Prevention, Recognition, and Management of Urologic Injuries During Gynecologic Surgery

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Question 1:
Do the majority of bladder and ureteral repairs require conversion to an open surgical procedure, or can these typically be performed laparoscopically? Is it appropriate to consult a urologist for assistance in repairing an incidental cystotomy during a laparoscopic procedure in anticipation that this might avoid conversion to an open procedure?

Response from Drs. Sharp and Adelman:

Laparoscopic repair of bladder injury has been documented in several case series, to suggest that in the hands of surgeons with experience with laparoscopic suturing, laparoscopic bladder injury repair is feasible. Whether this is performed by a gynecologic surgeon or a urologic surgeon depends on the surgeon’s training and comfort level. If there is any question about the quality of the repair, or particularly if the injury is at the trigone, it is ideal to have this performed by a surgeon who is experienced in this repair. While minimally invasive approaches to surgery have many advantages, the surgeon should consider how the repair can be appropriately accomplished given the resources available at the time. In some cases, this may be by laparotomy.

Question 2:
The article reviews the instances in which cystoscopy, such as after certain urogynecologic procedures or with particular advanced laparoscopic or vaginal procedures, is recommended. Is there a role for universal cystoscopy after routine, uncomplicated hysterectomy?

Response from Drs. Sharp and Adelman:

At present, there is no evidence to support the use of universal cystoscopy after an uncomplicated hysterectomy, unless your personal urologic injury rate exceeds 2%. Recent graduates of a residency program, practitioners who rarely perform hysterectomy, and attending physicians who supervise resident education, however, may find value in universal cystoscopy, as the rate of urologic injury may warrant it. If cystoscopy is being performed on an as-needed basis, level of clinical suspicion should guide its use. For example, if there is bleeding at a pedicle that the surgeon feels may be close to the ureter, and the surgeon would like to assess the ureter for patency, it would be reasonable to perform cystoscopy.
Question 3: 
Given the limited ability to visually identify the ureters during vaginal hysterectomy, are there other steps that can be taken to minimize the risk of ureteral injury during this procedure?

Response from Drs. Sharp and Adelman:

Ureteral injury is actually less likely to occur during vaginal hysterectomy compared to abdominal hysterectomy. Some have hypothesized that this is due to caudad traction on the cervix during vaginal hysterectomy, pulling the uterus away from the ureters. There are however at least two things that can be done to decrease the risk of injuring the ureter at vaginal hysterectomy. One is to be sure to adequately dissect the bladder away from the cervix before the uterosacral ligaments and uterine arteries are ligated. This allows the ureters to travel with the bladder and be away from a clamped pedicle. Of note, it is not necessary to enter the anterior cul-de-sac before securing these pedicles as long as the bladder is dissected away. Secondly, the ureters can be palpated at the level of the trigone with an index finger feeling laterally under the bladder trigone.

Question 4: 
With the increase in medical management options for many gynecologic conditions, there are fewer hysterectomies performed in patients with entirely normal pelvic anatomy. In cases of distorted anatomy, such as large uterine fibroids or extensive endometriosis, should preoperative ureteral stenting be considered to aid in intraoperative identification of the ureters?

While there is no evidence to support the use of universal preoperative ureteral stenting, it is reasonable to consider its use when there is significant distortion to the pelvic anatomy and identification of the ureter is expected to be difficult. For the most part, the ureter can be identified by opening the pelvic side-wall, identifying it at the pelvic brim, and tracing it down into the pelvis. When there is significant fibrosis or scarring, however, it may be very difficult to identify the ureter or perform ureterolysis, and a stent may provide valuable information about the course of the ureter.

Question 5: 
While indigo carmine remains unavailable, the article recommends use of phenazopyridine or sodium fluorescein to assist in identification of ureteral efflux during cystoscopy. Are there contraindications to the use of these medications?

Response from Drs. Sharp and Adelman:

Phenazopyridine should be used with caution in patients with renal insufficiency, particularly the elderly. Also, in patients with G6PD deficiency, chronic overuse can result in hemolytic anemia. At the dose used to identify ureteral jetting, however, adverse reactions are uncommon. Adverse reactions to sodium fluorescein include hives, bronchospasm, nausea, GI distress, and rarely anaphylaxis. It should therefore be used with caution in patients with a history of asthma or hypersensitivity reaction. Severe local tissue damage can also occur with extravasation of sodium fluorescein.
**Question 6:**

Given the rise in cesarean delivery rates over the last several decades, surgeons might anticipate more technically challenging bladder dissection at the time of hysterectomy. Should robotic surgery be considered in these patients when available, in an attempt to decrease the incidence of bladder injury?

**Response from Drs. Sharp and Adelman**

*Both laparoscopy and robotic-assisted laparoscopy provide excellent visualization of the bladder, cervix, and low uterine segment. One does not necessarily need to use robotic assistance if they feel comfortable doing technically challenging dissections with traditional laparoscopic equipment. Furthermore, robotic assistance has not been shown to decrease the risk of bladder injury when compared with laparoscopy. The modality used should be the one with which the surgeon feels most comfortable and has the most experience.*

**Question 7:**

If intraoperative cystoscopy identifies the presence of delayed absorbable suture through the dome of the bladder, is it imperative that these sutures be removed? What is the risk of fistula formation if the sutures are left in place?

**Response from Drs. Sharp and Adelman:**

*Though the exact risk of vesicovaginal fistula formation when a delayed absorbable suture seen in the bladder at the time of cystoscopy is unknown, the main reason for removing it may not be the presence of the suture material alone. For example, we repair the bladder with delayed absorbable suture, and the vast majority of the time it heals well without a fistula. However, if a suture is seen during cystoscopy, it is usually implied that the bladder may not be dissected free from the vaginal cuff, and that the bladder was inadvertently incorporated into the cuff closure. The theoretical risk that a suture has been incorporated into the bladder at an area of vaginal inflammation, tension, and healing, is one of the reasons why it is typically removed. This is a practice based upon level III data, as a randomized study of this condition will likely never be undertaken.*

**References**