Case report

Laparoscopic Deloyers procedure for rare Synchronous Colon Cancer

Abstract

Aim

To report a rare case of synchronous colon cancer involving the midtransverse colon and mid sigmoid colon who underwent totally laparoscopic resection and reconstruction by Deloyers procedure.

Presentation of the case

62 year old male, known diabetic and hypertensive presented with blood in stools, occasional pain abdomen and weight loss since 6 months. On evaluation he was diagnosed as a case of adenocarcinoma involving midtransverse and mid sigmoid colon. He underwent laparoscopic left extended colectomy with ascending colon- rectal anastomosis by Deloyers technique

Discussion

Synchronous colorectal cancers accounts for 1-8% of all primary colorectal cancer. After extended left colectomy, it may be difficult to take down a well-vascularized colon into the pelvis and perform a tension-free colorectal or coloanal anastomosis. The Deloyers procedure comprising complete mobilization and rotation of the right colon while maintaining the ileocolic artery may be used in these circumstances. In our case the synchronous cancer was detected at the time of colonoscopy and it involved transverse and sigmoid colon. The surgery was performed by totally laparoscopic approach without extra incision for the retrieval of specimen. The specimen was retrieved through the ileostomy site. There was no compromise in oncological clearance and adopting Deloyers procedure helped to create a tension free colorectal anastomosis.

Conclusion

Laparoscopic Deloyers procedure after extended left colonic resections for synchronous colon cancer is technically demanding, but safe and feasible in experienced hands.

Keywords

Deloyers procedure, Laparoscopic Extended left colectomy, Synchronous colorectal cancer, Laparoscopic Deloyers procedure, Ascending colon rectal anastomosis

Introduction

"Synchronous colorectal cancer (SRC) is defined as more than one primary cancer in the colorectum at the time of resection or within six months. It accounts for 1-8% of all primary colorectal cancer" [1]. "It is more common in males with the male/female ratio 1.85" [2]. "The other known risk factors for SRC include inflammatory bowel diseases, Lynch syndrome, familial adenomatous polyposis and adenomas/hyperplasic polyposis" [3, 4]. "Subtotal and extended left colectomy with ileocecal junction (ICJ) preservation is the most

preferable technique in cases of SRC involving the transverse and sigmoid colon. These approaches might be challenging in terms of reconstructive steps. After extended left colectomy, it may be difficult to take down a well-vascularized colon into the pelvis and perform a tension-free colorectal or coloanal anastomosis. The Deloyers procedure (DP) comprising complete mobilization and rotation of the right colon while maintaining the ileocolic artery may be used in these circumstances" [5, 6].

Current study report a rare case of SRC involving the midtransverse and sigmoid colon who underwent laparoscopic resection and reconstruction by DP.

Presentation of Case

62 year old male ,diabetic and hypertensive presented with blood in stools, occasional pain abdomen and weight loss since 6 months .Colonoscopy showed growth in the mid sigmoid and midtransverse colon. Histopathology of the colonoscopic biopsy of the growths showed features of adenocarcinoma. He did not have any family history of colorectal cancer. Contrast enhanced computerised tomography (CECT) scan showed a mass in the midtransverse and mid sigmoid colon with no visceral metastasis. There were pericolic lymph nodes enlargement. PET CT scan done showed an operable disease. His Serum CEA was raised with 7ng/ml. He was planned for Laparoscopic surgery. Informed consent was obtained from the patient.

Operative steps

We followed the oncological principles including en bloc resection with complete lymphadenectomy, no-touch technique, proximal lymph-vascular ligation, adequate resected margin of the colon and total mesocolic excision.

Pneumoperitoneum was achieved with Veress technique .The ileostomy site was marked preoperatively. Ports placed as shown (Fig 1A). Medial to lateral approach was followed. Sigmoid colon was mobilised, hypogastric nerves and ureterogonadal complex were identified (Fig 1B, 1C) The inferior mesenteric artery and vein were isolated, clipped and cut at its origin (Fig 1D,1E,1F) .The splenic flexure of colon was mobilised from medial to lateral approach separating the mesocolon from gerotas fascia. (Fig 1G) The middle colic vessels were divided at its origin from SMA (Fig 1H).The gastro colic omentum was divided and lesser sac entered. (Fig1 I).This completed the mobilisation of entire splenic flexure (Fig1J)

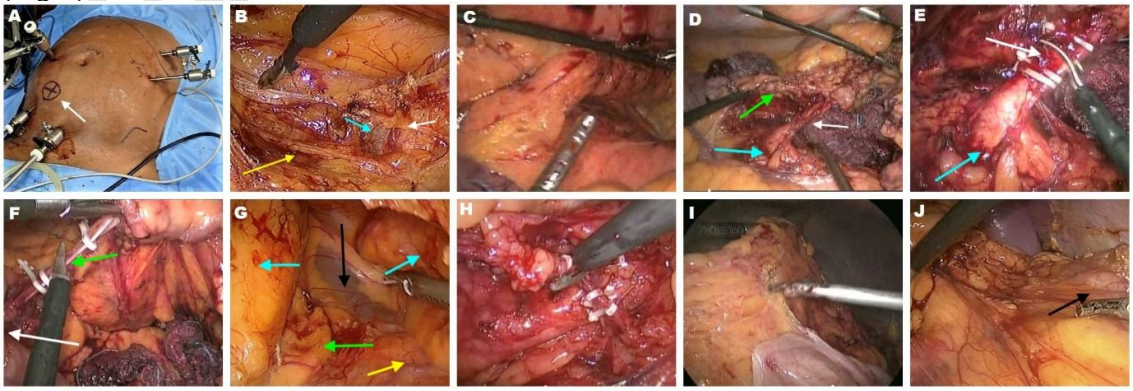

Figure 1

A. Port position (white arrow pointing marked ileostomy site)
B. Sigmoid colon mobilized by medial-lateral approach (yellow arrow hypogastric nerves, blue arrow gonadal vessel , white arrow ureter)
C. Sigmoid colon mobilized till recto sigmoid junction
D. Inferior mesenteric artery isolated at its origin (white arrow IMA, blue arrow aorta, green arrow IMV)
E. Clipping and division of IMA (white arrow IMA, blue arrow aorta)
F. Clipping and division of IMV (green arrow IMV, white arrow DJ flexure)
G. Splenic flexure mobilization Medial to Lateral approach (yellow arrow gerotas, green arrow pancreas ,black arrow spleen, blue arrow mesocolon)
H. Clipping and division of Middle colic vessels
I. Division of Gastrocolic omentum
J. Splenic flexure mobilised completely (black arrow transverse colon)

Hepatic flexure of colon and the ascending colon till the caecum was mobilised using harmonic shears. (Fig 2A). Complete mobilization of the right colon was carried out by incising the white line of Toldts and dissecting the avascular plane between the mesocolon and the retroperitoneum (Fig 2B, 2C). The mesenteric root was detached along the posterior wall of the peritoneum proceeding from the right iliac fossa up to the inferior duodenal flexure. (2C, 2D) The ileo-colic pedicle was preserved (Fig 2 E).The entire right colon was flipped to the left after dividing the right colic pedicle. (Fig 2F, 2G, 2H)

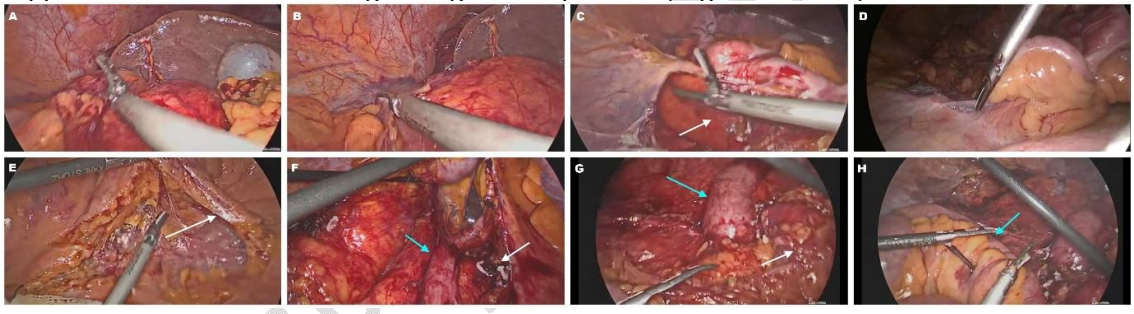

Figure 2

A. Hepatic flexure of colon mobilized
B. Mobilization along Line of Toldts
C. Complete Mobilisation of right colon(white arrow caecum)
D. Right colon mobilsed medially
E. Preserving Ileocolic pedicle (white arrow)
F. Right colic vessels clipped and divided (white arrow right colic vessels, blue arrow duodenum)
G. Right colon flipped to left(blue arrow duodenum ,white arrow caecum)
H. Right colon to left (blue arrow terminal ileum)

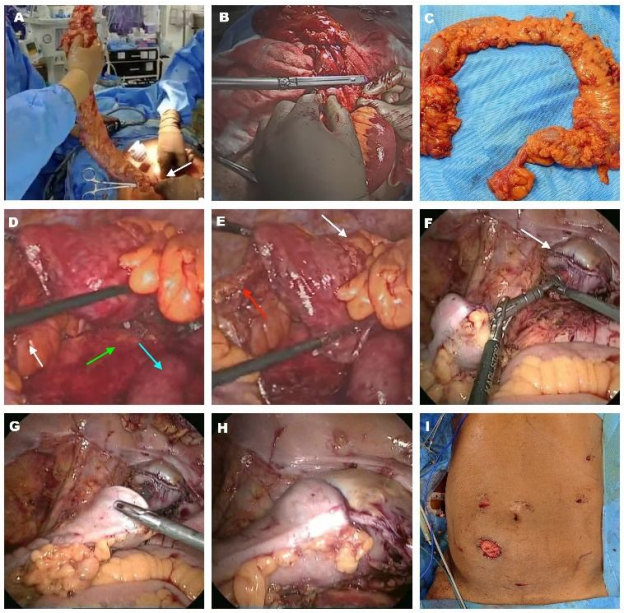

Figure 3

A. Specimen Retrieval through ileostomy site (white arrow ileostomy site)
B. Ascending colon divided with Endo GIA staplers
C. Resected specimen of extended left colectomy
D. Rotation of right colon (white arrow ileal mesentery, blue arrow duodenum, green arrow right kidney)
E. Rotation with intact pedicle(red arrow ileocolic pedicle, white arrow caecum in right hypochondrium)
F. Ascending colon to rectal anastomosis(white arrow rectal stump)
G. Ascending colon to rectal anastomosis by EEA stapler
H. Completed anastomosis
I. Loop covering ileostomy

The hepatic flexure of colon was marked with a silk suture. The rectosigmoid junction was divided using two Endo GIA 60mm purple cartridges. The specimen was retrieved through the ileostomy site (Fig 3A).The ascending colon was divided 5 cm from the hepatic flexure extracorporeally using Endo GIA 60mm purple cartridge (Fig 3B)and the entire specimen delivered (Fig 3C).The anvil was introduced and the ascending colon was pushed back. The fully mobilized colon, including the caecum and the ascending colon was transposed 180 degree counter clockwise around the axis of the ileocolic pedicle. (Fig 3D, 3E) The well vascularized ascending colon was then lowered to the pelvis and anastomosed to the rectum in a tension-free end-to end fashion using no 29EEA stapler.(Fig 3F,3G,3H) Leak test performed showed intact anastomosis . Abdominal drain was placed and a loop ileostomy was performed 30 cm from ICJ. (Fig 3I)

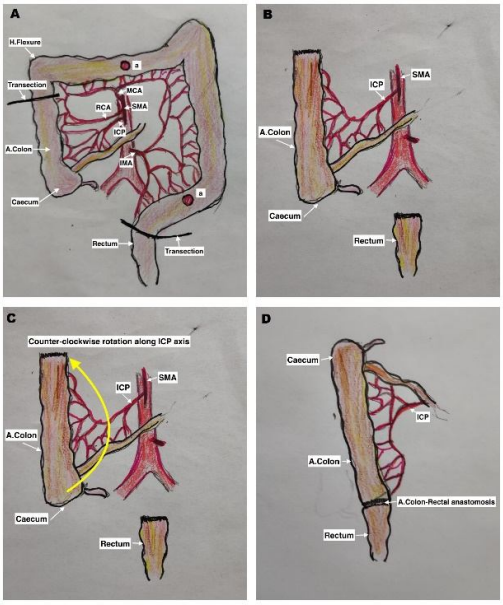

Figure 4: Diagrammatic representation of Deloyers procedure

a: Location of growths in transverse colon and sigmoid colon

IMA: Inferior Mesenteric Artery

SMA: Superior Mesenteric Artery

MCA: Middle Colic Artery

RCA: Right Colic Artery

ICP: Ileo Colic Pedicle

A.Colon: Ascending Colon

H.Flexure: Hepatic Flexure

The patient was started orally on 2nd post-operative day (POD) and was discharged on 4th POD on soft diet after drain removal. The histopathology of the resected specimen showed features of moderately differentiated adenocarcinoma with 26 lymph nodes being isolated and 8 were positive for metastasis. The stage was T4N2bM0. The patient received 6 cycles of adjuvant chemotherapy .The ileostomy was closed after completion of chemotherapy and CT scan with rectal contrast showed intact anastomosis. At 1 year follow up the patient is asymptomatic. The patient is advised to undergo annual CT Scan, Colonoscopy and Serum CEA levels.

Discussion

“Laparoscopic colorectal surgery for malignancies has achieved a tremendous impact among surgeons for its advantages over its open counterpart and also in short and long-term outcomes” [7-9]. “It has its own advantages as it provides decreased surgical trauma, fewer

perioperative complications and faster postoperative recovery with similar survival rates" [7,8].

"In a study performed by Greenstein and colleagues, SRC accounted for 2.5% of de novo colorectal carcinoma, 18% of ulcerative colitis related and 21% of familial adenomatosis polyposis-related carcinoma".[10] "However, the relative prevalence of these predisposing factors in SRC was rarely documented. Nevertheless, in a series obtained from a general population of colorectal carcinoma, patients with known predisposing factors may account for slightly more than 10% of SRC[3] Thus, other unknown factors may be the cause of the SRC".

"The common sites of SRC are the sigmoid colon or rectum. When compared to solitary colorectal carcinoma, SRC appears to more often involve the proximal portion of the colon in particular the ascending colon". [3] Our patient had synchronous cancer involving the midtransverse and mid sigmoid colon.

"Subtotal and extended left colectomy with ICJ preservation represent most preferable technique in cases of SRC involving the transverse and sigmoid colon. These approaches might be challenging in terms of reconstructive steps. The reconstructive procedures after extended left colectomy require the formation of a tension-free colorectal anastomosis, saving the terminal ileum, ileocecal valve and cecum when possible. The preservation of the colonic segment is crucial regarding the decrease of bowel motions and lower risk of postoperative small bowel obstruction and anastomotic leakage" [5].
"The reconstruction is feasible with a right colonic transposition or a complete intestinal derotation, known as DP" [5, 6]. "The colonic rotation might be complicated by the variability of vessel anatomy and difficulty in supplying artery preservation" [11]. The counterclockwise rotation of the cecum and ascending colon, known as "Deloyers Procedure," was introduced by Rosi and Cahill [12] in 1962 and Lucien Deloyers in 1964, as a possible reconstructive technique after extended left hemicolectomy and subtotal colectomy. (Figure 4) The representative works of this procedure by Deloyers and Manceau [6, 13] in 1964 and 2012 respectively, have shown that the Deloyers procedure provides a low morbidity and adequate long-term functional outcome. "The largest published series of 48 patients by Manceau et al. [6] demonstrated low morbidity and good long-term functional results after right colonic transposition, with no anastomotic leakage and 67% of patients having fewer than 3 bowel movements per day".

"Most surgeons prefer to perform an ileorectal anastomosis after extended colonic resections. In this the number and consistency of bowel movements is usually a problem". [14,15]
"Theoretically, the advantage of DP is the preservation of the ileocecal valve and thus a slower emptying from the small intestine to the fragment of the remaining colon and rectum, which can result in a lower number of bowel movements, better consistency[16,17] and greater absorption of water, sodium, and vitamin B12 compared to an ileorectal anastomosis"[18]

Laparoscopic performance of the DP, which requires complete mobilization of the colon and the mesenteric root is technically demanding. In our case the SRC was detected at the time of colonoscopy and it involved transverse and sigmoid colon. The surgery was performed by totally laparoscopic approach without extra incision for the retrieval of specimen .The specimen was retrieved through the ileostomy site. There was no compromise in oncological clearance and adopting DP helped to create a tension free colorectal anastomosis.

Conclusions

Laparoscopic DP after extended left colonic resections for synchronous colon cancer is technically demanding, but safe and feasible in experienced hands.

Consent

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

Ethical Approval:

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

References

1.Papadopoulos V, Michalopoulos A, Basdanis G, Papapolychroniadis K, Paramythiotis D, Fotiadis P, Berovalis P, Harlaftis N. Synchronous and metachronous colorectal carcinoma. Tech Coloproctol. 2004; 8 Suppl 1:s97-100.

2. Latournerie M, Jooste V, Cottet V, Lepage C, Faivre J, Bouvier AM.Epidemiology and prognosis of synchronous colorectal cancers. *Br JSurg* 2008; 95:1528–1533.

3. Lam AK, Carmichael R, Gertraud BP, Gopalan V, Ho YH, Siu S. Clinicopathological significance of synchronous carcinoma in colorectal cancer. *Am J Surg* 2011; 202:39- 44

4. Kiran RP, Khoury W, Church JM, Lavery IC, Fazio VW, Remzi FH.Colorectal cancer complicating inflammatory bowel disease: similarities and differences between crohn's and ulcerative colitis based on three decades of experience. *Ann Surg* 2010; 252:330–335.

5. Dumont F, Da Re C, Goéré D, Honoré C, Elias D. Options and outcome for reconstruction after extended left hemicolectomy. Colorectal Dis. 2013; 15(6): 747–54.
6. Manceau G, Karoui M, Breton S, Blanchet AS, Rousseau G, Savier E, et al. Right colon to rectal anastomosis (Deloyers procedure) as a salvage technique for low colorectal or coloanal anastomosis: postoperative and long-term outcomes. Dis Colon Rectum. 2012; 55(3): 363–8.

7.Ohtani H, Tamamori Y, Azuma T, Mori Y, Nishiguchi Y, Maeda K, Hirakawa K. A meta-analysis of the short-and long-term results of randomized controlled trials that compared laparoscopy-assisted and conventional open surgery for rectal cancer. J Gastrointest Surg. 2011; 15:1375- 85.

8. Li S, Chi P, Lin H, Lu X, Huang Y. Long-term outcomes of laparoscopic surgery versus open resection for middle and lower rectal cancer: an NTCLES study. Surg Endosc. 2011; 25:3175-82.

9. Feroci F, Kröning KC, Lenzi E, Moraldi L, Cantafio S, Scatizzi M. Laparoscopy within a fast-track program enhances the short-term results after elective surgery for resectable colorectal cancer. Surg Endosc. 2011; 25:2919- 25.

10. Greenstein AJ, Slater G, Heimann TM, Sachar DB, Aufses AH. A comparison of multiple synchronous colorectal cancer in ulcerative colitis, familial polyposis coli, and de novo cancer. *Ann Surg* 1986; 203: 123-128 [PMID: 3947149 DOI: 10.1097/00000658-198602000-00002]

11. Jones DW, Dimitrova M, Nandakumar G. Colonic salvage with antiperistaltic cecorectal anastomosis. Dis Colon Rectum. 2015; 58(2): 270–4.

12. Rosi PA, Cahill WJ. Subtotal colectomy with cecorectal anastomosis for multiple adenomas of the colon. Am J
Surg. 1962; 103(1): 75–80.

13. Deloyers L. Suspension of the right colon permits withoutexception preservation of the anal sphincter after extensivecolectomy of the transverse and left colon (including rectum).Technic – indications – immediate and late results. Lyon Chir.1964; 60:404–13.

14.You YN, Chua HK, Nelson H, Hassan I, Barnes SA, HarringtonJ. Segmental vs. extended colectomy: measurable differencesin morbidity, function, and quality of life. Dis Colon Rectum.2008; 51:1036–43

15. Mariani A, Moszkowicz D, Trésallet C, Koskas F, Chiche L,Lupinacci R, et al. Restoration of intestinal continuity aftercolectomy for non-oclusive ischemic colitis. Tech Coloproctol.2014; 18:623–7.

16. Christos K, Baloyiannis Y, Kinross J, Tan E, Rasheed S, TekkisP. Modified right colon inversion technique as a salvageprocedure for colorectal or coloanal anastomosis. ColorectalDis. 2014; 16:971–5.

17. Umar US, Kullar N, Dorudi S. Right colonic transpositiontechnique: when the left colon is unavailable for achieving apelvic anastomosis. Dis Colon Rectum. 2011; 54:360–2.

18. Sarli L, Costi R, Iusco D, Roncoroni L. Long-term results of subtotal colectomy with antiperistaltic cecoproctostomy. SurgToday. 2003; 33:823–7.