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Impact of Protective Ileostomy on Postoperative Electrolyte Imbalances in Rectal Cancer Surgery: A Retrospective Analysis

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Abbreviations:
LAR: Low Anterior Resection;
BMI: Body Mass Index;
ASA: American Society of Anesthesiologists;
TRG: Tumor Regression Grade;
ICG: Indocyanine Green;
TNM: Tumor, Node, Metastasis classification;
SPSS: Statistical Package for the Social Sciences;
GI: Gastrointestinal;
5-FU – 5-Fluorouracil.

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Rezumat

Impactul ileostomei de protecție asupra dezechilibrelor electrolitice postoperatorii în chirurgia cancerului rectal: analiză retrospectivă

Introducere: Dezechilibrele electrolitice reprezintă complicații frecvente după rezecțiile rectale minim invazive, mai ales la pacienții cu ileostomie de protecție. Aceste dezechilibre pot afecta sever recuperarea postoperatorie, conducând la deshidratare, insuficiență renală şi tulburări metabolice variate.
Obiective: Studiul îşi propune să evalueze incidența şi consecințele dezechilibrelor electrolitice la pacienții operați minim invaziv pentru cancer rectal, analizând diferențele dintre pacienții cu şi fără ileostomă.
Metode: S-a realizat o analiză retrospectivă pe un lot de 117 pacienți cu adenocarcinom rectal supuşi rezecțiilor rectale minim invazive între 2016 şi 2023. Pacienții au fost împărțiți în două grupuri în funcție de prezența ileostomiei de protecție. S-au evaluat riguros nivelurile preoperatorii şi postoperatorii ale electroliților şi complicațiile asociate.
Rezultate: Dintre cei 117 pacienți, 91 (77,8%) au avut ileostomă de protecție. Hipokaliemia şi hiponatremia au fost semnificativ mai frecvente în grupul cu ileostomie, afectând 16,2% dintre pacienți în ziua a doua postoperatorie şi scăzând la 7,7% în ziua a patra (p=0,03). Complicațiile legate de deshidratare au fost raportate la 3,4% dintre pacienți, iar insuficiența renală acută a fost observată în 0,9% din cazuri. Rata de reinternare a fost semnificativ mai mare la pacienții cu ileostomă (32,5%), predominant din cauza dezechilibrelor hidroelectrolitice (p<0,01).
Concluzii: Prezența ileostomiei de protecție în chirurgia cancerului rectal este asociată cu un risc crescut de dezechilibre electrolitice postoperatorii şi complicații ulterioare, subliniind importanța monitorizării şi gestionării atente a acestor pacienți.

Cuvinte cheie: cancer rectal, ileostomă de protecție, dezechilibru electrolitic, hiponatremie, hipokaliemie, chirurgie minim invazivă

Abstract

Introduction: Electrolyte imbalances are common following minimally invasive rectal resections, particularly in patients with protective ileostomies. Such imbalances can severely hinder postoperative recovery, resulting in dehydration, renal dysfunction, and various metabolic abnormalities. *Objectives:* This study aims to evaluate the incidence and ramifications of electrolyte imbalances in rectal cancer patients undergoing minimally invasive surgical procedures, irrespective of ileostomy status.
Methods: A retrospective analysis was performed on 117 rectal adenocarcinoma patients who underwent minimally invasive resections between 2016 and 2023. Patient categorization was based on ileostomy status, with rigorous assessment of preoperative and postoperative electrolyte levels and comprehensive documentation of complications.
Results: Of 117 patients, 91 (77.8%) had a protective ileostomy. Hypokalemia and hyponatremia were significantly prevalent in the ileostomy cohort; hypokalemia affected 16.2% of patients by postoperative day two, declining to 7.7% by day four ($p=0.03$). Dehydration-related complications were recorded in 3.4% of cases, while acute renal insufficiency was observed in 0.9%. Readmission rates were significantly increased in the ileostomy group (32.5%) due to fluid and electrolyte disorders ($p<0.01$).
Conclusions: The presence of a protective ileostomy during rectal cancer surgery is associated with an increased risk of postoperative electrolyte imbalances and subsequent complications, highlighting the need for diligent monitoring and management strategies.

Key words: rectal cancer, protective ileostomy, electrolyte imbalance, hyponatremia, hypokalemia, minimally invasive surgery

Introduction

Electrolyte imbalances, or dyselectrolytemias, are a frequently encountered yet often under-recognized complication in patients undergoing treatment for rectal cancer, particularly those with a protective ileostomy (1-3). A protective ileostomy, commonly performed to divert fecal flow and facilitate the healing of a rectal anastomosis, induces a series of physiological alterations that can significantly disrupt fluid and electrolyte homeostasis (4-7). These disturbances may result in clinically significant complications, including dehydration, hyponatremia, hyperkalemia, and metabolic alkalosis, thereby adversely affecting patient prognosis and complicating postoperative recovery (8-10).

Understanding the pathophysiological mechanisms underlying electrolyte disturbances in this patient population is essential for optimizing perioperative management. Beyond the surgical impact, adjunctive treatments such as chemotherapy and radiation therapy, which are integral to rectal cancer management, can further exacerbate electrolyte imbalances, necessitating vigilant monitoring and early intervention (11). Timely identification and proactive management of these disturbances are critical for improving clinical outcomes, minimizing complications, and enhancing long-term survival (12-16).

In the context of low rectal cancer, a protective ileostomy is often employed following sphincter-preserving procedures, such as low anterior resection (LAR), to mitigate the risks associated with anastomotic leakage. This approach is particularly indicated when concerns exist regarding anastomotic integrity, the risk of leakage, or the necessity of shielding the patient from severe complications, especially in tumors located near the anal sphincter (17-18). A protective ileostomy facilitates optimal healing while reducing the mechanical and inflammatory stress exerted by stool passage by diverting fecal content away from the anastomosis. Typically, the stoma is reversed within a few months once adequate anastomotic healing has been achieved. This strategy has been shown to significantly decrease the incidence of anastomotic leaks, a significant source of morbidity and mortality in rectal cancer surgery (19).

Despite its advantages, the formation of a pro-

tective ileostomy presents its own set of challenges. Patients frequently experience complications such as dehydration, electrolyte imbalances, and nutritional deficiencies due to altered intestinal physiology. Close postoperative monitoring and appropriate management of these factors are imperative to mitigate associated risks and ensure optimal recovery (20-29). Despite these potential complications, protective ileostomy remains an essential component of the surgical strategy for low rectal cancer, striking a balance between oncological safety and the preservation of quality of life (30-34).

The presence of multiple chronic conditions profoundly impacts postoperative outcomes for patients undergoing major surgery, particularly those diagnosed with colorectal cancer. Research indicates that individuals with two or more long-term health conditions face significantly elevated rates of mortality and postoperative complications (35). Furthermore, delays in accessing specialized oncological care during the COVID-19 pandemic have led to more advanced stages of colorectal cancer at the time of surgical intervention, thereby exacerbating the complexity and increasing the associated risks of these procedures (36).

Study Objective

This study aims to analyze the impact of protective ileostomy on electrolyte imbalances and post-operative complications in patients undergoing minimally invasive rectal resection.

Material and Method

Study Design and Patient Selection

This retrospective observational study was conducted in the First Department of General Surgery, Dr. Carol Davila Central Military Emergency University Hospital, Bucharest, Romania, between 2016 and 2023. The study includes 117 patients diagnosed with rectal adenocarcinoma who underwent minimally invasive rectal resection. Patients were divided into two groups: those who received a protective ileostomy (n=91) and those who underwent primary anastomosis without diversion (n=26).

The decision to perform a protective ileostomy considered tumor-related, biological, and technical factors that increase the risk of anastomotic leakage. Key tumor-related factors included the distance of the tumor from the anal verge, an advanced tumor stage (T3/T4), and lymph node involvement (N+), all of which impact healing and raise the risk of failure. Biologically, a poor nutritional status, indicated by hypoalbuminemia (<3.5 g/dL) and low total protein (<6.5 g/dL), was significant for wound healing. Electrolyte imbalances and anemia (hemoglobin <10 g/dL) were additional risk factors that suggested a compromised systemic condition. Technical factors such as prolonged operative times exceeding 300 minutes and an ASA score of 3 or higher indicated increased surgical stress and the potential for post-operative complications. The effects of neoadjuvant therapy were also assessed for their impact on tissue integrity, especially in cases involving ycT3/ycT4 tumors or poor tumor regression grade 2-3 (TRG). The surgeon's intraoperative evaluation of tissue viability, tension, and perfusion was crucial, employing fluorescence imaging with indocyanine green (ICG) to assess anastomotic perfusion. The final decision regarding ileostomy was based on these evaluations. Patients with multiple high-risk features were recommended for the procedure, while borderline cases relied on the surgeon's discretion and real-time assessment decision.

Inclusion Criteria

- Histologically confirmed rectal adenocarcinoma.
- Undergoing minimally invasive rectal resection.
- Availability of complete preoperative and post-operative clinical and biochemical data.

Exclusion Criteria

- Incomplete medical records.
- Pre-existing electrolyte imbalance due to chronic conditions such as chronic kidney disease or endocrine disorders.
- Emergency surgery for obstructive or perforated rectal cancer.

Data Collection

Data were collected retrospectively from electronic medical records, including:

- Demographic variables: age, gender, BMI.
- Surgical details: operative time, TNM staging, tumor location.
- Preoperative and postoperative laboratory values focus on serum electrolytes (sodium, potassium), albumin, and total protein.

- Postoperative complications related to electrolyte imbalance, dehydration, renal insufficiency, and anastomotic leak.

Assessment of Electrolyte Imbalances

Serum sodium and potassium levels were measured preoperatively and on postoperative days 2 and 4 to monitor key physiological changes following ileostomy creation. The second postoperative day represents the acute phase of adaptation, during which fluid redistribution, inflammatory responses, and increased ileostomy output lead to significant electrolyte losses. At this stage, hyponatremia and hypokalemia are commonly observed, requiring early detection to prevent complications. The body stabilizes by the fourth postoperative day when persistent dyselectrolytemias become clinically relevant. While some early imbalances resolve spontaneously, a continued high-output stoma or insufficient oral intake may exacerbate sodium and potassium deficits, increasing the risk of dehydration and acute kidney injury. Evidence suggests that electrolyte abnormalities peak around postoperative day 4, making it a critical point for reassessment (37). Monitoring at these time points allows for timely intervention, optimizing fluid management, and reducing the risk of readmission.

Hyponatremia was defined as serum sodium <135 mmol/L and hypokalemia as serum potassium <3.5 mmol/L. Hypoalbuminemia was defined as serum albumin <3.5 g/dL.

Statistical Analysis

Descriptive statistics were used to summarize demographic and clinical data. The chi-square test was employed to evaluate associations between categorical variables, while the Student's t-test was used for continuous variables. A p-value <0.05 was considered statistically significant. Statistical analyses were performed using SPSS version 25.0 (IBM Corp., Armonk, NY. https://www.ibm.com/products/spss-statistics) using the Titu Maiorescu University of Bucharest official license.

Results

A total of 117 patients diagnosed with rectal adenocarcinoma were included in the study, all of whom underwent minimally invasive rectal resection. Of these, 91 patients (77.8%) required a protective ileostomy, while 26 (22.2%) underwent primary anastomosis without diversion.

Preoperative hypoalbuminemia was identified in 11.1% of patients and was significantly associated with the necessity for a protective ileostomy (χ^2 = 8.254, p = 0.004). Within the ileostomy group, 13 patients (14.3%) presented with hypoalbuminemia, compared to 2 (7.7%) in the non-ileostomy group. This indicates that nutritional status plays a role in surgical decision-making, as hypo-albuminemia is a recognized risk factor for poor anastomotic healing and postoperative complications. Postoperatively, a significant decrease in serum albumin levels was noted, with 41% of patients developing hypoalbuminemia by postoperative day 4. This reduction reflects the combined effects of surgical stress, increased catabolism, and ongoing ileostomy-related fluid and protein losses. Total serum protein levels also exhibited a downward trend, with 35.9% of patients showing hypo-proteinemia by day 4 (*Fig. 1*), highlighting the extent of perioperative metabolic changes. The persistent negative protein balance observed in patients with an ileostomy emphasizes the necessity of early nutritional intervention to mitigate complications such as delayed wound healing, increased infection risk, and prolonged recovery. These findings suggest that preoperative nutritional optimization should be considered for high-risk patients to reduce the need for ileostomy or enhance postoperative recovery.

Regarding electrolyte imbalances, preoperative hyponatremia was present in 17.1% of patients and showed minimal fluctuation in the early post-operative period, affecting 16.2% of the cohort by day two and 15.4% by day four. This stability suggests that factors other than the surgical procedure may contribute to sodium dysregulation, such as preexisting comorbidities or fluid

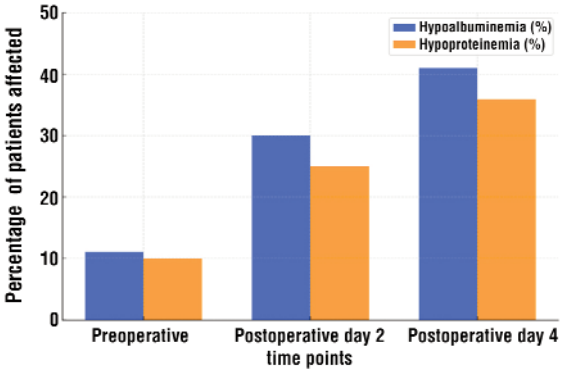

Figure 1. Preoperative and postoperative variations in serum proteins

management strategies. In contrast, potassium depletion was more pronounced postoperatively, particularly among ileostomy patients. Hypokalemia was observed in 16.2% of patients by day two, decreasing to 7.7% by day four, indicating a trend toward progressive potassium loss (*Fig. 2*). Given the role of potassium in neuromuscular function and cardiac stability, these findings highlight the importance of close electrolyte monitoring and timely potassium supplementation in patients with a protective ileostomy.

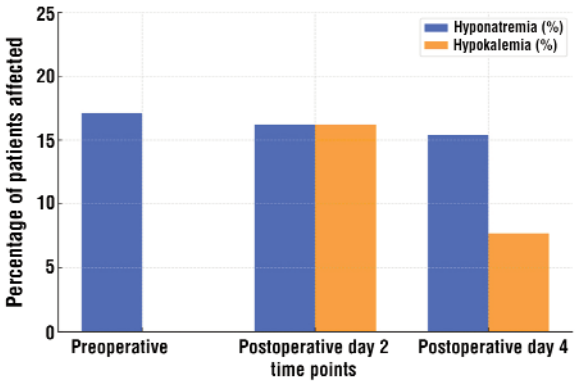

Figure 2. Preoperative and postoperative electrolyte variations

Impact of Ileostomy on Electrolyte Balance and Complications

Patients with a protective ileostomy experienced significantly higher rates of dehydration-related complications, underscoring the physiological burden associated with prolonged intestinal fluid loss. Among these patients, 3.4% required hospitali-zation due to severe dehydration, highlighting the potential for substantial fluid imbalances that may necessitate aggressive rehydration strategies. Additionally, 8.5% of ileostomy patients developed peristomal irritation, a complication often linked to excessive effluent output and compromised skin integrity.

In more severe cases, 0.9% of patients progressed to acute renal insufficiency, emphasizing the critical need for vigilant fluid management to prevent irreversible renal dysfunction. Electrolyte imbalances were also more prevalent in the ileostomy cohort, with a notably higher incidence of hypokalemia and hyponatremia than in patients without an ileostomy (*Fig. 3*). These findings suggest that patients with a protective ileostomy are at increased risk of cumulative electrolyte depletion, likely due to the continuous loss of potassium and sodium-rich intestinal fluids. The progressive nature of these imbalances reinforces the necessity for routine electrolyte monitoring, individualized hydration plans, and early nutritional interventions to minimize complications and improve postoperative recovery.

Surgical and Oncological Parameters

TNM staging revealed that most patients had advanced rectal cancer, with 45.3% classified as stage IIIB and 41.9% as stage IIIC. Although tumor location and staging did not show a statistically significant correlation with the need for protective ileostomy, patients with more advanced disease exhibited a higher incidence of postoperative complications, particularly electrolyte imbalances. This suggests that disease severity may contribute indirectly to postoperative metabolic disturbances, potentially due to the increased physiological stress and systemic inflammatory response associated with advanced malignancy.

The mean operative time was 283.99 minutes (±70.34), with no statistically significant difference between patients with and without an ileostomy. This finding indicates that the formation of a protective ileostomy did not substantially prolong the surgical procedure, reinforcing its feasibility as a standard protective measure in selected cases. However, given the associated risks of dehydration and electrolyte disturbances in ileostomy patients, the decision to perform an ileostomy should be carefully weighed against patient-specific risk factors to optimize postoperative outcomes.

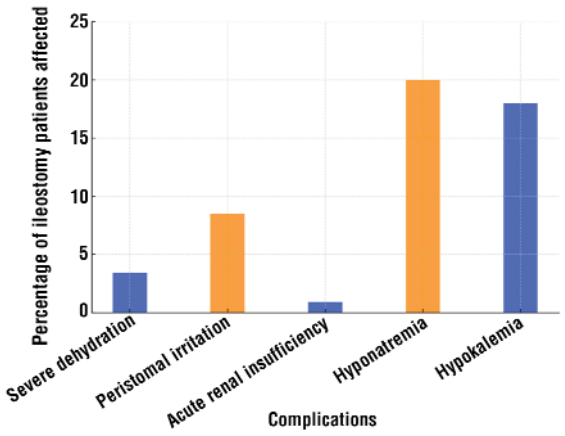

Figure 3. Impact of ileostomy on electrolyte balance and complications

Postoperative Course and Readmission Rates

Postoperative complications were observed in 23.1% of patients during hospitalization, with postoperative ileus being the most frequent complication (19.7%). The high incidence of ileus may reflect the physiological response to major abdominal surgery, the effects of opioid analgesia, or the disruption of normal gastrointestinal motility, particularly in patients with ileostomy.

After discharge, 30.8% of patients developed complications, with dehydration (3.4%) and anastomotic fistula formation (8.5%) being the most clinically significant. Dehydration, primarily observed in ileostomy patients, underscores the persistent challenge of maintaining adequate fluid and electrolyte balance postoperatively. Anastomotic fistula formation, a severe complication associated with increased morbidity, may be influenced by factors such as impaired healing due to nutritional deficits, ongoing inflammation, or technical aspects of the surgical procedure.

Notably, readmission was required in 32.5% of cases, emphasizing the substantial long-term impact of postoperative complications, particularly those related to fluid and electrolyte disturbances in patients with a protective ileostomy (*Fig. 4*). These findings highlight the need for structured postoperative care protocols, including early patient education, close outpatient follow-up, and proactive management strategies to reduce readmission rates and improve overall patient outcomes.

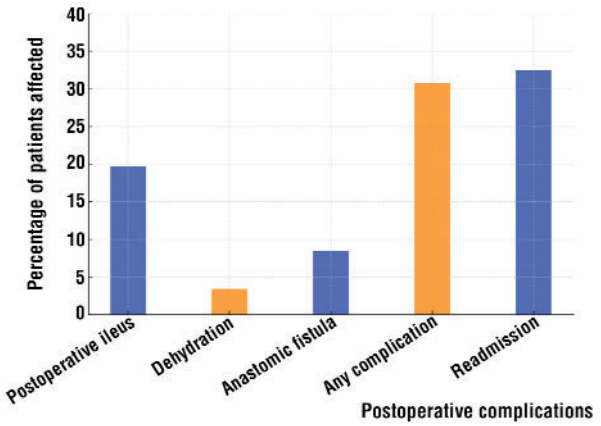

Figure 4. Postoperative complications and readmission rates

Comparative Clinical and Biochemical Characteristics

Table 1 presents a comparative overview of the

Table 1. Comparative characteristics of patients with and without protective ileostomy

Parameter	Ileostomy (Mean ± SD)	No Ileostomy (Mean ± SD)	p-value
Age (years)	63.4 ± 10.6	56.6 ± 10.8	–
BMI (kg/m²)	25.8 ± 4.2	23.1 ± 2.3	0.0195
ASA II	73.6% (67/91)	92.3% (24/26)	0.0194
ASA III	25.3% (23/91)	7.7% (2/26)	0.0247
Operative Time (min)	295.7 ± 64.4	283.9 ± 70.3	–
Surgical Approach: LaTME	83.5% (76/91)	80.8% (21/26)	–
Surgical Approach: TaTME	16.5% (15/91)	19.2% (5/26)	–
Preoperative Albumin (g/dL)	4.02 ± 0.41	4.17 ± 0.43	–
POD2 Albumin (g/dL)	3.47 ± 0.50	3.61 ± 0.48	0.0378
POD4 Albumin (g/dL)	3.51 ± 0.55	3.74 ± 0.52	0.0021
Preoperative Total Protein (g/dL)	7.05 ± 0.54	7.19 ± 0.63	–
POD2 Total Protein (g/dL)	6.54 ± 0.81	6.70 ± 0.77	0.0413
POD4 Total Protein (g/dL)	6.59 ± 0.81	6.79 ± 0.74	0.0392
POD2 Sodium (mmol/L)	138.9 ± 4.0	139.2 ± 2.7	–
POD4 Sodium (mmol/L)	139.1 ± 3.3	139.7 ± 2.9	–
POD2 Potassium (mmol/L)	3.8 ± 0.5	3.9 ± 0.4	–
POD4 Potassium (mmol/L)	3.9 ± 0.4	4.1 ± 0.3	0.0417
Readmission Rate	32.5% (30/91)	7.7% (2/26)	0.0085
Postoperative Ileus	24.2% (22/91)	3.8% (1/26)	0.0279
Dehydration	3.4% (3/91)	0% (0/26)	–
Acute Renal Insufficiency	1.1% (1/91)	0% (0/26)	–

primary demographic, clinical, biochemical, intraoperative, and postoperative characteristics between patients with and without a protective ileostomy. Statistically significant differences ($p<0.05$) were observed in serum protein dynamics, complication rates, and readmissions, indicating distinct metabolic and clinical trajectories for the two groups.

Discussion

Protective ileostomy is a widely adopted surgical intervention in the management of rectal cancer, especially in cases where the tumor is located near the anal sphincter or when the risk of anastomotic failure is high. Typically performed following low anterior resection (LAR) or other sphincter-preserving procedures, this technique temporarily diverts fecal content from the rectal anastomosis to promote healing. While protective ileostomy has proven invaluable in reducing the risk of anastomotic leaks and improving postoperative recovery, it introduces physiological challenges, particularly concerning electrolyte balance. This discussion explores the relationship between protective ileostomy, rectal cancer, and the resulting electrolyte imbalances, highlighting the underlying mechanisms, clinical implications, and management strategies (1,2).

In patients undergoing surgery for rectal cancer, a protective ileostomy can provide significant benefits by preventing the contamination of the anastomosis site with stool. Ileostomy diverts fecal matter to an external bag, allowing the rectal anastomosis to heal without the stress of bolus stool flow, which can lead to mechanical failure of the healing junction. As a result, protective ileostomy is considered a preventive measure against complications such as anastomotic leaks, which can increase morbidity and mortality in this patient group. However, while ileostomy protects the healing site, it alters the gastrointestinal (GI) physiology, contributing to several systemic effects, including fluid and electrolyte balance disturbances (3-5,38,39).

One of the primary physiological changes associated with ileostomy formation is fluid and electrolyte absorption alteration. The ileum, responsible for absorbing water, sodium, potassium, and other key electrolytes, becomes the site for diversifying fecal matter. Unlike the colon, which absorbs a significant amount of water and electrolytes, the capacity of the ilium for absorption is more limited. Consequently, patients with an ileostomy often experience considerable fluid and electrolyte loss through the stoma. This loss is compounded by the fact that the output from the ileostomy is typically high, ranging from 1 to 1.5 liters per day, depending on the individual and the nature of the surgery. As a result, patients are at risk for dehydration and various electrolyte imbalances, including hyponatremia, hypokalemia, and metabolic alkalosis (31).

The loss of sodium and potassium through the ileostomy output is a primary concern, as these electrolytes are crucial for maintaining cellular function, nerve conduction, and muscle contraction. Sodium is essential for fluid balance, and a deficiency can lead to symptoms such as weakness, dizziness, confusion, and even seizures in severe cases. Similarly, potassium loss can result in muscle cramps, arrhythmias, and general fatigue. Hypokalemia, in particular, can be exacerbated by the use of diuretics, which are commonly prescribed in rectal cancer patients to manage fluid retention and other symptoms related to chemotherapy. In addition to sodium and potassium, the loss of magnesium and calcium, which are also absorbed in the ileum, can further compound the electrolyte disturbances in these patients.

The impact of chemotherapy on electrolyte balance must also be considered in patients undergoing rectal cancer treatment. Chemotherapeutic agents, such as fluorouracil (5-FU) and oxaliplatin, cause various metabolic derangements, including electrolyte imbalances. 5-FU, for example, can lead to hypokalemia, hyponatremia, and hypomagnesemia, while oxaliplatin has been associated with both hyponatremia and hypokalemia (40). These side effects can be further exacerbated in patients with a protective ileostomy, as the altered absorption in the small intestine reduces the body's ability to compensate for electrolyte losses.

In addition to the direct effects of ileostomy and chemotherapy on electrolyte balance, the loss of fluids and electrolytes can lead to dehydration, further complicating the clinical picture. Dehydration is often a silent issue in patients with ileostomies, as the symptoms can be subtle and may overlap with other post-surgical effects. However, if left unaddressed, dehydration can progress to more severe complications, including renal failure and circulatory shock (41). The body's compensatory mechanisms to maintain blood pressure and tissue perfusion during dehydration may exacerbate the electrolyte imbalances, creating a vicious cycle which is difficult to break without appropriate intervention.

The clinical management of electrolyte

imbalances in patients with a protective ileostomy requires a multi-faceted approach, focusing on prevention, early detection, and prompt treatment. Preventive measures include educating patients on the importance of adequate fluid intake and electrolyte supplementation, particularly during the initial postoperative period. It is essential to closely monitor the output from the ileostomy, as any significant increase in volume may indicate fluid loss that needs to be addressed. Additionally, patients should be instructed to report symptoms of dehydration, such as dry mouth, dizziness, and reduced urine output, which may indicate an electrolyte disturbance. Also, if some other comorbidities arise in the postoperative stage, such as acute pancreatitis, the importance of electrolyte disbalance is even more critical to manage aggressively, as such a disorder may lead to unpredictable results (42).

In terms of management, treating electrolyte imbalances typically involves oral or intravenous supplementation of the deficient electrolytes, focusing on sodium, potassium, and magnesium. Oral electrolyte solutions are often preferred as they help correct mild imbalances while minimizing the need for more invasive treatments. In cases of severe electrolyte disturbance, intravenous administration of electrolytes may be necessary, and in some instances, patients may require hospitalization for more intensive monitoring and management. It is important to remember that electrolyte imbalances should be corrected gradually, as rapid electrolyte shifts can lead to serious complications, such as cardiac arrhythmias.

This study has several limitations that should be acknowledged. The retrospective nature of this single-center study introduces potential selection bias and inconsistencies in data collection. With 117 patients, the sample size may not fully represent the spectrum of electrolyte disturbances and their complications. The study primarily evaluates early postoperative electrolyte imbalances, lacking long-term follow-up on metabolic consequences, renal function, and quality of life post-ileostomy reversal. The effects of chemotherapy-induced electrolyte imbalances were not isolated, limiting the ability to determine whether disturbances were primarily due to ileostomy or oncologic treatment. The study focuses on physiological outcomes but does not evaluate patient-reported quality of life, which may play a role in postoperative recovery. Therefore, we can outline future directions for further study that should focus on prospective, multicenter studies with larger cohorts, standardized perioperative protocols, and long-term follow-up to better understand the impact of protective ileostomy on electrolyte balance and patient outcomes.

Conclusion

Protective ileostomy is an effective measure to reduce anastomotic leakage risk, but it comes with a higher incidence of electrolyte imbalances and postoperative metabolic complications. This study confirms that hypoalbuminemia is a significant predictor for ileostomy formation, emphasizing the importance of preoperative nutritional assessment. Furthermore, hypokalemia and hyponatremia occur frequently, peaking around postoperative day 4, reinforcing the need for structured electrolyte monitoring in this timeframe.

Additionally, this study highlights the distinction between hypokalemia and hyperkalemia in ileostomy patients. Hypokalemia is primarily driven by increased ileostomy output and excessive potassium losses, whereas hyperkalemia, though less frequent, may develop in patients with renal impairment or excessive potassium supplementation. Proper differentiation is crucial for effective electrolyte management.This research provides clinically actionable recommendations for optimizing surgical outcomes in rectal cancer patients by establishing postoperative monitoring protocols and patient selection criteria. Further studies should explore perioperative nutritional interventions to reduce the necessity of ileostomy and improve long-term patient recovery.

Clinicians must be aware of the interplay between surgical intervention, chemotherapy, and potential electrolyte disturbances to ensure the best possible care for these vulnerable patients.

Conflict of Interest

The authors declare no conflict of interest in drafting this research.

Ethical Statement

This study was conducted in accordance with the Declaration of Helsinki and received approval from the Ethics Committee of Dr. Carol Davila Central Military Emergency University Hospital in Bucharest, Romania - no. 564/ 20.12.2022. Due to the retrospective nature of the study, informed

consent was waived. Patient confidentiality was maintained throughout, and all data were anonymized before analysis.

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