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Anastomosis following low anterior resection – does one size fit all?

Low anastomosis

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Low anterior resection with total mesorectal excision (TME) is typically performed for selected low rectal cancers as a sphincter-sparing procedure that entails subtotal resection of the rectum followed by a low colorectal or coloanal anastomosis to re-establish continuity. Several options exist for the construction of this anastomosis including anastomosis in a colonic J-pouch configuration. The most utilised is a straight end-to-end anastomosis with a stapled anastomosis (Figure 1). While this is often the least technically demanding option for the surgeon, is it always the most appropriate?

A common sequela of sphincter preserving surgery for rectal cancer is low anterior resection syndrome (LARS), which encompasses a constellation of symptoms including increased stool frequency, clustering and incontinence. This is in part due to a loss or reduction in rectal capacity post-operatively. Other factors such as radiation, surgically-induced nerve injury and rectal dysmotility⁴⁻⁶ also impact function. It has a major impact on patient quality of life, with 45.9% of cases at 12 months.² Amongst all the factors that contribute to LARS, the surgical technique has a significant impact.⁷

The proponents for an end-to-end anastomosis will argue that surgeons should not adopt a J-pouch operative strategy, and that any functional advantage of a colonic J-pouch is negated in comparison to an end-to-end anastomosis will be negligible at one year due to adaptation.⁷ However, pelvic anatomy varies widely, and in the era of personalized

mechanism, i.e. the anorectal ring, formed by the fusion of the internal anal sphincter and puborectalis muscle. An anastomosis may be formed above, at, or below the anorectal junction, and any resection below the anorectal junction will involve internal sphincterotomy. Functional results may be improved by performing bespoke reconstruction.

The dead-space created within the pelvis following any rectal resection is an important factor to consider when determining the type of reconstruction. Reflecting on the goals of surgery, the ideal reconstruction will effectively obliterate and replace the dead-space following resection with revascularised tissue. In contrast to a straight end-to-end anastomosis, formation of a colonic J-pouch or side-to-end anastomosis serves dual functions: it provides a more effective filling of the dead-space that exists following resection. A J-pouch is formed by folding the distal colon on itself, followed by division of the septum and anastomosis using a linear stapler (Figure 1). It is limited by anatomical characteristics such as bulky anal sphincters, insufficient colon length, obesity, and diverticulosis. In patients with a wide pelvis where anastomosis is required at, or above the anorectal junction, anastomosis is required below the anorectal junction in the setting of short bowel syndrome. If there is an inability to sufficiently mobilise the colon to construct a low anastomosis, bulky or in the setting of a narrow pelvis, a colonic J-pouch reservoir may be constructed. This article is protected by copyright. All rights reserved.

side-to-end coloanal anastomosis may then be used as an alternative. A sigmoid

For anastomoses below the anorectal junction where a long sphincter is present, a side-to-side anastomosis may be the only appropriate anastomosis. The exception to this is when the pelvic inlet is narrow, but the mid rectal space is wide and colonic length is sufficient to allow for a side-to-end anastomosis. In such a scenario, Halstedian principles trump the restrictions imposed by the inlet, and a colonic J-pouch is preferable. In the event of a leak, consequences are potentially mitigated by a reduction in size of the pouch, or the pouch occupied by a reservoir. For anastomoses below the anorectal junction a hand-sewn anastomosis is employed due to the anatomical confines limiting placement of a rigid stapler. Above the anorectal junction, these anastomoses are by and large stapled. Transanal total mesorectal excision (TME) is open, laparoscopic, robotic and transanal surgery. Transanal total mesorectal excision (TME) may be of use in the setting of a narrow pelvis where the standard abdominal approach is difficult.⁹ In this manner, a double-purse-string single-staple line, fired via transanal approach, may be applied.

[DELETE] Regarding an end-to-end anastomosis, the possibility of size mismatch is often considered, whereby luminal diameter of the colon proximal to the resection is smaller in size than that of the remaining rectum or anorectal stump. Surgically this is a challenging situation, but more importantly this may yield poor long-term outcomes, such as a chronic pelvic cavity causing significant morbidity if not addressed.

in this patient population, particularly considering the high incidence of L. 40/04 randomised controlled trial quality of life was assessed comparing end anastomosis, colonic J-pouch and straight end-to-end anastomoses. N and incontinence scores were observed twenty-four months post-operative analysis showed improved quality of life at the twelve-month mark for the colonic J-pouch anastomosis when compared to an end-to-end anastomosis anastomosis.¹⁰ [DELETE] Interestingly, this trial also reflected a preference for colonic J-pouch, in one third of cases randomised to colonic J-pouch surgery alternate choice of anastomosis, perhaps influenced by a perceived fear of or due to the technical demand of colonic J-pouch formation. Surgical outcomes (mortality, reoperation, anastomotic leak, and anastomotic stricture) do not differ between any of the reconstructive techniques.⁷ The Cochrane review Rectal Resection for Rectal Cancer found formation of a colonic J-pouch coloanal anastomosis was associated with improved functional outcomes operatively. Postoperative complication rates were similar comparing the

As a final consideration, mobility of the colon following dissection, and the mesentery can influence the fate of any low anastomosis. To facilitate a low splenic flexure is completely mobilised. High ligation of the inferior mesenteric

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and inferior mesenteric vein at the inferior border of the pancreas is pertinent

In conclusion, one size does not fit all, or rather one size does not *fill* all with regard to colorectal anastomosis. Careful consideration should be given to the most appropriate configuration which will best fill the pelvis. Before proceeding it is essential that sufficient colon length is available to facilitate a colonic J-pouch or side-to-end anastomosis. The colon is then effectively mobilised to complete that anastomosis. Pelvic anatomy, patient habitus and height of resection should guide anastomotic technique, which in turn will influence short-term and long-term patient outcomes including anastomotic failure rates, time to return of bowel function and possibly the prevalence of LARS.

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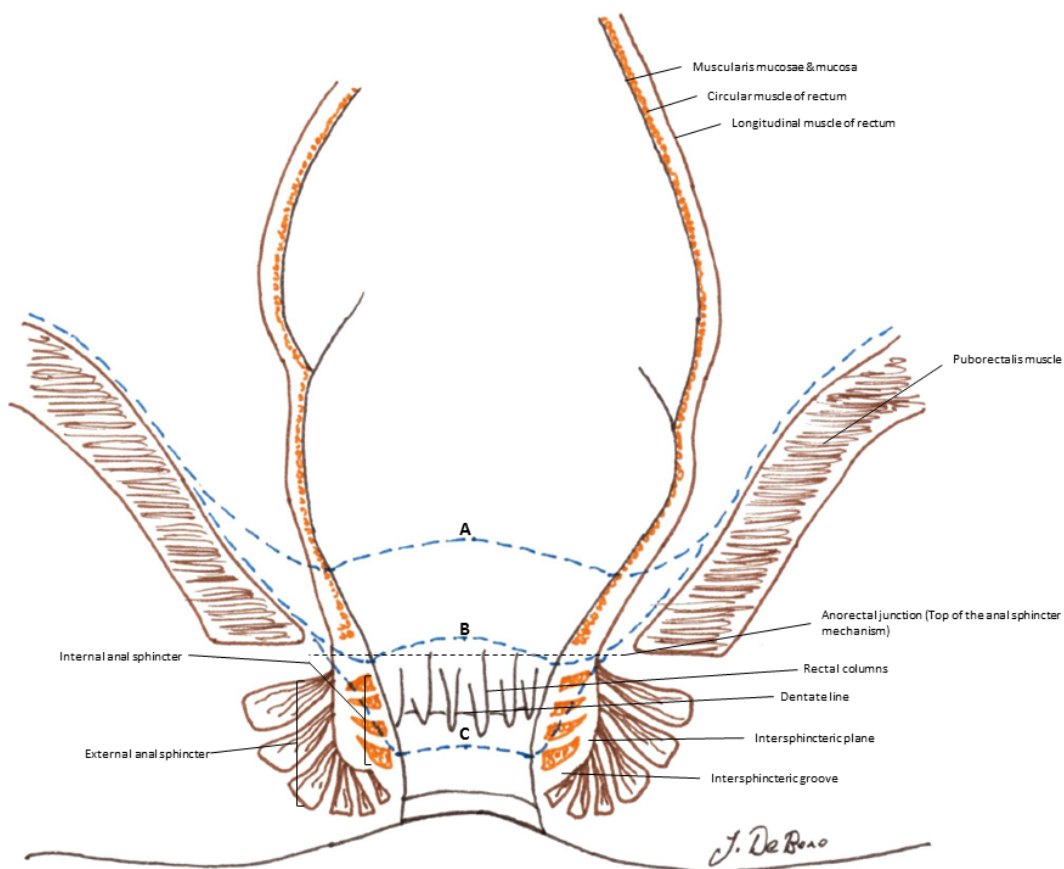
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Figure 1. Anastomosis following low anterior resection.

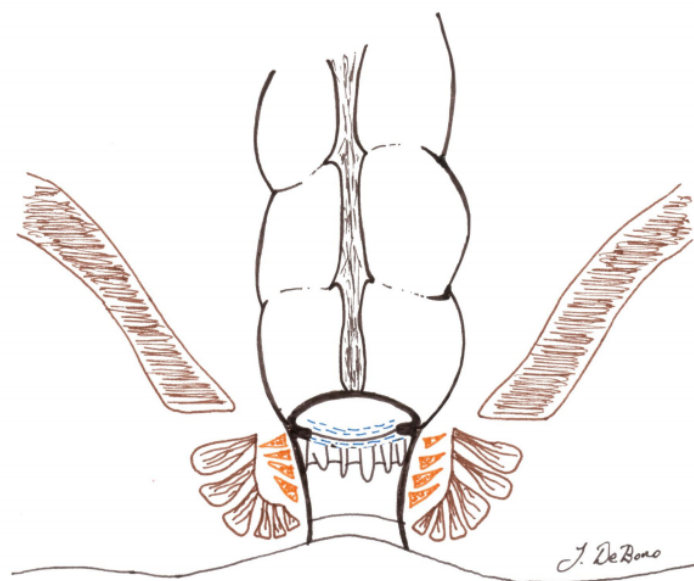
- a) Resection, above the anorectal junction (A); at the anorectal junction (B); below the anorectal junction (C).
- b) Straight end-to-end, double-stapled anastomosis.
- c) Colonic J-pouch anastomosis.
- d) Side-to-end anastomosis.

Figure 2. Flow diagram outlining factors that may influence choice of anastomosis following low anterior resection.

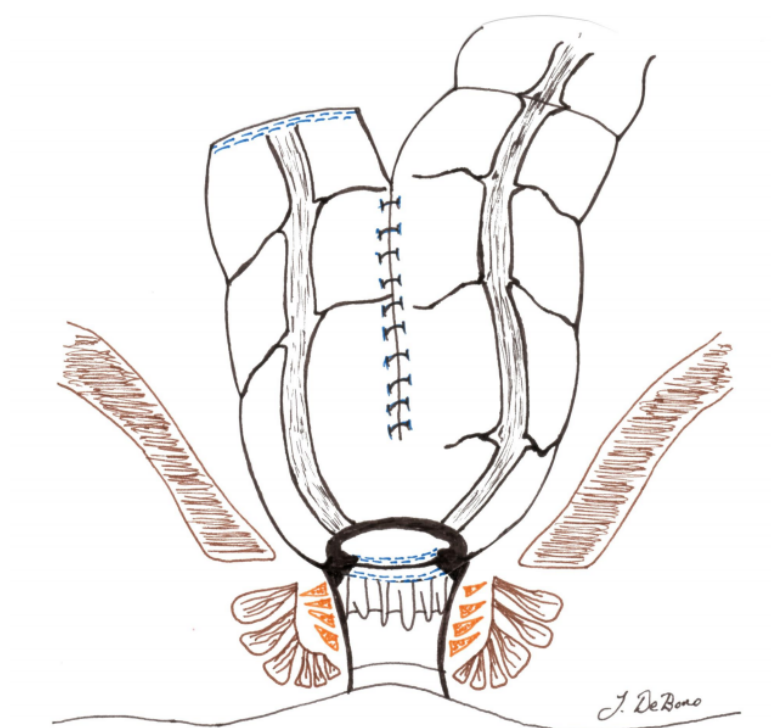
*In the setting of a narrow pelvic inlet but wide mid rectal space where sufficient space is available, a colonic J-pouch or side-to-end reservoir should be formed.



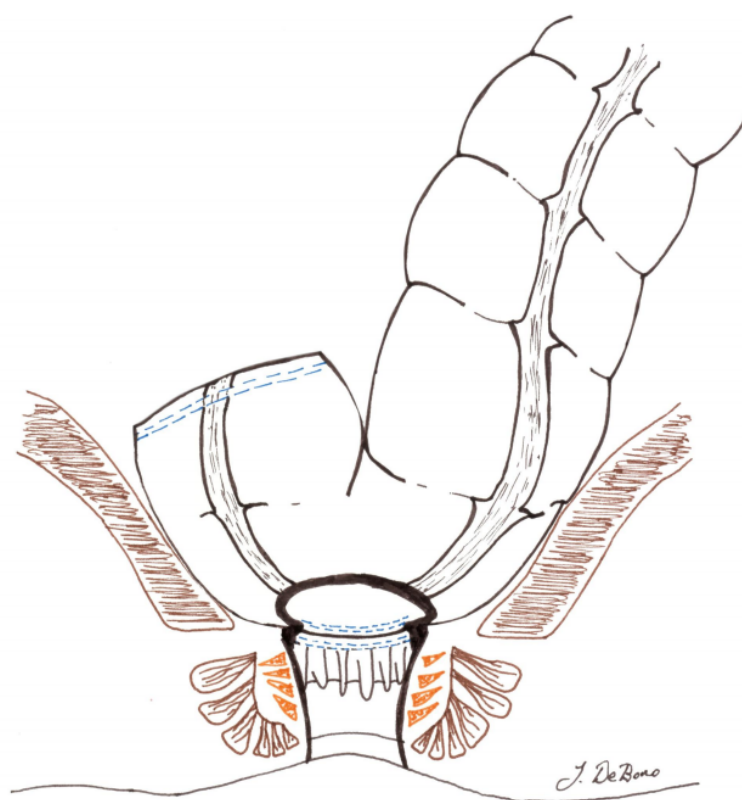
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