

Original Research Article**FATAL COMPLICATION OF RECTAL WASHING: A CASE REPORT OF HYPOKALEMIA AND CARDIAC ARREST IN ADVANCED RECTOSIGMOID CANCER**

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ABSTRACT

Introduction. Rectal washing is a routine procedure in bowel preparation but may cause complications, especially in high-risk patients. This report discusses a case of fatal complications following rectal washing in a patient with a malignant rectosigmoid tumor and comorbidities, emphasizing the potential risks of hypokalemia and cardiac instability. **Method.** A case study was conducted on a 65-year-old male with chronic heart failure and suspected rectosigmoid malignancy, who underwent colonoscopy at Prof. Dr. I.G.N.G. Ngoerah General Hospital, Denpasar, Bali. Comprehensive clinical data were obtained, including detailed medical history, physical examination, laboratory testing, imaging studies (ultrasound and CT scan), and colonoscopy with biopsy. Management adhered to established protocols for atrial fibrillation with rapid ventricular response, chronic heart failure, partial bowel obstruction, and suspected metastatic rectosigmoid carcinoma. The patient's condition was closely monitored through continuous assessment of vital signs, clinical progression, and follow-up diagnostics. **Result & Analysis.** The case highlights the interplay of rectal washing, electrolyte imbalance (suspected hypokalemia), and cardiac arrhythmia in a high-risk patient. Contributing factors such as metastatic burden and comorbidities compounded the fatal outcome. **Discussion.** This case underscores the need for vigilant monitoring and tailored bowel preparation strategies in patients with significant comorbidities to mitigate life-threatening complications.

Keywords: Bowel Preparation Complication, Rectal Washing, Electrolyte Imbalance, Case series

INTRODUCTION

Rectal washing, often employed as a preparatory step for colonoscopic procedures, is a widely used technique to cleanse the bowel and optimize visualization. While generally considered safe, the procedure is not without risks, particularly in patients with comorbidities. Complications may arise from the excessive use of mechanical or chemical agents, potentially leading to electrolyte imbalances^{3,5}, mucosal injury^{4,13}, and exacerbation of underlying conditions². Among these complications, hypokalemia—a potentially life-threatening condition—can occur due to excessive fluid shifts and electrolyte depletion⁶. Furthermore, patients with significant comorbidities, such as chronic heart failure (CHF), coronary artery disease (CAD), and diabetes mellitus, are particularly vulnerable to the systemic effects of these complications.⁸ Understanding the risks associated with rectal washing is crucial, especially in complex cases involving malignancies and pre-existing cardiac dysfunctions.

The management of colorectal cancer often involves a combination of surgical intervention, chemotherapy, and radiotherapy. Diagnostic procedures such as colonoscopy are crucial for identifying tumor location, assessing staging, and obtaining biopsy samples for histopathological evaluation^{9,10,12}. Pre-procedural bowel preparation, including rectal washing and enemas, is a standard practice to ensure adequate visualization during colonoscopy^{16,18}. However, these preparations are not without risks, particularly in patients with comorbidities. Complications can include fluid and electrolyte imbalances, mucosal injury, and

in rare cases, life-threatening cardiac arrhythmias¹⁵. In this case, rectal washing appears to have precipitated a series of adverse events, including hypokalemia, leading to cardiac instability in a patient with significant underlying medical conditions.

This case report aims to highlight the rare but critical complication of rectal washing, potentially leading to life-threatening hypokalemia in patients with advanced malignancy and comorbid cardiac conditions. By presenting this case, we seek to emphasize the importance of vigilant pre-procedural assessment, careful monitoring of electrolyte balance, and early recognition of complications in high-risk patients undergoing bowel preparation. This report also aims to contribute to the limited literature on the intersection of gastrointestinal malignancy, invasive procedures, and comorbidities such as heart failure and atrial fibrillation, to improve clinical outcomes and decision-making in similar cases.

METHOD AND ANALYSIS

We presented a case of a 65-year-old male with a history of chronic heart failure and suspected rectosigmoid malignancy, who underwent colonoscopy at Prof. Dr. I.G.N.G. Ngoerah General Hospital, Denpasar, Bali. Comprehensive data collection was conducted, including the patient's medical history, physical examination findings, and diagnostic workup results such as laboratory tests, imaging studies (ultrasound, CT scan), and colonoscopy with biopsy. The management followed standard protocols for addressing atrial fibrillation with rapid ventricular response, chronic heart failure, partial bowel obstruction, and suspected malignant

rectosigmoid tumor with metastasis. Patient progresses were closely monitored through regular assessment of vital signs, clinical

parameters, and follow-up diagnostic studies.

RESULT

A 65-year-old male with a known history of chronic heart failure (CHF) due to coronary artery disease (CAD) diagnosed in 2018 and type 2 diabetes mellitus (T2DM) diagnosed in 2023 presented with complaints of watery diarrhea and an abdominal mass for the past 1.5 months. The diarrhea occurred 2–3 times daily, characterized by yellow stools without blood or mucus. The patient also reported abdominal pain localized to the mid and lower right quadrants and a palpable mass in the same region. He denied associated symptoms such as fever, nausea, vomiting, or weight loss but noted a reduced appetite. Physical examination revealed a mildly distended abdomen, with tenderness and a firm, nodular mass palpable in the right hypochondrium. Digital rectal examination showed a smooth rectal mucosa with an impression of a hard, irregular mass measuring approximately 8 cm at the 2 o'clock position. Initial laboratory workup and imaging studies, including abdominal ultrasonography and CT scan, identified a malignant mass in the rectosigmoid region with evidence of extensive metastasis to the liver, lungs, spleen, and regional lymph nodes.

Findings also indicated a partial bowel obstruction secondary to the tumor. Echocardiography confirmed underlying chronic heart failure (CHF) with a reduced ejection fraction (43.07%), accompanied by

atrial fibrillation (AF) with rapid ventricular response (RVR). These findings suggested a complex clinical picture of advanced malignancy with systemic complications, compounded by pre-existing CHF and type 2 diabetes mellitus.

The patient underwent bowel preparation for colonoscopy, which included rectal washing, multiple administration of phosphate enema, and oral bulk forming agent (PEG 4000). However, the procedure on 6 September 2024 was aborted due to the onset of AF with RVR (heart rate 180 bpm), necessitating transfer to the Intermediate Ward. The patient was managed with amiodarone infusion, rate control using bisoprolol and digoxin, and supportive care, including fluid optimization and monitoring for metabolic derangements. After stabilization, a diagnostic colonoscopy with biopsy was successfully performed on 10 September 2024, revealing a rectosigmoid malignant tumor with a rectal polyp. Despite these efforts, the patient's condition deteriorated on 13 September 2024, marked by hypotension, tachycardia, and desaturation, culminating in cardiac arrest. Resuscitative measures, including cardioversion, dobutamine, vasopressors, and epinephrine, were unsuccessful, and the patient was declared deceased at 14 September 2024 20:39 WITA.

Table 1. Initial Pre-operative Laboratory Result

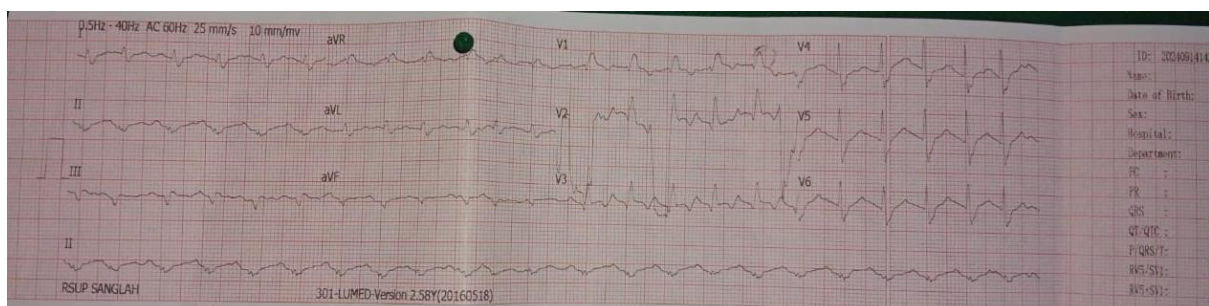
Parameter	Result	Unit	Reference Range
HGB	10.70	g/dL	12.0 – 16.0
WBC	9.49	$10^3/\mu\text{L}$	4.1 - 11.0
PLT	311	$10^3/\mu\text{L}$	140 - 400
HCT	32.70%	%	36.0 - 46.0
MCV	92.90	fL	80.0 - 100.0
MCHC	32.70	g/dL	31.0 - 36.0
MCH	27.4	pg	26.0 - 34.0
BUN	10.5	mg/dL	7 – 18.7
Creatinine	0.86	mg/dL	0.57 - 1.11
e-LFG	95.59		≥ 90
Kalium - Serum	4.15	mEq/L	3.5 – 5.1
Natrium - Serum	141	mEq/L	136 - 145
Hb-A1c	6.5	%	< 6.5

Source: Processed Data by Researchers

Table 2. Post Colonoscopy Laboratory Result

Parameter	Result	Unit	Reference Range
HGB	9.80	g/dL	12.0 – 16.0
WBC	5.99	$10^3/\mu\text{L}$	4.1 - 11.0
PLT	451	$10^3/\mu\text{L}$	140 - 400
HCT	29.40%	%	36.0 - 46.0
MCV	94.80	fL	80.0 - 100.0
MCHC	33.30	g/dL	31.0 - 36.0
MCH	31.60	pg	26.0 - 34.0
BUN	6.7	mg/dL	7 – 18.7
Creatinine	0.53	mg/dL	0.57 - 1.11
e-LFG	116.63		≥ 90
Kalium - Serum	3.51	mEq/L	3.5 – 5.1
Natrium - Serum	138	mEq/L	136 - 145

Source: Processed Data by Researchers

**Figure 1.** Post-Colonoscopy ECG Record of the Patient

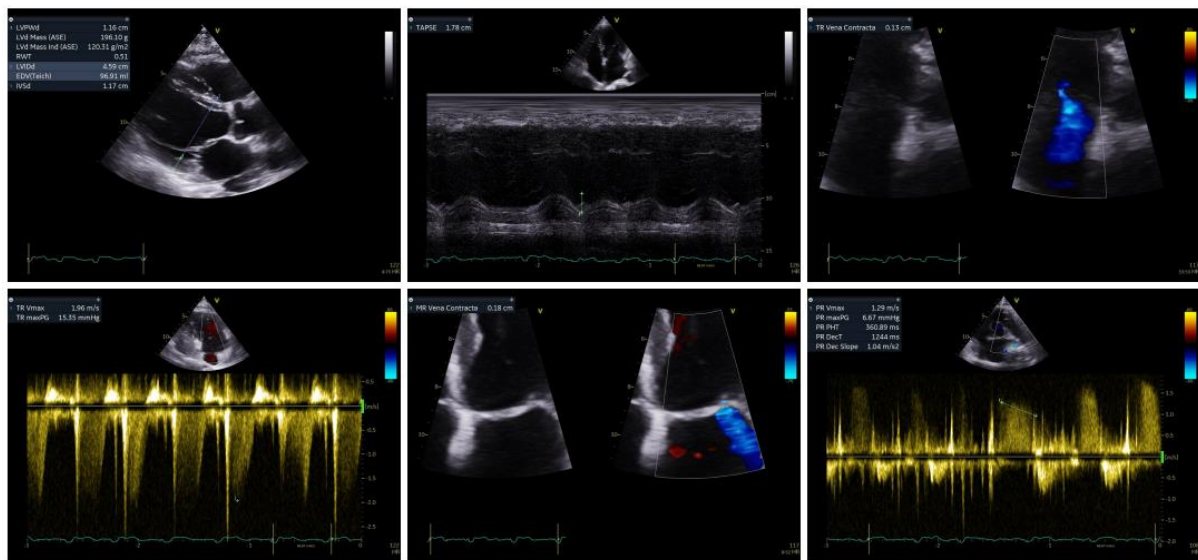


Figure 2. Echocardiography Record of the Patient
Source: Processed Data by Researchers

DISCUSSION

Complications from rectal washing can often be subtle and insufficiently explored, potentially complicating a patient's clinical condition^{14,17}. Anticipating these complications requires close monitoring, particularly in advanced healthcare settings. This case highlights the critical importance of establishing robust monitoring protocols and underscores the need for safer and more effective methods of bowel preparation.

Rectal washing, though commonly performed as a bowel preparation procedure^{16,18}, carries potential complications such as electrolyte imbalances, dehydration, and mucosal injury^{13,15}, which can lead to systemic disturbances, especially in vulnerable patients. In this case, the patient experienced severe clinical deterioration following rectal washing, likely due to exacerbation of underlying atrial fibrillation, cardiac dysfunction, and

possible hypokalemia^{2,6,7}, compounding the effects of metastatic rectosigmoid cancer. The prevalence of complications from rectal washing is not well-documented, but severe outcomes are more likely in patients with advanced malignancy, comorbid cardiovascular disease, and metabolic vulnerabilities, as seen in this case.

One significant complication is electrolyte disturbance, especially hypokalemia, which may result from excessive fluid shifts during rectal washing or the use of hypertonic solutions like phosphate enemas. Hypokalemia can lead to neuromuscular dysfunction and cardiac arrhythmias², posing a serious threat in patients with pre-existing atrial fibrillation or heart failure. Additionally, the mechanical effects of rectal washing may trigger mucosal irritation or microvascular injury, further exacerbating systemic inflammation^{4,13}. These mechanisms highlight the importance of carefully assessing procedural risks, particularly in

patients with significant comorbidities, implementation of preventive measures such as close monitoring of electrolyte levels and cardiac status during and after the procedure and the need for innovative bowel cleansing agents and preparation protocols that ensure greater safety and effectiveness.

The cornerstone of management includes correcting fluid and electrolyte imbalances through intravenous rehydration and supplementation of potassium while monitoring serum electrolyte levels closely²⁰. Cardiac monitoring is essential, particularly in patients with predisposing cardiac conditions, to detect and manage arrhythmias. Pharmacological management may include antiarrhythmic agents such as amiodarone, as used in this case, with careful titration to prevent bradycardia or other adverse effects²⁰. Additionally, bowel preparation regimens in high-risk patients should be carefully selected²¹, avoiding aggressive methods such as repeated enemas and rectal washing, to minimize metabolic and cardiovascular stress. Multidisciplinary collaboration involving digestive surgery, gastroenterology, cardiology, and critical care is vital in managing these complications effectively²², as demonstrated by the coordinated efforts in this case. Anticipative strategies, such as pre-procedure optimization of electrolyte balance and hydration, are crucial to reducing the risk of complications, particularly in patients with significant comorbidities²³.

Preventive measures are crucial for ensuring patient safety and procedural success¹⁹. These include comprehensive risk assessment and evaluation, optimizing bowel preparation protocols, improving the

formulation of rectal washing agents, providing close monitoring and support during the preparation process, and ensuring thorough post-procedure care and follow-up.

Other possible complications notable to be discussed in the upcoming paper are bowel perforation¹³ and kidney failure^{14,15}. Bowel perforation following rectal washing can result from excessive pressure, mechanical trauma, or pre-existing intestinal wall fragility in patients with malignancies or inflammatory bowel conditions¹³. Bowel perforation is a life-threatening complication that often presents with acute abdominal pain, peritonitis, and sepsis, requiring prompt surgical intervention.

Another complication is acute kidney failure associated with the use of phosphate enemas^{14,15}. Phosphate enemas, widely used for bowel cleansing, can lead to hyperphosphatemia, hypocalcemia, and volume depletion, particularly in elderly or frail patients with impaired renal function. The subsequent electrolyte and acid-base disturbances can precipitate acute kidney injury (AKI), which has been documented in multiple case reports^{14,15}. These risks emphasize the urge of novel sophisticated bowel preparation regimens, especially in patients with comorbid conditions such as chronic kidney disease, heart failure, or advanced malignancies.

Clinicians should maintain a high index of suspicion for these complications and implement preventive strategies, such as using alternative bowel preparation methods, close monitoring of at-risk patients, and patient education on reporting alarming symptoms. Future studies exploring safer bowel preparation practices in high-risk populations are urgently

needed to mitigate these potentially fatal complications.

CONCLUSION

This case highlights the complexity of managing advanced malignancies with widespread metastasis in patients with significant comorbidities, such as chronic heart failure, coronary artery disease, and type 2 diabetes mellitus. The fatal outcome in this patient underscores the potential risks of preparatory procedures like rectal washing, particularly in vulnerable individuals, where complications such as electrolyte imbalance (hypokalemia) and cardiac instability (atrial fibrillation with rapid ventricular response) can lead to devastating clinical outcome. This case emphasizes the need for careful pre-procedural assessment, vigilant monitoring during interventions, and multidisciplinary management to minimize risks and improve outcomes in high-risk patients. Bowel perforation following rectal washing and kidney failure as complications of fleet enema highlight the urgency for novel sophisticated bowel preparation regimen, which serves as a developmental idea in the future.

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