

## Colorectal Injuries in Minimal Invasive Urologic Surgery

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### Dear Editor,

Today most of urologic procedures such as adrenalectomy, nephrectomy, nephrolithotomy, pyeloplasty and prostatectomy are performed using minimal invasive methods like laparoscopic and robotic techniques. Colorectal injuries have been always a great concern during percutaneous and laparoscopic urological surgeries. Thorough preoperative evaluation and preventive measures as well as adequate surgical experience are crucial parameters to reduce the rate of such injuries. Here, we briefly reviewed the causes, diagnosis and management of possible colorectal injuries during percutaneous, laparoscopic and robotic urologic surgeries.

### 1. Colon Injury in Percutaneous Renal Surgery

Performing percutaneous renal surgeries (PRS) such as nephrolithotomy (the most common), nephrostomy insertion, endopyelotomy and tumor resection in prone position, may lead to colon injury at a rate of about 1%. Because of the anatomic relationship, the left colon can be injured two times more than the right one (1). Specific characteristics of kidney such as renal fusion anomaly (i.e. horse-shoe kidney), renal ectopia and previous kidney surgery may increase the rate of colon injuries during PRS. Furthermore, thin women, patients with advanced age, kyphosis and mobile kidneys are at a higher risk of such complications (2). Retrorenal colon which is more prevalent in some circumstances such as horse-shoe kidney also increases the risk (2). Colon injuries more likely occur when PRS is performed in prone position, rather than supine (2). In patients at risk of colon injury, a thorough preoperative computerized tomography (CT) scan can be useful to detect the anatomic position of colon and kidneys. Renal access under ultrasound or CT guidance

can reduce the risk of colon injury in these challenging circumstances (3-5).

In case of colon injury, early detection and immediate management are vital to prevent fatal infectious sequel. When surgeon suspects any kind of colon injury during PRS, injection of contrast media through nephrostomy tract could confirm colon injury. Provided the extraperitoneal location of the colon injury, conservative management including placement of nephrostomy tube into the colon lumen as colostomy, ureteral stenting and bladder drainage seems enough. Low residual diet and broad-spectrum antibiotics should be considered for five to seven days. With this conservative strategy, the medial wall of the colon as well as the calyceal system would usually heal successfully. When the integrity of the collecting system and the colon is confirmed by a colostogram and retrograde pyelogram, the colostomy tube can be advanced into the retroperitoneum as an external drainage for more than 2 to 3 days, which allows the lateral wall of the colon to heal. In case of intraperitoneal perforation, or the presence of signs and symptoms of peritonitis, urgent abdominal exploration and colostomy is mandatory (1-5).

### 2. Colorectal Injuries in Laparoscopic and Robotic Urologic Surgery

The overall incidence rate of bowel injury in urologic laparoscopic surgeries is 0.2-0.7%. Rectal injury can occur in approximately 0.5% of laparoscopic radical prostatectomies (6). Intestinal injury seems to be more common in operative laparoscopy 0.3-0.5% compared to diagnostic laparoscopy as 0.06-0.5% (7). In another report, there was an incidence rate of 0.5% to 9% for rectal injury during laparoscopic radical prostatectomy (8). Bowel complications

are mostly caused by trocar or the Veress needle (41.8%) (9). The rate of bowel injury is equal in closed and open access techniques for trocar insertion but with open access technique, there is a higher chance of immediate diagnosis of bowel injury. The second most common cause of intraoperative bowel injury is electrocautery (25.6%). Small intestine is the most commonly injured portion of the bowel by electrocautery (9). When multiple structures are injured, the most frequent combination is a vascular structure and bowel (7-9). Bowel injury can be thermal or mechanical. Thermal injury occurs due to four mechanisms as directly activated instrument, coupling to another instrument, capacitive coupling and insulation failure.

Mechanical damage can be caused by a wide variety of sharp and blunt instruments (graspers, scissors, and retractors) (7-9). Approximately, in a half of all large and small bowel injuries during laparoscopy, a delayed diagnosis later than 24 hours may happen. Delayed bowel injuries are more likely to be fatal compared to major retroperitoneal vessel injury (10). Bowel injury is a complication potentially debilitating and deadly if left unrecognized during the operation and leads to an acute abdomen and sepsis. Injuries related to thermal damage are usually unrecognized during the operation. These patients present typically days after the operation with signs of sepsis and acute abdomen. The presentation may be quite subtle with pain on trocar sites, leukopenia, fever and chills. However, patient's deterioration can be rapid with a mortality rate of 21% (9). Therefore, close surveillance is necessary to save patient's life. Rectal injury during laparoscopic radical prostatectomy can lead to severe postoperative complications (10). In a review of 1311 laparoscopic radical prostatectomy cases, three rectal injuries were found and required temporary colostomy (8).

Diagnosis of bowel injury during laparoscopy can be confirmed with abdominal CT scan. Extravasation of contrast media from the bowel and/or the presence of free air are diagnostic. Other imaging modalities such as gastrografin enema can be used to diagnose rectal injury. Perhaps the most prevalent bowel injury in urological

laparoscopic surgery is rectal injury, which can occur during robotic or laparoscopic prostatectomy. Most of these complications are ultimately managed successfully (9). Management of rectal injury remains debatable regarding interposition of healthy tissue between rectal repair and vesicoureteral anastomosis, and the necessity of diverting colostomy (10). Bowel injuries recognized at the time of operation can be repaired by the same techniques as open surgery using intracorporeal suturing. Early diagnosis and repair of bowel injury reduce patient's morbidity (10).

## References

1. Wolf JS. Percutaneous approaches to the upper urinary tract collecting system. In: Wein AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA editors. *Campbell-Walsh Urology*. 10 ed. Philadelphia: Saunders Elsevier; 2011. pp. 1324-56.
2. Qahtanis AL. Bowel and other organ injury during percutaneous renal surgery. In: Smith AD, Preminger G, Badlani G, Kavoussi L editors. *Smith's Textbook of Endourology*. 3 ed: Wiley-black well; 2012. pp. 1118-20.
3. Vicentini FC, Torricelli FC, Mazzucchi E, Hisano M, Murta CB, Danilovic A, et al. Modified complete supine percutaneous nephrolithotomy: solving some problems. *J Endourol*. 2013;27(7):845-9.
4. de la Rosette JJ, Laguna MP, Rassweiler JJ, Conort P. Training in percutaneous nephrolithotomy—a critical review. *Eur Urol*. 2008;54(5):994-1001.
5. Thiruchelvam N, Mostafid H, Ubhayakar G. Planning percutaneous nephrolithotomy using multidetector computed tomography urography, multiplanar reconstruction and three-dimensional reformatting. *BJU Int*. 2005;95(9):1280-4.
6. Juan YS, Huang CH, Chuang SM, Shen JT, Li CC, Wang CJ, et al. Colon perforation: a rare complication during percutaneous nephrolithotomy. *Kaohsiung J Med Sci*. 2006;22(2):99-102.
7. Lam A, Kaufman Y, Khong SY, Liew A, Ford S, Condous G. Dealing with complications in laparoscopy. *Best Pract Res Clin Obstet Gynaecol*. 2009;23(5):631-46.
8. Guillonnet B, Gupta R, El Fettouh H, Cathelineau X, Baumert H, Vallancien G. Laparoscopic [correction of laproscopic] management of rectal injury during laparoscopic [correction of laproscopic] radical prostatectomy. *J Urol*. 2003;169(5):1694-6.
9. Lasser MS, Ghavamian R. Surgical complications of laparoscopic urological surgery. *Arab J Urol*. 2012;10(1):81-8.
10. Vallancien G, Cathelineau X, Baumert H, Doublet JD, Guillonnet B. Complications of transperitoneal laparoscopic surgery in urology: review of 1,311 procedures at a single center. *J Urol*. 2002;168(1):23-6.