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Ureteral injury during left colectomy for cancer: Laparoscopic management. A case report

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ABSTRACT

INTRODUCTION: Iatrogenic ureteral lesions may occur after any abdominal and pelvic surgery. They are severe and can affect renal function and even vital prognosis. This study aimed to determine the clinical aspects and the therapeutic approaches of a lower third injury of the ureter during a laparoscopic left colectomy.

PRESENTATION OF CASE: An 81 year-old-man with left-sided colon cancer underwent laparoscopic left colectomy. During surgery there was a continuous full-thickness solution of the left ureter for which an end-to-end ureteral anastomosis was performed. In the postoperative period the patient underwent multiple urological and radiological interventional procedures due to the aforementioned injury.

DISCUSSION: Ureteral injury was defined as any laceration, transection or ligation of the ureter that required an unexpected procedure for repair, stent or drainage. It can be managed with several procedures. An appropriate repair should be chosen according to length and position of ureteral injuries. The lower third of the ureter, as the lesion of our patient, has a profuse blood supply resulting in this way less susceptible to ischemia.

CONCLUSION: In the last decade urological surgery, laparoscopy, ureteroscopic procedures and gynecological surgery are the main causes of iatrogenic ureteral lesions. Prognosis is conditioned by early diagnosis and the anatomic condition of the ureter. Laparoscopic end-to-end ureteral anastomosis could be considered a good option in the case of intraoperative iatrogenic lower ureteral injuries.

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1. Introduction

Ureteral lesions during urological surgery, laparoscopy, endourological procedures and gynecological surgery have a rate of 0.2% up to 6%. Multiple complications may occur if the lesion is not recognised during the same operative procedure: hydronephrosis, anuria (bilateral lesion), ureterovaginal fistula, peritonitis. The rate of recognition of an intraoperative ureteral lesion is 30% and it could rise up to 90% when cystoscopy with ureteroscopy is used at the end of the surgery [1]. Here we evaluated the safety and risk of an uretero-ureteral anastomosis with laparoscopic approach in line with the SCARE criteria [2].

2. Presentation of the case

We report a case of an 81-year-old man in good general clinical condition with medical history of an ectasia of the ascending aorta and benign prostatic hypertrophy and an endoscopic diagnosis of

moderately differentiated colon cancer located in the sigmoid colon [3]. Preoperative CT abdominal scan showed a concentric parietal thickening substenosing the lumen and extended longitudinally for a stretch of about 5.3 cm. We decided to perform a laparoscopic left hemicolectomy. We induced the pneumoperitoneum with transumbilical open technique and we positioned other three trocars in the right hypochondrium (5 mm), in the right iliac fossa (12 mm) and in the left flank (5 mm) [4]. On exploration of the peritoneal cavity, in correspondence of the sigmoid colon, we found the known neoplasm. We proceeded with colo-epiploic detachment in the middle-lateral direction starting from the middle transverse. The inferior mesenteric vein and artery were clipped and divided. In particular the inferior mesenteric artery appeared enveloped by an adipolymphatic tissue with neoplastic lymphangitis-like phenomena. Once the vascular phase was completed, we continued the dissection along the posterior plane with the preservation of the nervous plexus, the detachment and mobilization of the colon from the parietocolic peritoneum until the splenic flexure. Tenuous adhesions were observed with the Gerota fascia probably due to the aforementioned local lymphangitic phenomena. During these dissection maneuvers there was a continuous full-thickness solution of the lower third of the left ureter, immediately cranially to the cross with the iliac artery [5,6]. The colonic resection proce-

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dures ended after preparation and section of the proximal rectum with Echelon Flex45 mm. Considering the location and extent of the left ureteral lesion and the possibility to perform a tension-free suture, we carried out an uretero-ureteral end-to-end anastomosis with resorbable sutures and intracorporeal knotting after incannulation with the Bracci ureteral catheter as tutorial [7–9]. At the end of this procedure we administered indigo carmine to evaluate the ureteral anastomosis which appeared adequate without spillage of vital dye. On 5th POD the patient did an acute renal failure and the urologist used a 21Ch rigid cystoscope. The bladder presented an hyperemic mucosa and bullous edema. It was difficult to identify the left ureteral meatus which was cannulated with a PTFE guide wire which easily went up into the left ureter parallel to the Bracci ureteral catheter. Pollack catheter was positioned and, under radioscopic control, we performed an ascending pyelography which demonstrated regular visualization of the renal pelvis without dilation. A mono-J stent was placed on a PTFE guidewire. The patient was discharged on POD 10 with no other complications. Twenty days later, the left mono-J ureteral stent and the Bracci ureteral catheter was replaced by a 6Fr double-J 6F ureteral stent under radioscopic control which confirmed its correct positioning [9,10].

3. Discussions

Many different approaches are advocated for management of iatrogenic ureteral injuries during abdominal or pelvic surgery, also in laparoscopic and robotic procedures during which an ureteral reconstruction requires complex maneuvers [11–13]. New techniques to repair ureteral iatrogenic lesions using bladder or intestinal flaps are described [14]. Several authors recommend that injuries of the distal ureteral segment occurring less than 5 cm from its bladder entry would be best managed with ureteral reimplantation. In contrast, others studies indicate that even a 2.5 cm-long distal ureteral lesion is adequate for uretero-ureteral anastomosis, providing its margins are undamaged as we found in our case report [15]. Because the pelvic ureter appears to have a high preponderance of plexiform vessels, it has been considered susceptible to ischemia thought to occur after transection or a lesion; the aforementioned factors may seem to be proper reasons for not advocating uretero-ureteral anastomosis as the standard treatment of postoperatively detected iatrogenic lower ureteral injury, but we believe they are not enough to definitively exclude uretero-ureteral anastomosis from the list of treatment options for lower ureteral lesions. It is well established that, in contrast to the middle third of the ureter, which has a vulnerable blood supply, the lower third of the ureter, as the lesion in our patient, has a profuse blood supply from the lateral pelvic wall [16]. Urine leaking from the injured site can cause inflammation and subsequent tissue reaction resulting in formation of adhesion and/or fibrosis around the damaged ureteral segment. For this reason in our case the patient developed an acute renal failure which required the intervention of the urologist and the positioning of a mono-J ureteral stent successively replaced by a double-J ureteral stent which has become an integral part of the urological armamentarium nowadays because it allows good urinary drainage from the kidney to the bladder and is generally safe and well-tolerated [17].

4. Conclusion

In the last decade urological surgery, laparoscopy, endourological procedures and gynecological surgery are the main cause of iatrogenic ureteral lesions and, because the prognosis is conditioned by an early diagnosis, the recognition and treatment

of ureteral injuries is important to prevent morbidity. In our experience, laparoscopic uretero-ureteral anastomosis could be considered a realistic treatment option in the case of intraoperatively detected iatrogenic lower ureteral injuries [18]. Even if uretero-ureteral anastomosis is rarely performed today for treatment of lower ureteral lesions it offers the definite advantages of preserving the integrity of bladder and the natural antireflux mechanism compared with other surgical options such as ureteroneocystostomy. Finally, surgeons who are experienced, skilled, and familiar [19,20] with procedures such as distal ureterectomy may be more inclined to try preserving the integrity of the bladder performing open or laparoscopic uretero-ureteral anastomosis.

Declaration of Competing Interest

Di Buono Giuseppe and other co-authors have no conflict of interest.

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Ethical approval

Ethical Approval was not necessary for this study. We obtained written patient consent to publication.

Consent

We obtained written patient consent to publication.

Author contribution

Di Buono Giuseppe: study design, data collections, data analysis and writing.

Bonventre Giulia: study design, data collections, data analysis and writing.

Buscemi Salvatore: data collections.

Maienza Elisa: data collection.

Romano Giorgio: study design.

Agrusa Antonino: study design, data collections, data analysis and writing.

Registration of research studies

Not applicable.

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