Deloyer's Procedure : a good functional outcome for extended left hemicolectomy

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Abstract:
Introduction:
Cancers involving the transverse colon, splenic flexure and descending colon often require extensive resection of the large intestine following which performing a tension free well vascularised colorectal or coloanal anastomosis becomes quite difficult due to shortness of vascular pedicel and distance between the stumps. Deloyer's colorectal anastomosis is a well documented, vintage procedure which includes anticlockwise rotation of ascending colon and transposition to achieve a well vascularised tension free colorectal anastomosis

Objective: The aim of our study is to report technique and outcome of Deloyer's procedure in open extended left hemicolectomy

Methodology: This is a case report of 36 year old male case of Adenocarcinoma of splenic flexure who underwent extended left hemicolectomy at a rural tertiary health care set up.

Conclusion: Our experience showed that ascending colon transposition is a safe and tension free, well vascularised procedure with good functional outcome and is a safe alternative to prevent total colectomy and ileorectal anastomosis.

Keywords: Splenic flexure adenocarcinoma, colorectal anastomosis, Deloyers procedure, Extended left hemicolectomy.

INTRODUCTION:

Cancers involving the transverse colon and descending colon often require extensive resection of the large intestine following which performing a tension free well vascularised colorectal or coloanal anastomosis becomes quite difficult due to shortness of vascular pedicel and distance between the stumps[1] .

There can be three surgical procedures performed for management : a definitive transverse colostomy, in order to save large intestinal functions; total colectomy followed by an ileo-rectal anastomosis, when it is preferred to preserve continence; the Deloyers procedure in order to preserve both the large intestinal function and conitinence[1,2]
Deloyers procedure was developed as an adjunct to ileorectal anastomosis wherein only a short colorectal stump is available for restoration of bowel continuity. It involves the creation of anastomosis between the right or transverse colon and the rectum. It requires complete mobilization of the ascending colon with anticlockwise rotation while preserving the ileocolic pedicle.
Deloyers operation may be indicated during the primary operation of an extended left hemicolectomy or as a restoring procedure following an urgent colostomy with a
short segment of the remaining colon.[3]
Deloyer's colorectal anastomosis is a well documented, vintage procedure which includes anticlockwise rotation of ascending colon and transposition to achieve a well vascularised tension free colorectal anastomosis in conditions where short remnant colonic length doesn't allow for regular fashion anastomosis.[4,21]

Methodology:

A 36 year old male presented with chief complains of abdominal pain mainly at epigastric and left hypochondrium region since 6 months which was insidious in onset, non progressive , intermittent in nature and of dull aching type. There was history of passage of blood in stools two months ago with intermittent complaints of loose sticky stools. No history of loss of weight. No premorbid conditions. No similar family history. On examination vitally he was stable and per abdomen and per rectal examination was normal.

Patient was admitted for evaluation and underwent CECT Abdomen and Pelvis suggestive of heterogenously enhancing asymmetrical circumferential wall thickening noted involving distal part of transverse colon for a length of 6 cm approximately 2-2.5 cm from splenic flexure with maximum thickness of 13 mm along posterior wall causing near complete luminal narrowing. Fat planes with surrounding structures maintained.
Patient underwent colonoscopy which showed -Ulceroproliferative growth 50 cm from anal verse involving splenic flexure and proximal part of descending colon. Biopsy taken and histopathological report was suggestive of – well to moderately differentiated adenocarcinoma of colon.
On admission labs were Hb 8.2 , TLC 4x10*3, Plt 345, LFT and RFT – WNL , PT/INR – 11.6/0.9.
CEA 0.58 ng/ml (normal <2.50)
After complete evaluation and adequate correction of nutritional deficiencies and appropriate counselling and pre anaesthetic fitness patient was posted for extended left hemicolectomy.

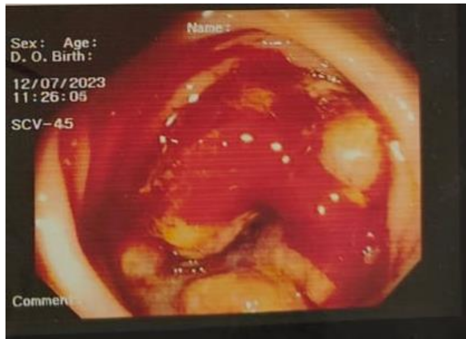


Fig 1:Colonoscopic image showing friable ulceroproliferative growth at sigmoid flexure

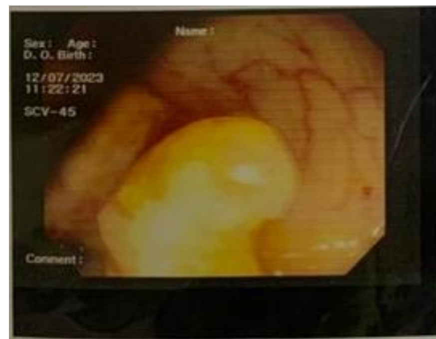


Fig 2:Colonoscopic image showing polyp at descending colon

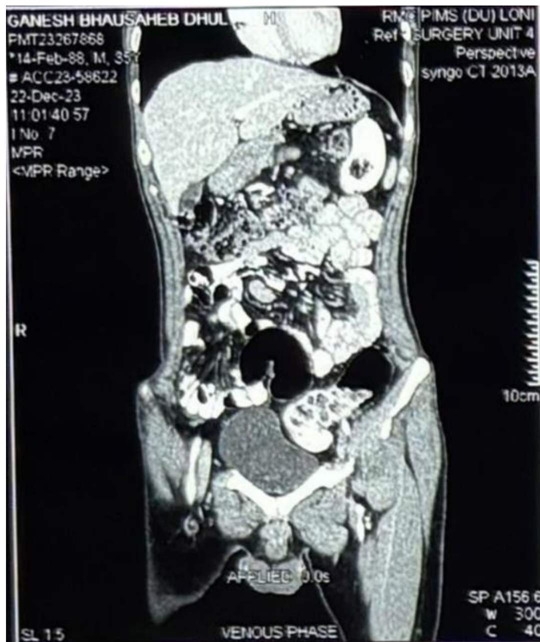


Fig 3: Coronal section showing splenic flexure

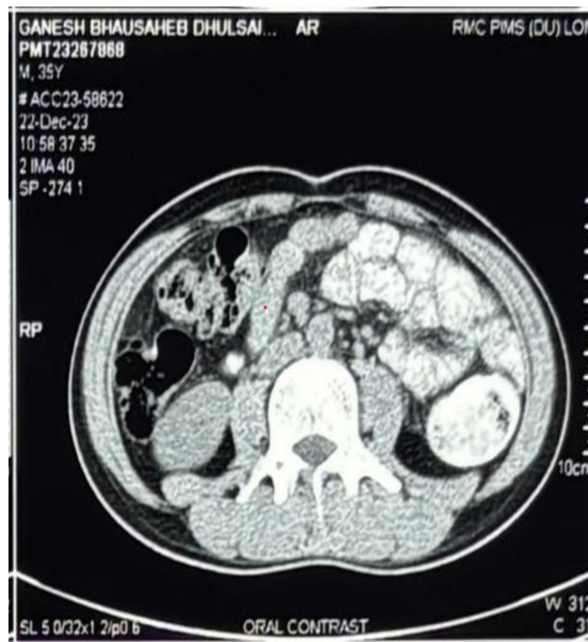
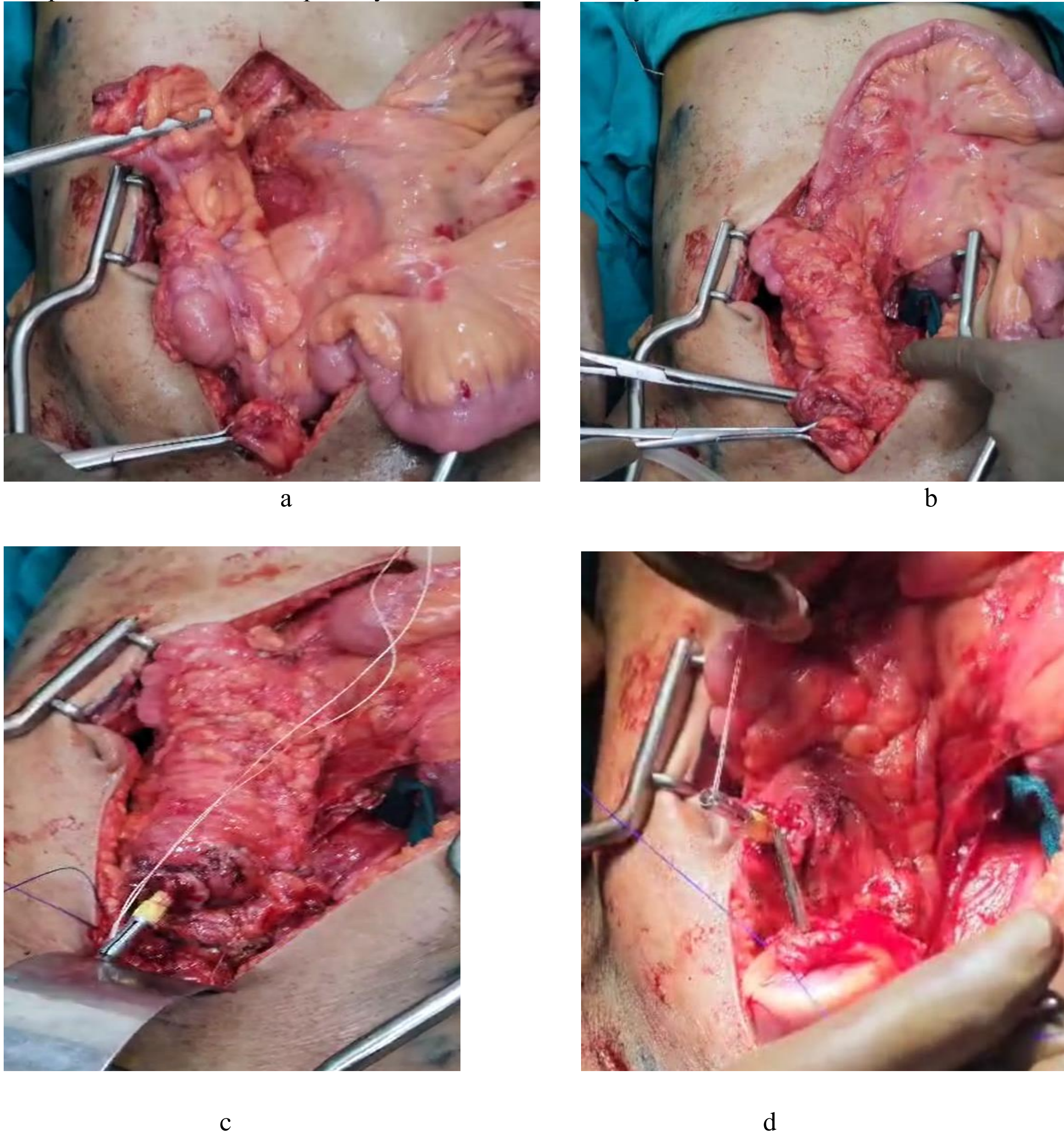


Fig 4: Transverse section showing growth at splenic flexure

Surgical procedure :
Patient underwent laparoscopic assisted open extended left hemicolectomy for splenic flexure adenocarcinoma. Initially laparoscopic dissection was performed to mobilize the sigmoid colon , descending colon and the transverse colon , also ligating the arterial supply to these segments and then procedure was converted to laparotomy . Distally the resection was done at rectosigmoid junction and proximally at proximal one third of transverse colon . Inferior mesenteric artery , Left colic , middle colic artery left branch and right branch both were ligated . Right colic artery was preserved.
For anastomosis initially Turnbull method of retro ileal transmesentric colo rectal anastomosis was considered , so as to create a window in the ileal mesentry and bring the proximal transverse colon stump via it into pelvis for anastomosis . But due the tension and stretch at the right colic artery pedicle and incomplete approximation of the colo-rectal stumps this method was abandoned. It was decided to perform Deloyers procedure where in the right colic

artery pedicle was ligated followed by cranio caudal anticlockwise rotation of the right colon and bringing it to the pelvis for colorectal anastomosis.
In the Deloyers procedure the caecum was brought to the subhepatic position,preserving the ileo- caecal valve , prophylactic appendectomy performed to prevent acute appendicitis at an ectopic position and followed by iso peristaltic colo-rectal anastomosis .End to end anastomosis was performed using a circular stapler. An air tightness test performed to check the patency. Abdomen closed in layers.



a b

c d

Fig 5: Intra operative images in seqeunce : a) ascending colon in normal position and rectal stump ;b)anticlockwise rotation of ascending colon performed and caecum mobilised to subhepatic position , prophylactic appendecectomy done and isoperistaltic loop of ascending colon with preserved ileocaecal valve brought to pelvis ; c) anvil inserted into to proximal stump ;d) rectal circular stapler end and proximal ascending colon stapler approximated for end to end anastomosis.

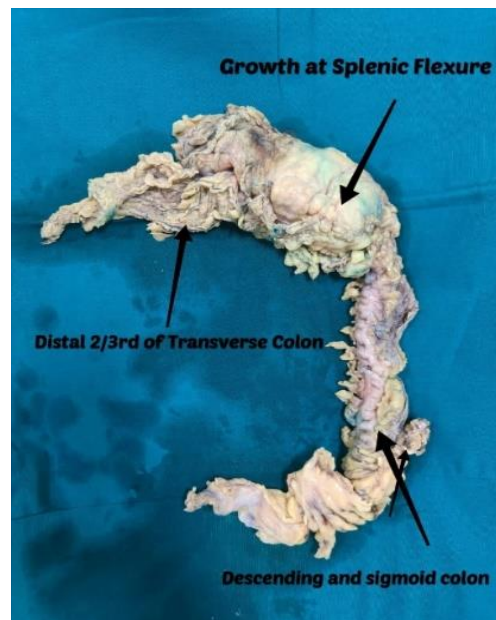


Fig 6 : Post op specimen

DISCUSSION:

Maintaining intestinal continuity by performing anastomosis after resecting a descending colon tumour generally represents a complex procedure because a well-vascularized and tension-free reconstruction in extended left hemicolectomy is difficult owing to the short vascular pedicles of the proximal transverse colon stump and the large distance between the two bowel loops. To avoid these hurdles, surgeons prefer to perform an ileorectal anastomosis. However, the number and consistency of bowel movements is usually a problem in ileo-rectal anastomosis .[5,6]

The concept of a creating a mesenteric window to facilitate anastomosis was first described by Andre Toupet in 1961. Following resection of splenic flexure carcinoma, Toupet created a defect in the small bowel mesentery to bring the proximal transverse colon to the sigmoid colon.[7,8] Subsequently, in 1976, Hays published a case report of anastomosis following extended left colectomy for left colon cancer utilizing a mesenteric window to pass the transverse colon to reach the upper rectum for anastomosis.[9]

In 1978 Rombeau and Turnbull described a series of 11 patients at the Cleveland Clinic[10] indicating utility and safety with no major septic complications reported. This maneuver initially was described using open surgery but now in era of minimally invasive surgery several reports confirm successful outcomes using laparoscopic technique.[11]

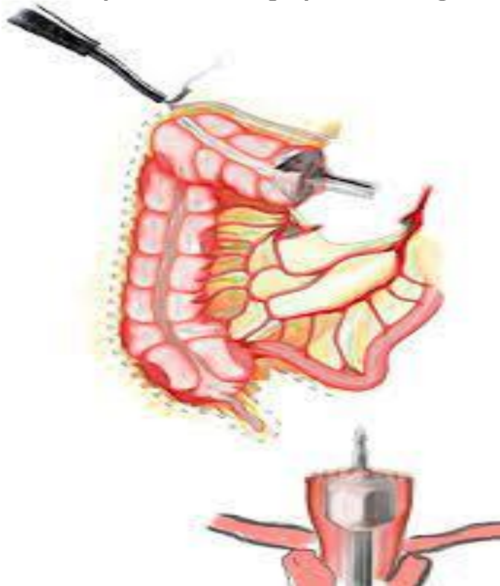


Fig 7: Image showing proximal 1/3rd transverse colon stump with rectal stump, preserved right colic pedicle and circular staplers insitu

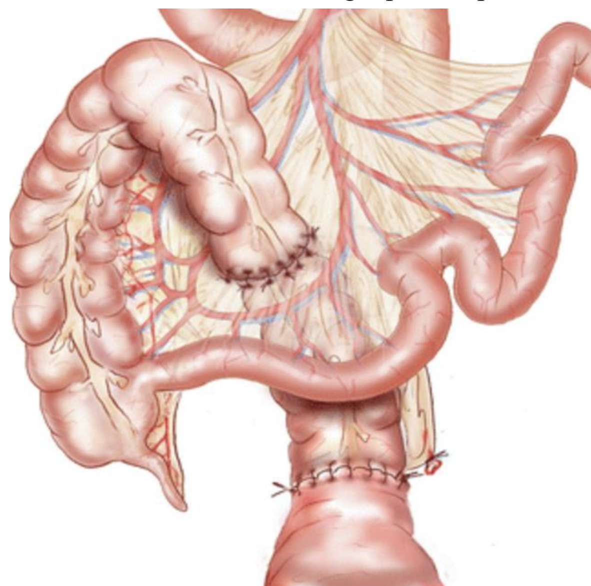


Fig 8: Image depicting retro ileal trans-mesentric colorectal anastomosis

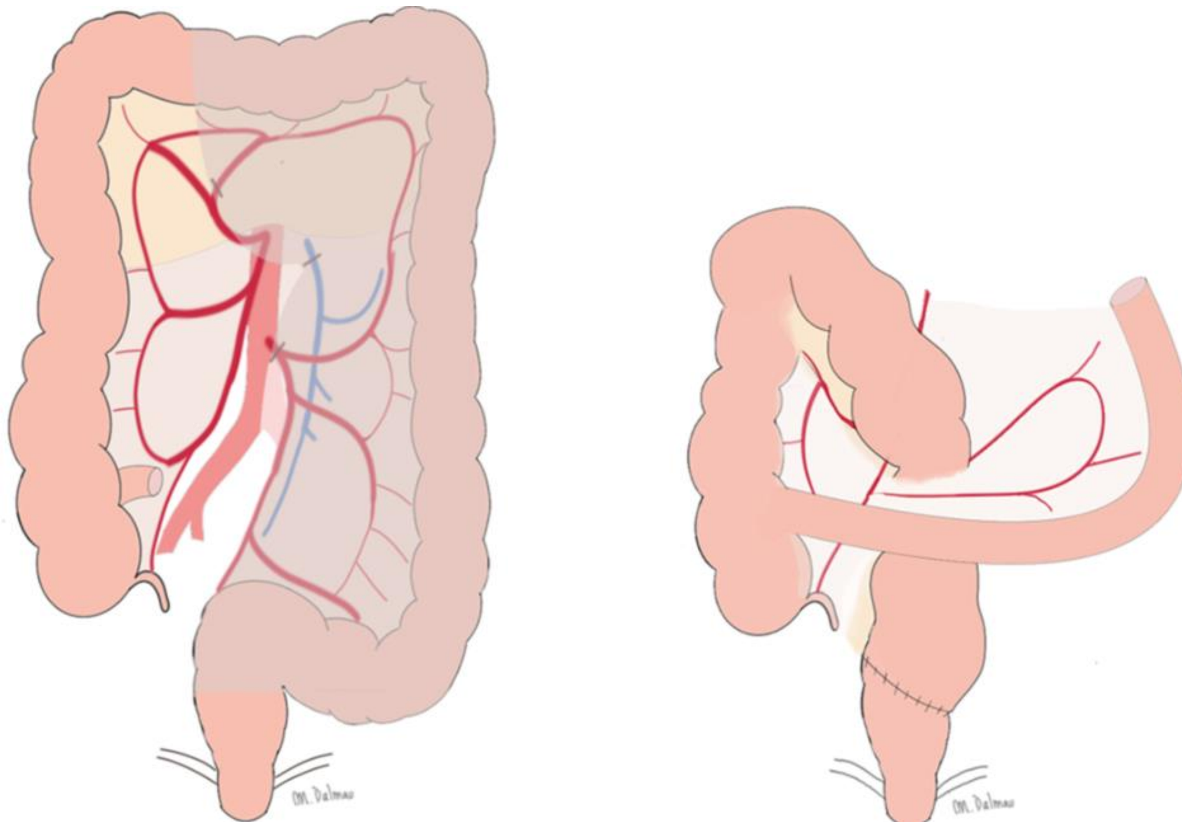


Fig 9 :Turnbull procedure :Shaded part is extended left hemicolectomy specimen with ligated Inferior mesentric artery and middle colic pedicle. Preserved ascending colon and proximal transverse colon anastomosed to rectal stump through a window in the ileal mesentry.[19]

In the description of Turnbull's procedure the middle colic vessels were divided.[10] and if the proximal stump is still short of length and fails to physically reach via the mesenteric window or if the proximal transverse colon becomes ischemic following middle colic pedicle transection, the next option for anastomosis involves Deloyer's procedure, or de-rotation of the right colon as was performed in our case

In 1955 a report by Lillehei and Wangensteen suggested variations of derotation with anastomosis of the ascending colon by anticlockwise rotation of the cecum in the coronal plane and construction of a cecorectal anastomosis. [52] In 1958, Deloyer's subsequently reported a technique of anastomosis of the ascending colon to the rectum following derotation in the sagittal plane .[2,12] In Deloyer's procedure the middle colic artery, right colic artery are divided and ileocolic artery is preserved. The proximal transverse colon may mostly be sacrificed, but in case of a well-perfusing intact marginal artery of Drummond the transverse colon vascularity may be maintained and can be used for anastomosis.[20] The appendix is prophylactically excised as the caecum is flipped at right hypochondrium and later if appendicitis occurs diagnosing it and excision can be challenging.[3]

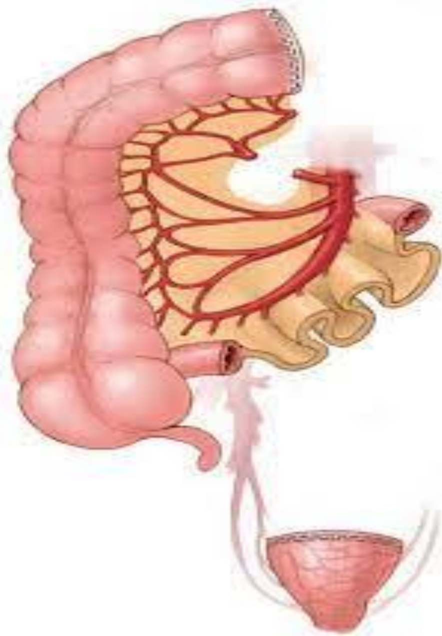


Fig 10: Image showing proximal 1/3rd transverse colon stump with rectal stump, ligated right colic pedicle

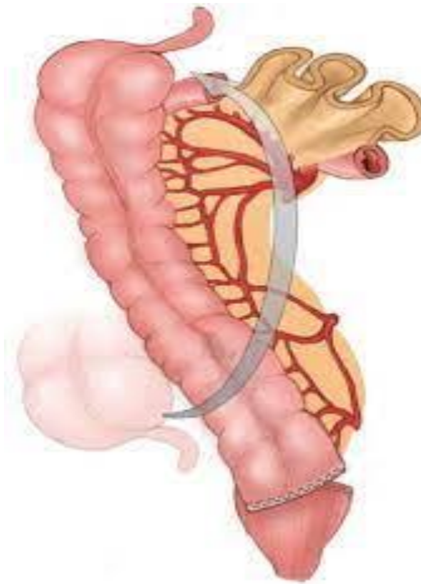
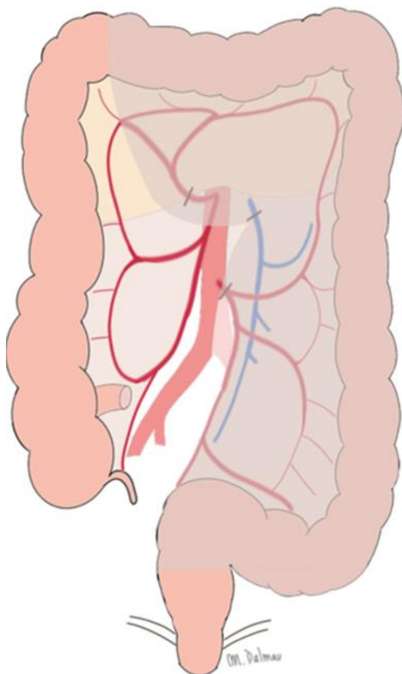


Fig 11: Image depicting anti clockwise rotated ascending colon with subhepatic caecum and proximal colon brought to pelvis with colorectal anastomosis



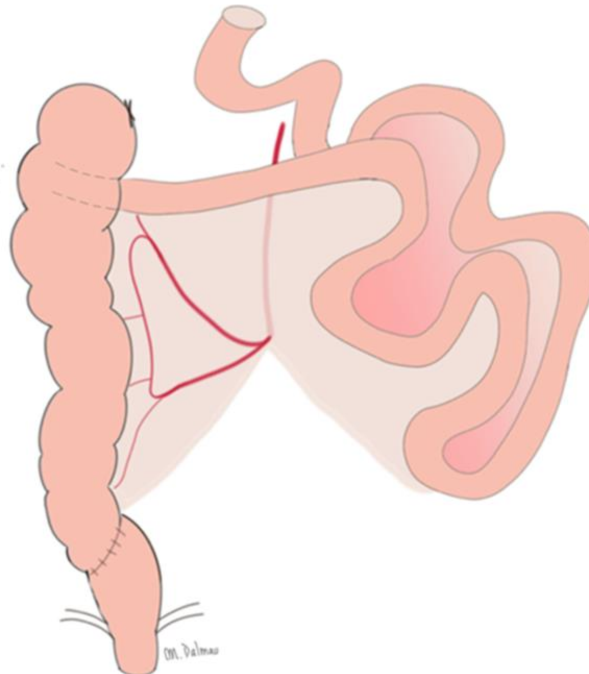


Fig 12: Deloyer's procedure :Shaded part is extended left hemicolectomy specimen with ligated Inferior mesentric artery and middle colic and right colic pedicle.Prophylactic appendecectomy done with subhepatic position of ceacum. Preserved ascending colon anastomosed to rectal stump in a isoperistaltic fashion with preservation of the ileocaecal valve. [19]

Theoretically, the advantage of this procedure is the preservation of the ileocecal valve and therefore 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[14,15] and greater absorption of water, sodium, and vitamin B12 compared to an ileorectal anastomosis.[16,17]

There is currently no recommendation on the use of protective ileostomy during the Deloyers procedure. The decision to perform a protective ileostomy in the minority of patients was based on the proper release and rotation of the proximal colon.

The main limitation of this procedure is torsion at the ileocolic vascular pedicle, which an increase the risk of ischaemia.In order to reduce compression of the ileocolic pedicle, Kontovounisio et al.[18] proposed a modification adding a caecopexy and right colon fixation to the right paracolic gutter.

CONCLUSION:

Malignancies involving the distal transverse colon , splenic flexure and descending colon pose as a nightmare to surgeons as the knowledge and technical skill to gain length: to fully mobilize the colon and its mesentery to achieve a tension free anastomosis during left-sided colorectal resection is very challenging . Anticipation and patience and are critical to achieve a good functional outcome. If one lacks the familiarity of these maneuvers, the only true safe option is stoma creation .
These maneuvers reduce the need for end stoma creation and also probability of anastomotic failure. It preserves bowel length and physiologic function in form of preservence of bowel continuity and continence also better degree of reabsorbtion of fluids and nutrients , and potentially impact the postoperative result for patients by many measures. As a result, a surgeon can achieve anastomotic construction and healing following colorectal resection thus restoring a patient to a sense of health and well-being.

CONFLICT OF INTERESTS:
The authors declare no conflict of interest.

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