Revascularisation of iatrogenic superior mesenteric artery injury by end to end anastomosis during robot assisted nephrectomy

Sunil Kumar*, Shiv C. Navariya, Deepak P. Bhirud, Satish K. Ranjan, Ankur Mittal, Kim J. Mammen

Department of Urology, Medical College Building, 6th Floor, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, 249203, India

A R T I C L E   I N F O

Article history:
Received 16 July 2019
Received in revised form 1 September 2019
Accepted 7 September 2019
Available online 19 September 2019

Keywords:
Superior mesenteric artery injury
Robot assisted laparoscopic nephrectomy
End to end anastomosis

A B S T R A C T

INTRODUCTION: Superior mesenteric artery (SMA) injury is very peculiar to left sided renal surgery. Although it is rare only, most of it is unreported. We report a case of SMA injury during robot assisted laparoscopic nephrectomy, which was managed successfully by end to end anastomosis.

CASE PRESENTATION: A 19-year-old male patient was undergoing robot assisted laparoscopic simple nephrectomy for pyelonphritic kidney. Because of dense adhesion, SMA was inadvertently clamped and cut. It was recognised intraoperatively and an end to end anastomosis was done by laparotomy.

DISCUSSION: SMA injury is rarely encountered in surgical practice. Most of it occurs following trauma. Iatrogenic SMA injury occurs in case of distorted local anatomy either due to adhesion or bulky tumor in left renal fossa and vicinity.

CONCLUSION: One should be cautious about proximity of SMA and its possible injury during left nephrectomy and it should be repaired as soon as possible.

© 2019 Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

1. Introduction

A peculiar anatomic relation of left renal hilal vessel is its proximity to superior mesenteric artery (SMA). Due to this reason, SMA is liable to incur injury during left renal surgery, particularly if there is distortion of anatomy due to tumor or adhesion. We report a case, in which SMA was inadvertently cut during robot assisted laparoscopic nephrectomy at a tertiary care academic institute. Fortunately, it was recognised very soon and repaired intraoperatively only. The present work has been reported in line with the SCARE criteria [1].

2. Presentation of case

A 19-year-old male presented with left flank pain and high grade fever. He had undergone open pyelolithotomy 2 months ago at an elsewhere hospital. On evaluation with CT urography, the pelvicalyceal system (PCS) corresponding to mid and lower pole of left kidney was dilated and it was not communicating with pelviureteric junction. The corresponding renal parenchyma of this obstructed renal segment was hypodense (Fig. 1). Initially, percutaneous drainage of this obstructed segment was done with a pigtail catheter, and the effluent was pus which grew Klebsiella on culture. Thereafter, there was no output from PCN. Later on, a nephrostogram combined with retrograde pyeloureterogram showed no communication between mid and lower pole PCS and ureter. Split renal function of left kidney was 21%. As major portion of left kidney was non-functioning and infected, a plan of left nephrectomy was made. Robot assisted laparoscopic nephrectomy was started as usual. Descending colon was reflected medially, gonadal vein and ureter were used as landmark to trace the renal hilum. Because of prior open pyelolithotomy, there was dense perinephric adhesion, and identification of anatomical structures and their alignment was difficult. One artery arising from the aorta was apparently coursing towards the kidney and was assumed to be renal artery. It was clipped and cut. On further dissection, another similar artery was seen. Cross sectional image was reviewed and there was sin-
Fig. 1. Left, contrast enhanced CT showing hypodense middle and lower pole renal parenchyma. Right, pelvicalyceal system corresponding to middle and lower pole kidney not communicating with ureter.

Fig. 2. Left, arterial phase of CECT showing renal and superior mesenteric artery, Right, reconstructed angiogram showing close relationship of superior mesenteric artery and left renal artery.

gle renal artery. Thus, it was realised that the artery cut earlier was SMA (Fig. 2). Nephrectomy was completed as usual (Fig. 3). Bowel was inspected, but there was no discoloration of bowel. Because of awareness of grave consequences of SMA injury, a decision was made to repair it. Laparotomy was done through midline. Hem o locks on the cut ends of artery were removed after taking control over it by bulldog clamps. To our surprise, there was good projectile back flow from the distal cut end of SMA. An end-to-end anastomosis with 6-0 prolene was done without any need of mobilisation of artery (Fig. 4). Post anastomosis, there was good thrill and pulsation across the anastomosis. Postoperative period was uneventful. At four month follow up, patient is doing well.

3. Discussion

Most SMA injuries are encountered following abdominal trauma [2,3]. Iatrogenic SMA injury is rare. It has been reported during pancreatic surgery and nephrectomy for tumors like renal cell carcinoma, transitional cell carcinoma and Wilms tumor [4–7]. SMA supplies entire small bowel and large bowel up to splenic flexure. Communications exist between SMA and inferior mesenteric artery (IMA) through various arterial arcades [8–10]. These collaterals evolve between SMA and IMA in chronically developing stenosis of SMA due to atherosclerotic disease, in which case any injury to either of these major arteries is uneventful. In case of acute injury to SMA, collateral from IMA cannot meet the circulatory requirement.
4. Conclusion

While doing left nephrectomy in the setting of perinephric adhesion, bulky tumor or lymph nodes with distortion of anatomy, one should be cautious about the possibility of inadvertent SMA injury. Any such injury should always be repaired immediately to avoid its disastrous consequences.

Sources of funding

No funding from any source.

Ethical approval

It is exempted as it is a case report and patient’s consent was taken.

Consent

Patient’s consent was taken.

Author’s contribution

Study concept or design: Sunil Kumar.
Data collection: Deepak P. Bhirud, Satish k. Ranjan.
Data analysis or interpretation: Sunil Kumar.
Writing the paper: Sunil Kumar, Shiv C. Navariya.
Editing: Kim J. mammen, Ankur Mittal.

Registration of research studies

Not applicable.

Guarantor

Sunil Kumar.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Declaration of Competing Interest

No conflict of interest.

References

[1] R.A. Agha, M.R. Borrelli, R. Farwana, K. Koshy, A.J. 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.
[2] R.A. Myers, Superior mesenteric artery injury: a case report, Injury 8 (1976) 124–126.
[3] W.A. Bourland, J.F. Kispert, G.L. Hyde, A. Kazmers, Trauma to the proximal superior mesenteric artery: a case report and review of the literature, J. Vasc. Surg. 15 (1992) 669–674.
[4] L. Sáez-Martín, L. Riera-Del Moral, M. Gutiérrez-Nistal, A. Aguilera, S. Stefanov, L. Riera de Cuba, Ligadura accidental de arteria mesentérica superior como complicación de nefrectomía mediante cirugía laparoscópica, Angiología 57 (2005) 71–76.
[5] M.L. Ritchey, K.P. Lally, G.M. Haase, S.J. Shochat, P.P. Kelalis, Superior mesenteric artery injury during nephrectomy for Wilms’ tumor, J. Pediatr. Surg. 27 (1992) 612–615.
[6] P. Neuvoux, L. Zini, A. Villers, E. Boleslawski, B. Nunes, P. Zerbib, Celiac axis and superior mesenteric artery: danger zone for left nephrectomy, J. Endourol. 22 (2008) 2571–2574.
[7] J.W. Moul, J.P. Foley, G.G. Wind, S. Rubin, J.A. Coffey, D.G. McLeod, Celiac axis and superior mesenteric artery injury associated with left radical nephrectomy for locally advanced renal cell carcinoma, J. Urol. 146 (1991) 1104–1108.
[8] T.M. Van Gulik, I. Schoots, Anastomosis of Riolan revisited; the meandering mesenteric artery, Arch. Surg. 140 (2005) 1225–1229.

[9] E.J. Gourley, S.A. Gering, The meandering mesenteric artery: a historic review and surgical implications, Dis. Colon Rectum 48 (2005) 996–1000.

[10] J.F. Lange, N. Komen, G. Akkerman, E. Nout, H. Horstmanshoff, F. Schlesinger, et al., Riolan’s arch: confusing, misnomer, and obsolete. A literature survey of the connection(s) between the superior and inferior mesenteric arteries, Am. J. Surg. 193 (2007) 742–748.

[11] J.G.N. Studley, R.C.N. Williamson, Injury to the superior mesenteric artery during pancreatectomy for chronic pancreatitis, Ann. R. Coll. Surg. Engl. 74 (1992) 35–39.

[12] S. Abu-Gazala, A. Schlager, R. Elazary, A. Keidar, L. Appelbaum, A.I. Rivkind, et al., Revascularization of the celiac and superior mesenteric arteries after operative injury using both splenic artery and saphenous graft, Ann. Vasc. Surg. 24 (2018) 693.

[13] C. Alfonso, J. Pereira, P. Eufrácio, J. Constantino, P. Rebelo, Splenomesenteric bypass as revascularisation technique after iatrogenic injury of the superior mesenteric artery during radical nephrectomy: a case report, Int. J. Surg. Case Rep. 30 (60) (2019) 34–37.

Open Access
This article is published Open Access at sciencedirect.com. It is distributed under the IJSCR Supplemental terms and conditions, which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.