Distal ileal necrosis: Right ileo-colic intussuscepted anastomosis as an alternative to ileostomy

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Summary

Introduction: The technique of ileo-right colic intussuscepted anastomosis creating a neo-ileo-colic valve, was first described by Ribault in 1989 and has been shown to be of value in patients with typhoid ileal perforation as well as in other non-cancerous lesions of the terminal ileum. This technique is simple and rapid, and avoids ileostomy and/or ileo-cecal resection. The goal of this case-series was to describe the technique of ileo-right colic intussuscepted anastomosis as an alternative to ileostomy.

Patients and methods: This is a retrospective, monocenter study of patients with lesions of the terminal ileum who were managed with right ileo-colic intussuscepted anastomosis between January 2008 and December 2013. The technique was standardized. The main outcome criterion was the post-operative complication rate.

Results: Four patients, three female and one male, with a median age of 35 years were managed with ileo-right colic intussuscepted anastomosis for necrosis of the terminal ileum. The cause of distal ileal necrosis was necrosis secondary to tubo-ovarian abscess and perforation secondary to non-specific ileitis, in one patient each, and band-related bowel obstruction with extended necrosis in two patients. There was no reported post-operative morbidity or mortality and, in particular, no post-operative anastomotic leak occurred.

Conclusion: Based on the findings in the literature and our series, right ileo-colic intussuscepted anastomosis is a simple technique, easy to learn and associated with little morbidity. These advantages underscore the need to be aware of this technique, which is particularly useful in countries where creation of an ileostomy is problematic.

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Introduction

The technique of ileo-colic intussuscepted anastomosis was originally described by Ribault et al. in 1989 at the Dakar Main Hospital [1]. They showed this technique to be of value in the management of typhoid ileitis with perforation and generalized peritonitis [1]. The technique is simple and rapid, and avoids ileostomy and/or right ileocolic resection, which can result in several post-operative complications and stoma-related problems; these are especially serious in Africa where supplies of stomal equipment are often unavailable and/or very expensive leading patients to use artisanal substitutes. In addition, stomas are poorly accepted by patients because of African traditions and religious beliefs resulting in a non-negligible psychological impact. In addition to the problem of high costs in low-income populations, stoma creation incurs the additional expense of a second hospitalization and re-operation to restore intestinal continuity. This places a heavy financial burden on populations who must pay for health care on their own and where the consequences related to a stoma are considerable.

The goal of this case-series was to describe the technique of ileo-right colic intussuscepted anastomosis, as an alternative to stoma for benign, non-typhoid lesions of the terminal ileum; it can be performed when ileal pathology lies so close to the ileo-colic junction that simple ileo-ileoanastomosis is either impossible or dangerous.

Patients and methods

Population

This short series included patients who required an ileocolic anastomosis for terminal ileal disease during the period between January 2008 to December 2013.

Operative technique

Through a low midline incision, complete and careful exploration of the abdominal cavity and the entire length of the small intestine is performed allowing identification of the ileal lesion. The condition of the adjacent colon and mesentery must also be carefully evaluated.

Ileal resection

This is the first step of the operation.

Enterolysis and mesenteric division is performed proximal to the proposed resection site, staying close to the ileum: the marginal artery is carefully spared while the vasa-recti are ligated one by one (Fig. 1). This is the best way to maintain the viability of the terminal ileal segment that will be invaginated to create a neovalve.

The ileum proximal to the level of division must be well-vascularized (Fig. 2). All non-viable small bowel must be resected, even when there is extensive necrosis. The small bowel is divided after placing atraumatic clamps to prevent enteric spillage; the intestinal contents of the proximal segment are evacuated, especially when there is proximal dilatation.

The ileum is divided distally 5 mm from the ileo-cecal valve (Fig. 2). As the remnant ileal segment is too short to proceed with an end-to-end anastomosis, a 2 cm segment of the terminal ileum is intussuscepted to create a neovalve.
the proximal 2 cm of colonic mucosa should be left intact to provide a hammock-like support (Fig. 4) upon which the mesenteric edge of the ileum will lie. This mucosal hammock enhances the water-tightness of the anastomosis.

End-to-side ileo-right colic intussuscepted anastomosis

The colonic lumen is cleansed with a moist sponge stick. The mesenteric edge is affixed to the mucosal hammock with interrupted absorbable 3/0 sutures that include the colonic seromuscular layer and the mesenteric edge, as far as the proximal end of the colonic mucosal incision. Tying down the first knot approximates the mesenteric edge to the mucosal hammock. The remaining two or three sutures can then be placed and tied affixing the right and left leaflets of the mesentery to their respective colonic seromuscular edges (Fig. 5).

Circumferential anastomosis of the neovalve is then performed. An initial seromuscular suture is placed on the anti-mesenteric border of the ileum, 4 cm from the end of the neovalve at the proximal edge of the colotomy. The ileal neovalve can now be inserted through the colotomy by the assistant while the surgeon tightens the knot(s) (Fig. 6).
Our variation

Because of our relative inexpeience with the technique and the risk of creating too slack a mucosal hammock to assure a water-tight anastomosis, we thought that it might be possible to skip the hammock step (Fig. 7). Too slack a hammock was considered to be a possible risk factor for anastomatic leak.

Results

Four patients with terminal ileal disease were managed with the ileo-right colic intussuscepted anastomosis technique: three women and one man, median age 35 (range 24–39) years old.

Distal ileal perforation and/or necrosis occurred due to tubo-ovarian abscess in one case, to non-specific ileitis with perforation in one case, and to band-related bowel obstruction with extensive small bowel infarction in two cases. No post-operative morbidity or mortality was observed—in particular no post-operative fistula occurred. Post-operative follow-up was unremarkable with a median duration of follow-up of one month (range: 1–72). Relevant patient data are summarized in Table 1.

Discussion

There are several methods of dealing with non-cancerous lesions that require terminal ileal resection. Excision followed by immediate anastomosis is possible in patients with minimal traumatic injuries seen early, but this is difficult when the lesion involves or extends too close to the ileo-cecal junction, exposing the patient to fistula if sutures should pull out (which has been reported to occur in 25% of typhoid lesions [2]). Segmental resection with ileo-ileo anastomosis requires that the distal ileal segment be long enough to allow performance of enterointerostomy under satisfactory conditions [3], otherwise nearly always leading to anastomotic leakage of the terminal ileum [1].

For lesions lying too close to the cecum, ileal resection followed by distal ileal closure and ileostomy or ileo-cecal resection with a double stoma has the advantage of simplicity and rapidity, but it exposes the patient to high morbidity and mortality, as reported by several authors [2,4–9]. The ileostomy-related morbidity includes peri-stomal irritation and skin breakdown, mechanical complications (pro-lapse, retraction, stricture, dehiscence), malnutrition, and fluid/electrolyte imbalances. One African study [8] reported peri-stomal and mechanical complication rates of 51% and 22.9%, respectively. Fluid and electrolyte imbalances occur frequently and have been reported in 20.1% of patients with ileostomy who require re-hospitalization [9]. Among these patients, 40.7% were admitted for dehydration. Right hemicolectomy with immediate ileum-to-transverse colon anastomosis seems excessive in the emergency setting. We were unable to find any literature reports advocating for this procedure for lesions lying close to the ileo-cecal junction.

Until intestinal continuity can be restored, patients with an ileostomy are subject to considerable morbidity and significant psychological distress [6,7,10]. This is particularly true in the African context where problems related to tradition and different religious beliefs abound. The main
characteristics are a feeling of psychological degradation or loss of dignity, accentuated by social rejection by those who do not understand why a stoma was created [6,8]. Most African authors report high mortality rates ranging from 9.4 to 11.5% [6,7], and even higher in children where the rate can attain 21.7% [8]. Furthermore, intestinal stomas expose the patient to problems particular to Africa: inconsistent availability of stoma bags, high costs, which lead patients to use artisanal bags (ordinary plastic bags), thereby increasing the morbidity and mortality [6]. Stoma creation requires two-stage surgery, initial stoma formation followed by restoration of intestinal continuity [2]. Stomas are problematic for several reasons: the patients often cannot afford the cost of a second operation, while the lack of adequate materiel in the operative suites may lead the surgeon to cancel or postpone the operation [5–7].

Surgeons working in the tropics have used classical methods to treat typhoid perforation of the ileum with inconsistent results [11—16]. This led Ribault et al. to reconsider the indications and the method of management of patients with typhoid perforation [1]. The technique of ileo-right colic intussuscepted anastomosis, as described by these authors, can be applied to all other non-cancerous perforations of the distal ileum as well as to resections extending so close to the right colon that there is not sufficient bowel length to correctly fashion an ileo-ileal anastomosis. In their series of 33 patients [1], five patients with necrosis of the terminal ileum were successfully treated: one patient had a neglected strangulated hernia and four patients had strangulation obstruction secondary to adhesive bands (similar to two patients in our series). This technique can be used in precarious emergency settings as well as for lesions that extend into the right colon, as described by Ribault et al. [17] who performed an ileo-tranverse intussuscepted anastomosis following right hemicolecctomy for complicated ileo-colic intussusception.

The indication for ileo-right colic intussuscepted anastomosis is justified by several of its advantages: the procedure is simple, rapid, safe, reliable and water-tight. No temporary stoma or secondary operation is needed to restore intestinal continuity (which has its own morbidity and mortality). Currently, several authors prefer one-stage surgery [11], avoiding a stoma. This argument is particularly pertinent in this African context where stomal care rests entirely on the patient who usually accepts it poorly. In addition, hospital stay is shorter and therefore the costs are lower if a second operation can be avoided [18].

Morbidity and mortality with this technique are low compared to other techniques [1]. Lauroy et al. [18] found that mortality with all the other techniques could reach as high as 18%; conversely, there was no mortality in our series or in that of Ribault et al. [1]. They did report two complications with this technique [1]: one patient developed post-operative obstruction due to stricture at the level of the ileal neovalue that appeared 15 days after operation and was ascribed to a technical error by an inexperienced operator, and a ten-year old patient developed an anastomotic leak on the seventh post-operative day, which resolved spontaneously two days later. However, the advantages of this technique for treatment of ischemic necrosis of the ileum have not yet been demonstrated in the literature. We believe that the indications should be proposed carefully, keeping in mind the risks of anastomotic leak and progressive ischemia in the remaining intestines.

Our proposed alternative technique, which omits the mucosal hammock, is encouraging judging from the results we have obtained. Nonetheless, this technique requires further evaluation and more experimental data before advocating its adoption.

Conclusion

Based on the literature and our results, the technique of ileo-right colic intussuscepted anastomosis is simple, easy to learn, and associated with low morbidity. These advantages lead us to believe that this technique should be recognized and used in countries where the consequences of a stoma are considerable.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

References


