

Mini Review

Cystoscopy at the Time of Hysterectomy: Does it make a Difference?

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Introduction

Lower urinary tract injuries are a known and significant potential complication of many gynecologic surgeries. The reported incidence of ureteral injuries is generally 0.03-2% for Total Abdominal Hysterectomies (TAH), 0.02-05% for Total Vaginal Hysterectomies (TVH), and 0.2-6% for Laparoscopic Hysterectomies (LH) [1]. Although these numbers are quoted with relative authority, the true incidence of the urologic injuries is unknown and is probably underreported. The 2012 AAGL practice report on the "Practice Guidelines of Intraoperative Cystoscopy in Laparoscopic Hysterectomy" recommends routine cystoscopy after laparoscopic hysterectomies (LH) [2]. This recommendation sounds reasonable when you look at studies from Harkki-Siren et al that quote a 35-fold increase in the rate of ureteral injuries in laparoscopic hysterectomies when compared to abdominal hysterectomies [3]. While some studies quote the incidence of such injuries to be as high as 6% for LH, the majority of studies support an incidence approximating 0.53% [1]. If the true incidence of these injuries is <1%, why do some expert gynecologists insist on doing routine cystoscopy after this procedure?

What the Data Shows?

Gilmour et al did a review of 30 published studies that compared the rate of urinary tract injuries in hysterectomies based on surgical approach [4]. This review found that the rate of bladder injuries was 12 per 1000 for total laparoscopic hysterectomies compared to 2.6 and 3.6 per 1000 cases for TAH and TVH respectively. Similarly, ureteral injuries were also found to occur more frequently in laparoscopic hysterectomies with a rate of 7.3 per 1000 compared to 1.2 and 0.6 per 1000 for TAH and TVH [4]. Harkki-Siren et al. did a similar review that supported the above findings. This study was retrospective and looked at urinary tract injuries in abdominal and laparoscopic hysterectomies in Finland and from 1990 to 1995 [3]. While there is no denying the increased risk of urinary tract injury seen in these studies, this information must be taken with some degree of skepticism as it highlights complications from the years when total laparoscopic hysterectomies were just being adopted into the specialty as a viable surgical option.

Abstract

Laparoscopic (robotic) and minimally-invasive hysterectomies become more and more common procedures as the level of technology increases and higher number of surgeons proceed to incorporate such surgery into their practice. Routine cystoscopy at the time of hysterectomy has been a topic of debate for many years – this article will highlight the pros and cons of performing such a procedure from economics to medico-legal point of view.

Keywords: Cystoscopy; Hysterectomy; Urinary damage; Electrosurgery

In 2004, Garry et al published the evaluate study where they looked at two trials including the abdominal and vaginal trials [5]. The abdominal trial compared the rate of surgical complications in laparoscopic hysterectomies compared to abdominal hysterectomies. The vaginal arm did the same comparing laparoscopic hysterectomies and vaginal hysterectomies. The study included 1346 hysterectomies in total. In each trial, two patients were randomized to laparoscopy arm for every one patient randomized to abdominal and vaginal hysterectomy in the respective trials. Similarly to the above reviews, the study found that there were more bladder and ureteral injuries with laparoscopic hysterectomies than with abdominal or vaginal hysterectomies.

These reviews show two repetitive themes: 1) Urinary tract injuries occur more frequently in laparoscopic hysterectomies than abdominal or vaginal hysterectomies. 2) Even with the higher rate of urinary tract injuries in LH, the incidence is still <1%. With such a low incidence, is it advantageous to do routine cystoscopy after gynecologic surgery?

Pros for Routine Cystoscopy

Several studies have demonstrated that approximately 25% of bladder injuries and 50% of ureteral injuries are diagnosed intra operatively without the use of cystoscopy [2]. This means that up to 75% of patients with bladder injuries can be discharged home with injuries that go unrecognized. Conversely, with the use of intraoperative cystoscopy, Gilmour found that 100% of ureteric and 80% of bladder injuries were identified prior to leaving the OR. The advantage of intraoperative diagnosis is the ability to repair the injuries at the time of surgery, thus, avoiding postoperative complications, medico-legal issues, and patient dissatisfaction.

Mahendran et al, reported a better prognosis when urinary tract injuries are recognized and addressed early [6]. This study revealed 7 delayed (post-operative) diagnoses of ureteral injuries. Five of the seven delayed cases presented with ureterovaginal fistulas. Delayed recognition of these injuries can lead to infection, permanent renal impairment, ureterovaginal fistulas, need for percutaneous nephrostomy tubes, etc. Intraoperative diagnosis significantly



Figure 1: Bilateral jet efflux from ureteral openings during a post-TLH cystoscopy.

decreases the risk of the aforementioned complications. Wu and colleagues found that early detection of ureteral injury allowed for more conservative management of the injuries. For instance, in cases that had delayed diagnosis (diagnosed on an average of 19 days post-operatively) five of the 8 patients required laparotomy compared to one of the 7 patients whose injuries was diagnosed intraoperatively or within 3 days post-operatively [1].

Cons of Routine Cystoscopy

Potential cons for routine cystoscopy are largely related to the logistics of operating room flow. The addition of another procedure leads to longer OR time and potentially different operating room personnel capable of handling the required equipment. In addition to the prolonged OR time, the patient will be exposed to anesthesia and associated risks for a longer period. Given that cystoscopy uses special equipment, there is also increased cost for routine cystoscopy. In some settings, the cystoscopy may not be able to be performed by the primary surgeon, thus requiring a person with the appropriate credentialing to perform the procedure. Many gynecologists are neither trained nor comfortable enough to do diagnostic cystoscopy. Even when the OR staff prepared and the gynecologist is credentialed, some hospitals discourage any department other than urology to perform these procedures. Policies such as these create territorial disputes and weaken the surgical independence of other departments.

Finally, one of the reasons for increased ureteral and bladder injuries in laparoscopic surgery are the use of electrocautery. Thermal injuries, as a rule, tend to present many days later. Even intra-operative cystoscopy might fail to identify them. Of the aforementioned disadvantages, cost of the procedure appears to be the most significant. Although, cystoscopy is a useful tool when evaluating the lower urinary tract for injuries, it is not perfect. During a diagnostic cystoscopy, one looks for efflux from the ureteral orifices

(Figure 1) as well as evidence of perforation or sutures in the bladder wall.

Wu and colleagues revealed that of 51 patients who underwent an intra-operative cystoscopy at the time of hysterectomy, one patient with a normal cystoscopy, was found to have a ureteral injury 36 days after surgery [1].

Visco et al, found that the cost-effectiveness of routine cystoscopy was dependent upon the incidence of ureteral injury regardless of the operation performed. If the incidence of ureteral injury exceeded 1.5% for abdominal hysterectomy or 2% for vaginal or laparoscopic hysterectomy, then routine cystoscopy was cost saving [7]. The study demonstrated that at a rate of 0.2% for ureteral injury for abdominal surgery it would cost \$54,000 to diagnose one ureteral injury. However, if the ureteral injury rate was 2%, there would be a cost savings of \$2,200 for every ureteral injury diagnosed. The study found similar findings for laparoscopic hysterectomies [7]. In the study design, the estimated cost of repairing ureteral obstruction was \$10,000 and the estimated cost of repairing uretero-vaginal fistula was \$11,000. These two presentations were used because they were most commonly seen in patients with delayed diagnosis of ureteral injury. Completing an intraoperative cystoscopy increased the procedure's cost by \$100-300. Re-implantation of a ureter at the time of surgery costs \$3,000-\$5,000 in this model. However, if the patient required a separate admission and surgery for re-implantation of an obstructed or injured ureter, the cost would increase to the aforementioned \$10,000 [7]. These numbers reveal why the rate of ureteral injuries greatly impacts the use of intraoperative cystoscopy. If the likelihood of detecting a ureteral injury is very low, then the patient/insurance gets charged an additional \$100-300 for no apparent reason, not to mention the additional instruments that are required.

Conclusion

With all of the information available, it seems that routine cystoscopy might not be beneficial in facilities with very low rates of ureteral and bladder injuries. While it is rare to discover a ureteral or bladder injury on intraoperative cystoscopy, it is a useful skill for general gynecologists to master. Training gynecologists to be competent to perform intra-operative cystoscopy can greatly reduce the amount of time used while waiting for an intra-operative consultation to perform a procedure that lasts fewer than 15 minutes. This training also improves the surgeon's ability to diagnosis urinary tract injuries that may otherwise be missed. Many gynecologists are more than capable of performing the correct diagnostic procedure, but the hospitals must facilitate this practice. This is best accomplished by adequately cross-training multiple OR staff members who are comfortable with the cystoscopy systems. Table 1 depicts pros and

Table 1: Advantages and disadvantages of cystoscopy at the time of hysterectomy.

Pros	Cons
Early diagnosis of urinary injuries	Not cost efficient in most cases
Decreased use of consultants	Often requires consultants
Cost efficient in settings with high incidence of urinary injuries	Requires a specialized OR team
Lower incidence of fistula formation	Cannot detect thermal injuries
Lower incidence of reoperation	Conflicts with urology

cons of routine intra-operative cystoscopy performed at the time of hysterectomy.

One of the most visible challenges facing today's medical system is trying to practice medicine while using our resources efficiently in terms of cost. Some hospitals will not allow gynecologic surgeons to hold cystoscopy privileges, thus mandating to bring an expensive consultant for every case of needed cystoscopy. Another major issue is the medico-legal aspect of caring for patients. How can a provider explain missing a diagnosis like a ureteral injury if there is an easy procedure to diagnosis it? Routine cystoscopy may not be the most cost effective procedure; however, it is a quick and easy way to avoid the long-term complications that can occur in patients with delayed recognition of urinary tract injuries.

Prevention is the best treatment. It would be best for gynecologists to be aware of the most places where the ureters and bladder may be injured in pelvic surgery. In depth knowledge of pelvic anatomy and urinary collecting system is of utmost importance. These injuries may also be prevented by selecting the most appropriate patients for open versus minimally invasive surgeries. Even if all of the necessary precautions are taken, injuries will still occur. Recognizing that it is our duty as surgeons to minimize the damage of these complications, routine cystoscopy is one of the best ways to complete this task.

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