral obstruction associated with urinary leakage from the vagina strongly suggests the presence of an ureterovaginal fistula.^[9] Various investigations such as USG abdomen, three gauge test, IVU, Cystoscopy and RGP, CT urography, and magnetic resonance (MR) urography can be used to confirm the clinical diagnosis. IVU demonstrates ureteric injury and hydroureteronephrosis, with cut off of the contrast at the injured site of the ureter and contrast leak. CT and MR urography are used increasingly for detection of ureteric injuries and demonstrates hydroureteronephrosis due to ureteric stricture and ureterovaginal fistula. An RGP is helpful to diagnose ureteral injury, and the placement of ureteral stent could be attempted at the same time.^[10] If we look into the literature [Table 3] Selzman et al. reported that ureterovaginal fistulas resolved in all seven patients treated with an internal ureteral stent.^[6] Al-Awadi et al. reported a success rate of 59.4% with “Double J” stent insertion in their series of 75 patients with ureteral injuries.^[11] A combined ureteroscopic and fluoroscopic technique to re-establish ureteral integrity has been reported to be a successful treatment.^[15] Early intervention is recommended in the treatment of the iatrogenic ureterovaginal fistula, to minimize morbidity, discomfort, and cost.^[16] Double J stenting should be attempted in all patients presenting with ureteric injuries. If unsuccessful, these are the candidates for PCN or ureteric reimplantation depending on the clinical situation.

CONCLUSION:

Earliest intervention within 10 days of injury gives good result even with endoscopic intervention of least morbidity.

The cases presented after 2 weeks of primary surgery are best managed by open or laparoscopic ureteric reimplantation.

Conflict Of Interest: There is no conflict of interest in the study.

Source Of Funding: There was no funding source allocated for the study.

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