

Case Series

Lactose free diet as therapeutic strategy in low anterior resection syndrome: a case series

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Abstract

Low anterior resection syndrome (LARS) is a challenging complication following sphincter-preserving rectal surgery, characterized by bowel dysfunctions such as urgency, frequency, and incontinence. This case series investigates the potential role of lactose intolerance in exacerbating LARS symptoms. Three patients who developed LARS after rectal resections showed persistent symptoms despite conventional management with bulking agents, physiotherapy, and loperamide. However, all three experienced significant improvement in symptomatology, reflected by reductions in their LARS scores, after eliminating cow's milk from their diets. These findings suggest a potential link between lactose intolerance, including possible late-onset forms, and LARS symptoms. This study highlights the effectiveness of dietary modifications, particularly lactose elimination, as a simple and non-invasive strategy for managing LARS. The findings also support the need for dietary screening processes and recommendations for milk substitutes to enhance clinical care. Further research is necessary to validate these observations and refine therapeutic strategies.

Keywords: low anterior resection syndrome (LARS); lactose intolerance; sphincter-preserving rectal surgery; dietary modification

Introduction

Low anterior resection syndrome (LARS) is a prevalent and debilitating condition that affects a significant proportion of patients following sphincter-preserving rectal surgery, where up to 90% of patients experience some change in bowel habits, although not all meet the criteria for LARS [1]. This syndrome is characterized by a spectrum of bowel dysfunctions, including increased bowel frequency, urgency, fecal incontinence, and clustering of defaecation episodes [2]. These symptoms not only disrupt the physiological process of defaecation, but also profoundly diminish the quality of life of affected individuals.

Although various strategies are employed to manage LARS, dietary modifications, such as a high-fiber diet and avoidance of certain foods (spicy, caffeine, alcohol, and citrus), are usually trialed first [3, 4]. Overall, the impact of diet on gastrointestinal function is well documented. Dairy products, particularly milk, have been proven to be an irritant, particularly to those with lactose intolerance due to a deficiency in the enzyme lactase, leading to lactose malabsorption [5]. This undigested lactose is subsequently fermented by colonic bacteria to produce gas (resulting in bloating), exert osmotic effects (causing diarrhea), and trigger abdominal pain [6]. The symptomatology associated with lactose intolerance bears a significant resemblance to that

of LARS, with overlapping clinical manifestations that one can hypothesize with cow's milk cessation could alleviate the symptoms of LARS.

This study aimed to investigate the onset of LARS in patients who underwent sphincter-preserving rectal surgery and the correlation between LARS symptoms and cow's milk cessation. We hypothesized that the elimination of cow's milk from the diet may result in symptom improvement, suggesting a link between cow's milk cessation and modulation of LARS symptomatology. Uniquely, this study focused on milk as a specific dietary factor, with the intention of providing insights for tailoring dietary recommendations and developing targeted screening strategies to improve LARS management.

Case series

Retrospectively, we identified three patients who underwent different sphincter-preserving rectal surgeries. Preoperatively, these patients demonstrated no symptoms that were indicative of LARS. However, each patient developed varying degrees of LARS post-operatively. All cases were managed by a single surgeon across two tertiary centers in Perth, Western Australia. Pertinently, these symptoms showed marked improvement

Received: October 7, 2024. **Revised:** November 26, 2024. **Accepted:** December 30, 2024

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Table 1. Patient baseline characteristics and symptomatology.

	Case 1	Case 2	Case 3
Age	74	84	73
Gender	F	F	M
Surgery	High anterior resection	High anterior resection	Ultra-low anterior resection
Indication	Malignant polyp	Diverticular stricture	Malignant polyp
Chemotherapy	No	No	No
Radiotherapy	No	No	No
Urgency	Yes	Yes	Yes
Frequency	Yes	Yes	Yes
Clustering	No	Yes	Yes
Flatus incontinence	Yes	Yes	Yes
Liquid incontinence	Yes	Yes	Yes
LARS score pre-milk cessation	30	29	34
LARS score post-milk cessation	0	9	0

during subsequent clinic visits following cessation of cow's milk consumption.

The baseline demographic and clinical findings of these patients were retrospectively collected from electronic medical records and clinical letters. This included information on age, sex, previous surgery, and prior chemotherapy or radiotherapy to the pelvis. The retrospective nature and small cohort size ($n=3$) precluded adjustments for confounding variables, such as surgical type, patient demographics, and comorbidities. As such, the findings represent observed clinical correlations, rather than evidence of causality. Additional history of the onset and nature of the symptoms, as well as their temporal relationship to resolution, was obtained through a follow-up telephone interview. A validated LARS score was used to retrospectively quantify improvements pre- and post-milk cessation [7].

All three cases listed below underwent a comprehensive trial of expectant management, which included the use of bulking agents to improve stool consistency, physiotherapy to strengthen pelvic floor muscles, dietary modifications, and chemo-modulation with loperamide to reduce bowel frequency and urgency prior to the suggestion of cow's milk elimination. For an overview of baseline patient characteristics and symptomatology, refer to Table 1.

Case 1: A 74-year-old female with a history of hypertension, cholecystectomy, and hysterectomy underwent laparoscopic high anterior resection (HAR) in September 2021 for a diagnosis of malignant polyp. Following her initial surgery, she did not show any symptoms of LARS. She developed symptoms of LARS in late 2022, predominantly in the form of urgency, an increased frequency of bowel movement, and flatus incontinence. She also reported symptoms of abdominal discomfort and bloating. During her routine cancer follow-up in 2023, terminal ileal-ileal intussusception was noted, which required ileocolic resection for the primary small bowel cancer. Following the surgery, the patient's LARS symptoms persisted. Considering this, cholestyramine was trialed with no significant improvement in symptoms. In early 2024, a lactose-free diet was introduced, and within 6 weeks, she noticed a significant improvement in her symptoms. A retrospective LARS score was obtained during the telephone review, revealing a score of 30 prior to eliminating milk from the diet and a score of 0 after.

Case 2: An 84-year-old female with a history of asthma, reflux disease, osteoporosis, appendectomy, and hysterectomy, underwent laparoscopic HAR in July 2020 for symptomatic structuring and hypertrophic diverticulosis. The patient was subsequently

discharged but represented in 2022 with symptoms consistent with LARS in the form of bloating, abdominal pain, urgency, flatus and liquid incontinence, increased frequency, and clustering. During this period, the patient was diagnosed with low-grade metastatic ovarian malignancy and subsequently underwent debulking surgery followed by adjuvant chemotherapy in 2023. Despite completing treatment and negative surveillance results, her LARS symptoms persisted. Similar to other cases, a suggestion was made to remove cow's milk from her diet in 2024, and the patient noted symptomatic improvement within 6 weeks. The patient reported that she is currently using milk alternatives, such as oats and soy milk, and her improvement in symptoms persisted. A retrospective LARS score was obtained during the telephone review, revealing a score of 29 prior to eliminating milk from her diet, and a score of 9 after.

Case 3: A 73-year-old male with a medical history of hypertension, high cholesterol, left orchidectomy for post-vasectomy infection, and no prior abdominal surgery underwent laparoscopic-assisted ultra-low anterior resection (ULAR) with diversion ileostomy in March 2020 for a diagnosis of a malignant polyp. The closure of ileostomy was performed 3 months later at the end of May 2020. The patient initially experienced mild symptoms associated with LARS, but these worsened two years post-operatively. He presented to the follow-up clinic with symptoms that progressed to include abdominal pain, bloating, clustering of bowel movements, flatus, and liquid incontinence. Subsequently, a recommendation was made to eliminate cow's milk from his diet, and he noted clinical improvement within a week. It is also noteworthy that the patient adjusted his diet to a carnivorous regimen and attributed some of the improvements to this change. A retrospective LARS score was obtained during the telephone review, revealing a score of 34 prior to eliminating milk from his diet and a score of 0 after.

Discussion

There was reasonable variability in symptoms and response post-operatively among the three patients, reflecting that LARS can be particularly challenging to treat due to its multifaceted nature. Anatomically, partial resection of the rectum leads to a reduction in rectal capacity and compliance, impairing its function as a reservoir [8]. Moreover, injury to the internal and external sphincters can be caused by the introduction of stapling devices during surgery, which can result in weakened sphincter function and

compromised continence [9]. Another significant aspect of LARS is the alteration in colonic motility. The reduction in bowel length, along with denervation of the left sigmoid colon and neorectum, can accelerate colonic transit time [10]. Furthermore, loss of the rectoanal inhibitory reflex (RAIR), which helps distinguish between gas, liquid, and stool, exacerbates the clustering of bowel movements commonly observed in LARS [11].

It is important to note that two of our patients underwent HAR, which generally carries a lower risk of developing LARS than rectal surgery involving more distal portions of the rectum. One study reported that the incidence of LARS was 26.3% in patients who had HAR, compared to 58.5% in those who underwent ULAR in their cohort [12]. Given these findings, it would be worthwhile to consider a trial of lactose elimination in patients who present with severe LARS symptoms, especially when their surgical profile does not typically place them at a high risk for developing such symptoms. This approach could potentially benefit patients whose symptoms are not anticipated based on the type of surgery they have undergone.

Previous studies have successfully associated the impact of lactose with gastrointestinal symptoms, particularly in patients who are lactose intolerant. Cow's milk, owing to its lactose content, is a dietary irritant for many individuals, whether it is due to the inability to digest lactose due to a deficiency in the enzyme lactase or due to sensitivity to milk proteins such as casein [13]. This leads to alterations in the colonic microbiome owing to lactose fermentation. Recently, the gut microbiota has been increasingly recognized not only for its role in modulating bowel function but also for its potential influence on LARS symptoms. For instance, Min et al. demonstrated that in the gut microbiome of patients with major LARS, frequency- and incontinence-dominant patterns have different taxonomic compositions [14].

All three patients experienced significant improvement in their symptoms within 6 weeks of eliminating cow's milk from their diet, suggesting a link between lactose consumption and exacerbation of LARS symptoms. There have been studies independently leading to observed changes in beneficial bacteria, such as *Bifidobacterium*, in both LARS and lactose intolerance [14, 15]. These shared alterations may have contributed to the overlapping gastrointestinal symptoms observed in both conditions. However, given the complexity of the gut microbiota, it is still too early to draw definitive conclusions about these associations, and further research is necessary to fully understand the underlying mechanisms.

Two of the patients initially experienced a period of normal bowel function following their initial surgery, but later developed symptoms consistent with LARS. This raises the question of whether these patients developed lactose intolerance post-operatively, possibly as a natural result of increasing intolerance with age [16] or because of the surgery itself. From a pathophysiological standpoint, there is evidence that the cause of this discrepancy may be related more to small intestinal bacterial overgrowth in older adults rather than a decline in lactase activity [17]. Additionally, it is known that surgical resection, especially small bowel resection [18] and gastric bypass surgery [19], disrupts normal anatomy and physiology, alters intestinal transit time, and reduces the availability of intestinal lactase enzymes, limiting the small bowel capacity to hydrolyse lactose effectively. Notably, post-colectomy patients have been shown to experience a significantly higher incidence of small intestinal bacterial overgrowth (SIBO), with rates up to twice as high [20], and can exacerbate malabsorption by fermenting unabsorbed lactose into gasses and short-chain fatty acids.

Given these pathophysiological insights, the observed improvement in quality of life following the elimination of cow's milk highlights the potential role of lactose intolerance or even SIBO in LARS symptomatology. This evidence provides a strong theoretical foundation for the development of diagnostic tools and dietary interventions as effective therapeutic strategies for managing LARS. A key clinical application of these findings could involve implementing a dietary screening process for patients with LARS, including assessments for lactose intolerance or early trials of milk cessation, particularly in those with severe or refractory symptoms. Additionally, recommending appropriate milk substitutes, such as lactose-free milk, soymilk, or oat milk, ensures nutritional adequacy while alleviating symptoms. By incorporating dietary modifications into the management framework for LARS, clinicians can offer a simple yet impactful intervention to improve patient outcomes.

We acknowledge several notable limitations in the interpretation and generalizability of our findings. The most significant limitation is the small sample size of the three cases, which limits our ability to draw robust conclusions and the applicability of our results to a broader population. Additionally, the observed improvement following cow's milk cessation may be confounded by an unclear temporal relationship between existing comorbidities, surgical intervention, onset of symptoms, and its resolution. The lack of statistical adjustment for these confounders further limited the ability to determine the independent effects of milk cessation.

This case series highlights the need for a well-designed prospective study to explore the role of cow milk cessation in the management of LARS. Such a study should account for potential confounders to clarify the relationship between lactose intolerance and LARS, establish definitive diagnostic criteria, and refine dietary recommendations. Addressing these gaps could pave the way for effective and personalized therapeutic strategies that significantly improve the quality of life of patients with LARS.

Conflict of interest statement

The authors declare that they have no conflict of interest.

Funding

None declared.

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