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The Role of Probiotics in Preventing Post-Appendectomy Complications in Obese Child: a Case Report

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Abstract
Appendicitis is an inflammation of the appendix that often occurs in children, with appendectomy being the primary treatment. Obese children have a higher risk of post-operative complications. Probiotics play a role in maintaining balanced gut flora, potentially accelerating post-operative recovery. A 12-year-old boy, weighing 50 kg, standing 140 cm tall, and with a BMI of 25.5 kg/m² (above the 95th percentile according to the CDC, 2000), was diagnosed with acute appendicitis and underwent a laparoscopic appendectomy. On the first postoperative day, the patient experienced constipation and abdominal distension. He received a total energy intake of 1,300 kcal/day and was given two sachets of probiotics (*Lactobacillus acidophilus*, *Bifidobacterium longum*, and *Streptococcus thermophilus*) daily. On the third day, his abdominal distension decreased, and his bowel pattern improved. Obesity causes changes in the gut microbiota, increases inflammation, and slows gut motility and wound healing. Studies show that a combination of probiotics can lower the risk of constipation and post-operative infection, improve gastrointestinal tract motility, and reduce inflammation. Probiotics also contribute to gut health by increasing the production of short-chain fatty acids. In this case, probiotic administration supported its use in post-appendectomy recovery in obese children, as evidenced by rapid symptom improvement. Probiotics can help accelerate post-appendectomy recovery in obese children by balancing the gut microbiota, reducing inflammation, and improving gut motility.

INTRODUCTION

Appendicitis is one of the acute abdominal cases caused by inflammation and is often followed by emergency appendectomy (Moris, Paulson, & Pappas, 2021). This diagnosis commonly occurs in children and is most evident in older children, as younger ones tend to have atypical symptoms that lead to delays in early diagnosis (Brown, Parikh, & Patel, 2020; Hus & Segal, 2021).[1] Compared to children with an ideal body mass index (BMI), obese children have a higher risk of developing post-operative complications (Minhas, Chow, & Otsuka, 2016), such as impaired bowel motility and wound infection, which result in longer hospital stays (Frazer, Hussey, & Bemker, 2018).

The gut microbiome plays a crucial role in surgical recovery, and probiotics have emerged as a promising adjuvant therapy (Alverdy, Hyoju, Weigerinck, & Gilbert, 2017; Shi et al., 2022). Systematic reviews and clinical trials have demonstrated the benefits of probiotics in pediatric postoperative care (Chowdhury et al., 2020; Yang, Wu, Liu, & Fan, 2017). For

instance, a meta-analysis by (Saviano et al., 2024) showed that probiotic supplementation reduced antibiotic-associated diarrhea and improved gastrointestinal recovery in pediatric surgical patients.[8] Similarly, a clinical trial by (Garcia, Dutton, Cochrum, & Chen, 2023) reported that Lactobacillus rhamnosus GG significantly decreased postoperative infectious complications in children undergoing abdominal surgery.[12]

Probiotics contribute to recovery through multiple mechanisms: they restore balanced gut microbiota composition, enhance intestinal barrier function, modulate immune responses, and improve gastrointestinal motility (Gou, Zhang, Ren, Li, & Zhang, 2022).[34] These effects are particularly relevant in obese pediatric patients, who often exhibit gut dysbiosis, chronic inflammation, and impaired wound healing (Marcus, Danielsson, & Hagman, 2022).[1011]

This case report presents a novel illustration of probiotics as a preventive measure against postoperative complications in obese pediatric appendectomy patients (Sánchez-Alcoholado et al., 2020). The clinical relevance lies in its potential to inform perioperative nutritional protocols, particularly within Enhanced Recovery After Surgery (ERAS) guidelines for pediatric populations (Arena et al., 2021; Brindle et al., 2020). By documenting improved recovery outcomes with probiotic administration, this case contributes to the growing evidence supporting targeted microbiome modulation in high-risk surgical patients (Skonieczna-Żydecka et al., 2018).

RESEARCH METHOD

This study is a descriptive case report based on clinical observation of a pediatric patient who underwent appendectomy and received probiotic intervention. Clinical data were collected through comprehensive medical records, laboratory results, and direct patient monitoring over three postoperative days, focusing on demographic information, clinical symptoms, surgical details, and recovery progress. Data were analyzed descriptively, with particular attention to tracking symptom progression, comparing laboratory values, and evaluating the relationship between probiotic administration and clinical outcomes.

Case Report

A 12-year-old boy (50 kg, 140 cm; BMI 25.5 kg/m², >95th percentile, CDC 2000) presented with a 3-day history of fever, abdominal pain, nausea, and vomiting. Physical examination revealed McBurney tenderness. Laboratory results showed a hemoglobin level of 12.1 g/dL, hematocrit of 36.3%, leukocyte count of 18,550/µL, and platelet count of 184,000/µL. The patient was diagnosed with acute appendicitis and was treated with a laparoscopic appendectomy.

After surgery, the patient was kept nil per os (fasting) for 6 hours until bowel sounds returned to normal. A liquid diet, consisting initially of water, was then introduced and gradually advanced according to the patient's tolerance.

On the first postoperative day, the patient experienced bloating and nausea without vomiting. Flatus was present, with abdominal distension and decreased bowel sounds.

Initially, the patient received therapy in the form of intravenous fluids, KAEN 1B, antibiotics, and symptomatic therapy. After the onset of abdominal distension, a nasogastric tube (NGT) was inserted for decompression, and probiotics were administered. Nutritional therapy was administered gradually according to the patient's tolerance, with a target total

energy intake of 1,300 kcal per day, consisting of 1.5 g/kg body weight of protein, 50% carbohydrates, and 30% fat. The diet was given parenterally in liquid form. The fluid requirement is 2100ml/24 hours, which was met through intravenous fluids and the liquid form diet. The patient was given probiotics (Lactobacillus acidophilus, Bifidobacterium longum, Streptococcus thermophilus) one sachet/12 hours parenterally. The patient received ceftriaxone 1g intravenously every 12 hours, ranitidine 50mg intravenously every 8 hours, and ondansetron 8mg intravenously every 8 hours. The patient was monitored for gastrointestinal tolerance, hydration status, and total intake, and underwent regular laboratory tests.

On the second postoperative day, the bowel movement started improving with hard stool consistency and no longer experienced nausea. The NGT was removed and oral feeding was initiated. By the third day, defecation patterns improved and abdominal distension decreased. The patient no longer experienced bloating, and there was no nausea or vomiting. Laboratory results on the third day were within normal limits, with a hemoglobin level of 12.2 g/dL, hematocrit of 36.4%, leukocyte count of 8,450/µL, and platelet count of 185,000/µL.

RESULTH AND DISCUSSION

Table 1. Follow up of clinical symptoms, laboratory results, and interventions

Day Post-Op	Clinical Symptoms	Abdominal Distension	Bowel Motility	Defecation/Flatus	Lab Results	Intervention/Therapy
Day 1	Nausea, bloating, constipation	Present	Decreased bowel sounds	Flatus (+), no defecation	Hb 12.1, WBC 18,550, Plt 184,000	IV fluids, ceftriaxone, ranitidine, ondansetron, NGT, probiotics started
Day 2	Less nausea, mild distension	Reduced	Improving	1x defecation (hard stool)		Continued antibiotics, IV fluids, probiotics, gradual liquid diet
Day 3	No nausea, no bloating	Absent	Normal bowel sounds	Regular bowel movement, defecation patterns improved	Hb 12.2, WBC 8,450, Plt 185,000	Oral feeding tolerated, continued probiotics, supportive therapy

Source: Patient medical record data, 2024

Discussion

Studies show that probiotics can improve the gut microbiota colony ratio, increase gastrointestinal motility, and reduce inflammation.[5-7] Probiotics can alsolower the risk of constipation, and reduce post-operative infections.[8,9] Obesity causes changes in the gut microbiota, which can slow intestinal motility, increasing inflammation, and delaying wound healing.[10,11]

Probiotics play a role in gut health by increasing the production of short-chain fatty acids.6 Another study found that Lactobacillus acidophilus improved stool consistency and gut motility; Streptococcus thermophilus has anti-inflammatory benefits; Bifidobacterium can reduce abdominal pain, distension and improve bowel urgency. Furthermore, this study

concluded that the combination of Lactobacillus, Bifidobacterium, and Streptococcus generally improved gastrointestinal symptoms in 85% of the patients studied.[7]

Obesity worsens surgical outcomes through dysbiosis, increased permeability, and endotoxemia.[10,11] Probiotics strengthen tight junctions, reduce permeability, and prevent bacterial translocation.[8,9] They also modulate immunity by reducing IL-6, TNF-α, and CRP, while increasing IL-10.9 Probiotics also enhance motility and prevent post-operative ileus by modulating the enteric nervous system.8,9 Clinical studies show reduced antibiotic-associated diarrhea in children and faster nutritional recovery.[12,13] Integration with ERAS guidelines highlights probiotics as adjuvant to perioperative nutrition.[14,15] In this case, probiotic administration demonstrated rapid symptom improvement, supporting its use in post-appendectomy recovery in obese children. . As a single case, findings cannot be generalized. Larger RCTs in obese pediatric populations are needed to define optimal strains, dosages, and duration.

CONCLUSION

Probiotics appear to support faster post-appendectomy recovery in obese children by promoting gut microbiota balance, reducing inflammation, and enhancing intestinal motility, thereby improving overall gastrointestinal function and healing outcomes. Future research should focus on large-scale clinical trials to determine optimal probiotic strains, dosages, and treatment durations specifically tailored to obese pediatric surgical patients to maximize therapeutic benefits and ensure long-term safety.

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