

FREQUENCY OF URETERAL INJURY IN PATIENTS UNDERGOING HYSTERECTOMY IN COMPLICATED PELVIC PATHOLOGY USING PEROPERATIVE CYSTOSCOPICALLY PLACED URETERIC STENTS

Nargis Gulab¹, Fouzia Afridi², Mehr Un Nisa¹, Sidra Jabbar Khan¹

ABSTRACT

Objective: To determine the frequency of ureteral injury in patients with complicated pelvic pathology using preoperative cystoscopically placed ureteral stents.

Methods: This was a prospective Comparative study which was conducted in Northwest General Hospital and Research Centre (from 1st January, 2014-31st December, 2016). All cases at high risk for ureteric injuries undergoing total abdominal hysterectomies during a 3-year period were admitted to NWGH & Research Centre and using nonprobability purposive sampling technique patients were grouped into two groups. Group A include patients that were subjected to cystoscopic placement of ureteric stents followed by Total abdominal hysterectomy whereas Group B included patients that were subjected to Total Abdominal hysterectomy without placement of ureteric stents. Data was collected and placed on SPSSR version 16.0 and data was analysed.

Results: A total of 361 Total abdominal hysterectomies were performed that were labeled as high risk either because of previous surgery, endometriosis, large fibroids etc during a period of 3 years. Fibroid related menorrhagia was found in 251 patients, 67 hysterectomies were performed for other causes of abnormal uterine bleeding, 15 for adenomyosis, 13 for chronic PID, 15 for severe endometriosis (stage III & IV).

Conclusion: The use of ureteral stents for complicated hysterectomies prevents ureteral injury significantly. Whether the frequency of uncontrolled hemorrhage is a cause or sequelae of ureteric injury needs further definition. These benefits are subject to increased cost and duration of surgery but not found significant in our study.

Key Words: Cystoscopy, ureteric injury, ureteric stents.

INTRODUCTION

Hysterectomy is the second most commonly performed surgery in women of reproductive age and it ranks second after cesarean section. According to the Center for Disease Control and Prevention (CDC), 11.7% of women between the ages of 40-44 had a hysterectomy from 2006-2010.¹ Of a large list of indications for hysterectomy in gynecological practices some are more prone to develop a ureteric injury which is the most dreadful complications of the common procedure because of the intimate relationship between genital tract and urinary tract. One of the studies conducted reports incidence of ureteric injury from 0.5% -3%².

The incidence of ureteric injury during abdominal and pelvic surgery has been reported in different stud-

¹ Department of Gynae Northwest General Hospital Peshawar

² Department of Gynae KTH Peshawar

Address for correspondence:

Dr. Nargis Gulab

Assistant Professor

Department of Gynae Northwest General Hospital Peshawar

Cell: 0300-5884835

ies to range from 1-8%.³⁻¹⁵ Ureteric injuries are mostly encountered in abdominal hysterectomy (1.3 injuries per 1000 cases) compared to vaginal hysterectomy (0.2 injuries per 1000 cases).¹⁶ Ureteric injury is common in patients with complex pelvic pathology i-e in patients with malignancy, with history of previous surgery, infection, endometriosis. Ureteric injury has serious implications in terms of both morbidity and litigation. The morbidity arising from ureteric injury includes increased hospital stay, secondary invasive interventions, reoperation, potential loss of renal function and deterioration of the woman's quality of life.^{17,18}

Identification of the ureter during a surgical procedure has been reported to range from an invasive procedure to a very minimal surgical procedure. The common sites where ureter can get damaged are at pelvic brim, near infundibulopelvic ligament and near the cervix where cardinal ligament crosses the ureter. Injury to the ureter can be prevented by identifying high risk cases and by adopting preventive strategies in those high risk cases. Prevention can be attempted by preoperative and intraoperative precautions (placement of ligated ureteral stents). To date the use of intraoperative ureteral stents to prevent ureteric injury is controversial. Some of the gynaecologists suggest that prophylactic

ureteral catheterization for preventing ureteral injuries in high risk cases is of significant help and evidence proven that a lower frequency of ureteral injury was observed and stated that this is an extremely useful procedure that can reduce ureter injury to zero.^{19,20,21} Other suggested that prophylactic ureteral stents for preventing ureteral injuries did not affect the rate of ureteral injury and there was no statistically significant difference in rate of ureteral injuries in patients who did and patients who did not undergo preoperative ureteral stenting.^{22,23}

MATERIAL AND METHODS

This study was conducted at the Department of Gynaecology at North West General Hospital, Peshawar from the 1st of January, 2014 till 31st December, 2016. Over the three years period a total of 681 hysterectomies were performed. Majority were performed abdominally with 10% performed vaginally. A limited number of hysterectomies were performed laparoscopically. After excluding patients that were not to be included in study a total of 361 patients out of 681 were included in study. Prospectively patients were alternately (non-purposive) placed into two groups amongst cases that were labeled as high risk.

High risk cases included those cases with diagnosis of PID, endometriosis, with history of previous surgery. Group A included patients that were subjected to pre-operative cystoscopically placement of ureteral stents and followed by Total Abdominal Hysterectomy whereas group B included patients in whom total abdominal hysterectomy was performed without preoperative placement of ureteric catheters. Those cases with malignancy, candidates for vaginal hysterectomies and laparoscopic TAH were excluded from the study limiting selection bias. Patients with all age ranges indicated for hysterectomy were admitted through the out patient department and were informed of their inclusion in the study to address blinding.

Ethical issues regarding their inclusion and cost of the procedure were addressed by the ethical committee of North West general Hospital. Following approval, all patients were run through a series of investigations that included Complete Blood picture, blood group, RBS, HBsAg, anti HCVab, HIV, B urea and creatinine, PT, APTT, ECG, ECHO.

Group A patients were placed on the operating table and General Anesthesia given and in the initial few cases with collaboration of urologist were passed non fluorescence PTFE ureteral stents or catheters bilaterally depending on the consultant choice. In later cases all stents were passed by the attending operating gynaecologists. Following placement a standard pfennensteil incision was fashioned in all cases. Patients in Group B had undergone hysterectomy in the same fashion without placement of stents. At the end of the procedure all patients that had catheters passed were removed.

Statistical Analysis

Data was collected, placed on SPSSR version 16.0 and analyzed. Data was represented in tabulated format as demographic details, indications for previous laparotomy and complications of procedure. Continuous data was compared between groups using students t test and Man Whitney U tests whereas qualitative data was analyzed using chi square test or Kruskal Wallis test. A difference between groups determining a p value of less than 0.05 was considered as significant.

RESULTS

Study included 361 patients. Most of the patients were in age group of 42.4(±4.9). Mean operative time for group A was 74.4(± 21.5) minutes and for group B was 62.1(± 18.6) minutes. The difference in operative time in both group was attributed to cystoscopically placed ureteric catheters in group A patients. Intra-operative blood loss in group A was 218.4 ml (±69.9) and in group B was 286.2 ml (±113.4). Preoperative Hb was almost same in both groups. 12.1 (± 3.8) gm/dl in group A and 11.6 (± 3.1) gm/dl in group B.

As fibroid uterus is the most common cause of menorrhagia upto 70% (251) of hysterectomies were performed for fibroid related menorrhagia 19% (67) were performed for other causes of AUB. Of the total, 4.1% (15 cases) of hysterectomies were performed for adenomyosis. In 13 cases (3.6%) hysterectomies were performed for chronic PID. And 4.1% (15 cases) of hysterectomies were performed for severe endometriosis.

A fair share of the hysterectomies (117 cases), had a previous history of surgery rendering these cases as high risk based on their indications for hysterectomy. Majority of patients were placed in a subgroup of cases that had C-section at some point in their life (55 cases).

Table 1: Demographic Data and Operative Data

	Group A n=180	Group B n=181	P value
Mean Age (s.d.)	41.3(±4.9)	43.4(±5.1)	0.984
weight	73.4(±13.1)	66.8(±17.5)	0.76
Intra-Operative blood loss (ml)	218.4(+69.9)	286.2(±113.4)	0.15
Operative time (min)	74.4(±21.5)	62.1(±18.6)	0.556
Pre-op Hb (g/dl)	12.1(±3.8)	11.6(±3.1)	0.335

Table 2: Indications

Indication for surgery	Group A n=180	Group B n=181	P value
Fibroid uterus	126	125	0.7
Other causes of AUB	33	34	0.89
Adenomyosis	07	08	0.677
Chronic PID	06	07	0.23
Endometriosis	08	07	0.115

Table3: Indications of previous surgery (where applicable)

Indication for previous surgery	Group A n=60	Group B n=57	P value
C-section	28(46.6%)	27(47.3%)	0.3
Ovarian cystectomy / oophorectomy	14(23.3%)	15(26.3%)	0.21
Ectopic pregnancy	08(13.3%)	07(12.2%)	0.45
Laparotomies for gut surgeries	09(15%)	07(12.2%)	
Rectal procedures	01(1.66%)	00	—
Urinary bladder procedures	00	01(1.75%)	—

Table 4: Complications

Complications	Group A n=180	Group B n=181	P value
Pulmonary complications	06(3.3%)	09(4.9%)	0.21
DVT	03(1.6%)	05(2.7%)	0.33
Uncontrolled bleeding	05(2.7%)	14(7.7%)	0.04
Ureteric injuries	01(0.55%)	07(3.8%)	<0.001
Hematuria persistent	01(0.5%)	03(1.6%)	0.15
Intestinal perforations iatrogenic	03(2.7%)	02(1.1%)	0.41
Wound infection	12(6.6%)	15(8.2%)	0.44
Wound dehiscence	01(0.5%)	01(0.5%)	0.98

Moreover 18 patients (15.3%) out of the mentioned patients with history of previous surgery had non-gynecologic surgery that made access to the peritoneal cavity difficult.

This was an important data relating to cases undergoing hysterectomy for various indications as the dissection was difficult and time consuming, but not explained in tabulated format this did not lead to a significant increase in operative time despite the added

time needed for adhesiolysis in comparison to a whole group of patients without any operative history.

With the intent of the application of cystoscopically placed ureteric stents to reduce the incidence of ureteric injury the intervention proved its worth as the number of significantly lower ureteric injuries is evident from the results with only one partial injury (0.55%) to the ureters in a case with multiple previous laparotomies in group A. Group B on the other hand had a higher number of ureteric injuries (3.8%).

To one's surprise, there was another significant difference between groups with uncontrolled hemorrhage mostly requiring a staged procedure such as pack removal. The higher number of cases requiring packing was frequent (7.7%) in group B with a p value of 0.04. A greater but non-significant number of patients from group B had wound infection (8.2%) as compared to group A(6.6%). (p=0.44)

DISCUSSION

The indications for hysterectomies which were included in our study were fibroid uterus (most common), other causes of AUB (endometrial hyperplasia second commonest, cervical polyp etc), chronic pelvic pain due to PID and endometriosis, adenomyosis. Fibroid related menorrhagia was found in 70% of cases. Of the total number of hysterectomies 19% were performed for other causes of abnormal uterine bleeding. These cases were found to be high risk as 117 cases were associated with previous history of surgery at some point in life. Most of these previous surgeries were gynaecological and obstetrical related and 19 cases out of 117 were associated with non gynaecological surgeries. History of previous surgery, endometriosis and chronic PID made it difficult to reach pelvic cavity because of adhesions between uterus, adnexa, gut, bladder, lateral pelvic walls and obliteration of pouch of douglas.

This study is one of studies of its kind as all international studies were retrospective studies and this is a prospective study where properly selected patients are divided in to two groups. Lots of studies were done on prophylactic ureteric stenting in patients with complex pelvic pathology. Although few of the studies support prophylactic ureteric stenting for preventing ureteric injuries^{19,20,21} and some studies didn't support it^{22,23}. The incidence of ureteric injuries in our study was significantly higher in Group B (3.8%). This could be due to better visualization of ureters in group A where only one partial injury settled by maintaining a ureteric stent for a few weeks.

The dissection time required was not calculated but a subjective feeling of the operating surgeon was that dissection was more comfortable and less time consuming in group A than in group B where there was no guidance with stents. The results from our study widely

differed from the results of a retrospective analysis of a very large number of patients in a study conducted by Kuno et al.²² Where only four injuries (0.13%) were detected in 3071 patients. Only 469 patients had prophylactic bilateral ureteric catheterization out of the total patients. The frequency of injury was 0.62% in cases where prophylactic placement of catheters was performed, suggesting the omission of the intervention before the procedure.

Contradictory to the other study mentioned, a study performed on 151 patients there was a zero percentage of ureteric injuries performed by Reydan et al¹⁸ but the cost effectivity of the increased operative duration and the cost of the ureteric stents was considered. The data of ureteric injury as an iatrogenic complication during pelvic surgery is defined as high as 2.5%²⁵⁻²⁷ of all cases that approaches zero with prophylactic stenting preoperatively in bilateral cases with a higher frequency to the left ureter as depicted by a study conducted by Aghaji et al²⁸ In a study conducted by Chou et al²² the frequency of ureteral injury in both groups with a similar study design was similar (1.2% vs 1.09%), opposing results of our study.

All injuries were in distal portion of ureter where ureters are closely related to uterine vessels which could possibly be because of adhesiolysis of extensive adhesions or kinking of ureter. In all cases ureteric injuries were unilateral and ureteric catheters were already placed in a few cases the. After confirming ureteric injuries catheters were removed and DJ stents were placed which were removed later on after 6 weeks. The claim of uncontrolled hemorrhage as a cause for the ureteric injury has long been part of literature, the question of labeling hemorrhage as a cause for the ureteric injury or blaming the ureteric injury and in conjunction with the hemorrhage is immaterial²⁹.

The number of patients with previous history of surgery in our study was quite high as compared to rest of the literature. Very few studies took into account the prospective nature of utilizing the intervention to prevent ureteric injury is worth listing. Whether the use of preoperative bilateral catheterization is a method for better identification and observing and ongoing injury to the ureters during surgery or prevention is a matter of debate and needs back up with a larger number of patients to justify the exceeded time during surgery as well as the increase in cost.

CONCLUSION

The use of ureteral stents for complicated hysterectomies prevents ureteral injury significantly. Whether the frequency of uncontrolled hemorrhage is a cause or sequelae of ureteric injury needs further definition. These benefits are subject to increased cost and duration of surgery but not found significant in our study.

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