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

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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 recognized during the same operative procedure: hydrenephrosis, 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 pneumatoparitoneum with transluminal 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.

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https://doi.org/10.1016/j.ijscr.2020.09.054
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from the parietocolic peritoneum until the splenic flexure. Tenacious 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 crosse with the iliac artery [5,6]. The colonic resection procedures ended after preparation and section of the proximal rectum with Ethelon 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 laparoscopic 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 laparoscopic control which confirmed its correct positioning [3,10].

3. Discussions

Many different approaches are advocated for management of iatrogenic ureteral injuries during abdomino-pelvic surgery, also in laparoscopic and robotic procedures during which an ureteral reconstruction requires complex maneuvers [11–13]. New techniques to repair ureteral iatrogenic procedures 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 uretero-neocystostomy. 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.

Funding

Di Buono Giuseppe and other co-authors have no study sponsor.

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

This article is part of a supplement entitled Case reports from Italian young surgeons, published with support from the Department of Surgical, Oncological and Oral Sciences – University of Palermo.

Guarantor

Di Buono Giuseppe.
Agrusa Antonino.

Provenance and peer review

Not commissioned, externally peer-reviewed.
Acknowledgement

This article is part of a supplement entitled Case reports from Italian young surgeons, published with support from the Department of Surgical, Oncological and Oral Sciences – University of Palermo.

References

[1] R.A. Stoica, T. Enache, N. Iordache, Intra operative lesion of the pelvic ureter solved in a minimally invasive manner, Case Rep. J. Med. Life 7 (September (3)) (2014) 396–398.
[2] R.A. Agha, M.R. Borrelli, R. Farwana, K. Koshy, A. Fowler, D.P. Orgill, For the SCARE Group, The SCARE 2018 statement: updating consensus surgical Case report (SCARE) guidelines, Int. J. Surg. 60 (2018) 132–136.
[3] G. Novo, E. Corrado, E. Tortorici, A. Novo, A. Agrusa, V. Saladinò, I. Marturana, R. Lentini, M. Ferrandez, C. Viscenti, F. Massenti, M. D’Arienzo, F. Vitale, G. Gulotta, S. Novo, Cardiac risk stratification in elective non-cardiac surgery: role of NT-proBNP, Int. Angiol. 30 (June(3)) (2011) 242–246.
[4] A. Agrusa, G. Di Buono, S. Buscemi, G. Cucinella, G. Romano, G. Gulotta, 3D laparoscopic surgery: a prospective clinical trial, Oncotarget 9 (April (25)) (2018) 17325–17333, http://dx.doi.org/10.18632/oncotarget.24665, eCollection 2018 Apr 3.
[5] Y.H. Chou, M.T. Chen, C.H. Huang, Changing trends of ureteral injuries, Kaohsiung J. Med. Sci. 14 (December (12)) (1998) 751–753.
[6] C.M. Han, E.H. Tan, N. Kay, C.J. Wang, H. Su, C.F. Yen, C.L. Lee, Outcome of laparoscopic repair of ureteral injury: follow-up of twelve cases, J. Minim. Invasive Gynecol. 19 (January–February (1)) (2012) 68–75, http://dx.doi.org/10.1016/j.jmig.2011.09.011, Epub 2011 Nov 18.
[7] D.E. Fry, L. Milhollen, P.J. Harbretch, Iatrogenic ureteral injury options in management, Arch. Surg. 118 (4) (1983) 454–457, http://dx.doi.org/10.1001/archsurg.1983.01390040064013.
[8] G. Romano, A. Agrusa, M. Galia, G. Di Buono, D. Chianetta, V. Sorce, L. Gulotta, G. Brancatelli, G. Gulotta, Whipple’s pancreaticoduodenectomy: surgical technique and perioperative clinical outcomes in a single center, Int. J. Surg. 21 (September (Suppl 1)) (2015) 568–71, http://dx.doi.org/10.1016/j.ijsu.2015.06.062, Epub 2015 Jun 26.
[9] K. Wu, Z. Wu, Z. Han, Diagnosis and treatment of iatrogenic ureteral injury, Zhonghua Wei Ke Za Zhi 34 (December (12)) (1996) 720–722.
[10] J.W. Uttrie, Bladder and ureteral injury: prevention and management, Clin. Obstet. Gynecol. 41 (1998) 755–763.

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Please cite this article in press as: G. Di Buono, et al., Ureteral injury during left colectomy for cancer: Laparoscopic management. A case report, Int J Surg Case Rep (2020), https://doi.org/10.1016/j.ijsr.2020.09.054