

Clinical Pharmacist-Led Perioperative Management and Pharmaceutical Care in a Patient Undergoing Extended Right Hemicolectomy for Suspected Colon Adenocarcinoma: A Case Report

Subhasis Mishra, Raghavendra Shivaram Hegde*

Department of Pharmacy Practice, BVV's H. S. K. College of Pharmacy, Bagalkote, Karnataka, INDIA.

ABSTRACT

Colorectal cancer is among the most frequently diagnosed malignancies worldwide and a leading contributor to cancer-related mortality. The perioperative course of patients undergoing major colorectal resection is frequently complicated by anaemia, electrolyte disturbances, malnutrition, infection risk, cardiovascular comorbidity and polypharmacy. The clinical pharmacist, as a member of the multidisciplinary surgical team, contributes to medication optimisation, identification and resolution of drug-related problems, antimicrobial stewardship, electrolyte correction, perioperative risk reduction and patient counselling. A 53-year-old woman with a six-year history of hypertension presented with dull, intermittent abdominal pain of four months' duration. Colonoscopy revealed a luminal occluding colonic growth with multiple polyps, and contrast-enhanced computed tomography demonstrated circumferential colonic wall thickening, luminal narrowing and enlarged regional lymph nodes. The carcinoembryonic antigen level was markedly elevated at 83.7 ng/mL. Clinically significant findings included severe anaemia (haemoglobin 7.2 g/dL), hypokalaemia (potassium 2.7 mEq/L), hypoalbuminaemia (albumin 2.3 g/dL) and hypertension. The patient underwent extended right hemicolectomy. The clinical pharmacist conducted structured medication review and provided interventions targeting electrolyte correction, perioperative medication optimisation, antimicrobial stewardship, pain management, cardiovascular monitoring, nutritional support, discharge counselling and medication reconciliation. The patient achieved satisfactory postoperative recovery with stabilisation of clinical and biochemical parameters and was discharged on appropriate medication with structured follow-up advice. This case illustrates the measurable value of clinical pharmacist-led pharmaceutical care in optimising perioperative outcomes in patients undergoing major colorectal cancer surgery and supports the integration of clinical pharmacists within multidisciplinary surgical oncology teams.

Keywords: Antimicrobial Stewardship, Clinical Pharmacist, Colon Adenocarcinoma, Extended Right Hemicolectomy, Perioperative Care, Pharmaceutical Care.

Correspondence:

Dr. Raghavendra Shivaram Hegde

Faculty, Department of Pharmacy Practice, BVV's H. S. K. College of Pharmacy, Bagalkote-587101, Karnataka, INDIA.

Email: raghavhegde28@gmail.com

ORCID: 0009-0003-7523-6333

Received: 09-03-2026;

Revised: 25-05-2026;

Accepted: 17-07-2026.

INTRODUCTION

Colorectal cancer is one of the most commonly diagnosed malignancies worldwide and a major cause of cancer-related death. According to GLOBOCAN 2022 estimates, cancer of the colorectum accounted for approximately 9.6% of all newly diagnosed cancers and 9.3% of all cancer deaths globally, ranking among the top three malignancies in both incidence and mortality (Bray *et al.*, 2024). Surgical resection remains the cornerstone

of curative treatment for localised disease (Dekker *et al.*, 2019). However, the perioperative period is frequently complicated by anaemia, electrolyte disturbances, malnutrition, heightened infection risk, cardiovascular comorbidity and polypharmacy, each of which can adversely affect surgical outcomes and recovery (Govaert *et al.*, 2015).

Optimal perioperative care therefore requires a coordinated multidisciplinary approach involving surgeons, anaesthesiologists, physicians, nurses and clinical pharmacists. Enhanced Recovery After Surgery (ERAS) pathways have consistently demonstrated that systematic preoperative optimisation and structured perioperative management reduce complications and length of stay in colorectal surgery (Gustafsson *et al.*, 2019). Within this framework, clinical pharmacists have become integral members of surgical teams by identifying and resolving drug-related



DOI: 10.5530/ijopp.20260918

Copyright Information :

Copyright Author (s) 2026 Distributed under Creative Commons CC-BY 4.0

Publishing Partner : Manuscript Technomedia. [www.mstechnomedia.com]

problems, optimising pharmacotherapy, preventing adverse drug events, promoting rational antimicrobial use and strengthening patient education (Dalton and Byrne, 2017). A growing body of evidence indicates that pharmacist involvement improves medication safety, reduces preventable harm and enhances therapeutic outcomes across surgical and oncology settings (Chisholm-Burns *et al.*, 2010).

This report describes the role of a clinical pharmacist in the perioperative management of a patient undergoing extended right hemicolectomy for suspected colon adenocarcinoma, with emphasis on the identification and resolution of clinically significant drug-related problems and the delivery of comprehensive pharmaceutical care.

CASE PRESENTATION

Patient Information

A 53-year-old woman, a homemaker, with a six-year history of hypertension maintained on amlodipine, presented to the surgical outpatient department with abdominal pain. She had no known history of diabetes mellitus, epilepsy or bronchial asthma.

Chief Complaint

Abdominal pain of four months' duration.

History of Present Illness

The patient had been apparently well until four months prior to presentation, after which she developed gradually progressive abdominal pain. The pain was dull and aching, intermittent in nature, and not associated with any significant aggravating or relieving factors. There was no associated fever, vomiting, burning micturition or altered bowel habit.

Past History

- Hypertension for six years, on regular amlodipine therapy.
- Tubectomy approximately 23 years earlier.
- History of blood transfusion.
- No history of diabetes mellitus, epilepsy or bronchial asthma.

General Examination

The patient was conscious, cooperative and oriented. Blood pressure was 110/80 mmHg, pulse rate 72 beats per minute, and she was afebrile. There was no cyanosis, clubbing, pedal oedema or icterus on examination.

Investigations

Significant laboratory findings on admission are summarised in Table 1. The results revealed severe anaemia, hypokalaemia,

hypoalbuminaemia and a markedly elevated Carcinoembryonic Antigen (CEA) level, together with mild hyponatraemia and leucocytosis.

Radiological Findings

Contrast-enhanced computed tomography of the abdomen and pelvis demonstrated circumferential wall thickening involving the colon, luminal narrowing with features of bowel obstruction, pericolic fat stranding and enlarged regional lymph nodes, findings collectively suggestive of a neoplastic colonic process.

Endoscopic Findings

Colonoscopy revealed a luminal occluding growth with multiple colonic polyps. A biopsy was obtained for histopathological evaluation.

Clinical Impression

Suspected colon adenocarcinoma with bowel obstruction, requiring surgical intervention.

Surgical Management

Following multidisciplinary evaluation and preoperative optimisation of the identified biochemical abnormalities, the patient underwent extended right hemicolectomy. Preoperative correction of anaemia and hypokalaemia was prioritised to reduce the risk of perioperative arrhythmia and to improve surgical tolerance (Munk-Madsen *et al.*, 2019).

Pharmaceutical Care Assessment

The clinical pharmacist performed a comprehensive medication review and structured pharmaceutical care assessment, classifying drug-related problems in accordance with the Pharmaceutical Care Network Europe (PCNE) framework (Pharmaceutical Care Network Europe Foundation, 2020). Eight clinically significant drug-related problems were identified, each prompting a targeted intervention with a documented outcome, as summarised in Table 2.

Medication Review

The pharmacist reviewed the complete medication profile across the chronic, inpatient and discharge phases of care to ensure therapeutic appropriateness, avoid duplication and support medication reconciliation. The medication profile is presented in Table 3.

Clinical Timeline

The chronological sequence of clinical events, from symptom onset to discharge, is presented in Table 4.

Patient Counselling Provided

Structured patient counselling was delivered by the clinical pharmacist at discharge, covering the following areas:

- Medication adherence and the rationale for each prescribed drug.
- The importance of uninterrupted antihypertensive therapy.
- Recognition of early warning signs of infection.
- Nutritional advice emphasising adequate high-protein intake to support wound healing.
- The importance of follow-up investigations, including histopathology review and serial CEA monitoring.
- Lifestyle modification and general postoperative recovery measures.
- Postoperative wound-care education.

Table 1: Significant Laboratory Findings on Admission.

Parameter	Patient Value	Reference Range
Haemoglobin	7.2 g/dL	12.0–15.0 g/dL
Total leucocyte count	14,000 cells/mm ³	4,000–11,000 cells/mm ³
Serum sodium	133 mEq/L	135–145 mEq/L
Serum potassium	2.7 mEq/L	3.5–5.1 mEq/L
Serum creatinine	0.6 mg/dL	0.6–1.1 mg/dL
Serum albumin	2.3 g/dL	3.5–5.2 g/dL
Random blood sugar	192 mg/dL	< 200 mg/dL
Carcinoembryonic Antigen (CEA)	83.7 ng/mL	<5 ng/mL (non-smokers)

CEA: Carcinoembryonic Antigen. Reference ranges are those of the reporting laboratory.

DISCUSSION

Major colorectal surgery presents substantial perioperative challenges because affected patients frequently present with anaemia, electrolyte disturbances, nutritional deficiency and multiple comorbidities (Govaert *et al.*, 2015). In this setting, clinical pharmacists contribute meaningfully to reducing medication-related complications and improving therapeutic outcomes through systematic identification and resolution of drug-related problems (Dalton and Byrne, 2017). The present case demonstrates how targeted pharmaceutical care addressed several interlinked perioperative risks in a single patient.

Severe hypokalaemia represented a clinically significant perioperative risk factor in this patient, given its well-recognised association with cardiac arrhythmias and neuromuscular dysfunction. Early identification and correction were therefore essential to reduce intraoperative and postoperative risk (Kardalas *et al.*, 2018). Similarly, severe preoperative anaemia warranted careful monitoring and optimisation, as perioperative anaemia is associated with increased morbidity, delayed recovery and prolonged hospitalisation (Fowler *et al.*, 2015).

The hypoalbuminaemia observed in this patient reflected compromised nutritional status, a recognised predictor of impaired wound healing and adverse postoperative outcomes (Gupta and Gan, 2016). Nutritional counselling and protein optimisation were therefore important components of the pharmaceutical care plan, consistent with established clinical nutrition guidance for surgical patients (Weimann *et al.*, 2017).

The pharmacist further contributed to antimicrobial stewardship by reviewing the appropriateness of antimicrobial therapy and promoting rational use throughout the perioperative period, an intervention of particular importance in gastrointestinal surgery

Table 2: Drug-Related Problems Identified and Clinical Pharmacist Interventions.

Drug-Related Problem	Pharmacist Intervention	Outcome
Severe hypokalaemia (2.7 mEq/L)	Recommended potassium correction with serial electrolyte monitoring	Improved and stabilised electrolyte status
Severe anaemia (Hb 7.2 g/dL)	Advised haematological monitoring and perioperative optimisation	Reduced perioperative surgical risk
Markedly elevated CEA	Documentation and recommendation for postoperative follow-up	Baseline tumour marker established
Hypoalbuminaemia (2.3 g/dL)	Nutritional counselling and protein optimisation	Improved nutritional support
Hypertension	Continuation and review of antihypertensive therapy	Stable perioperative blood pressure
Infection risk/antimicrobial use	Antimicrobial appropriateness review and stewardship	Rational antimicrobial use; infection prevention
Postoperative pain	Analgesic monitoring and patient counselling	Adequate pain control
Cardiac risk evaluation	Recommended ECG/troponin review and cardiology consultation	Enhanced perioperative cardiovascular safety

CEA: Carcinoembryonic Antigen; ECG: Electrocardiogram; Hb: Haemoglobin.

Table 3: Medication Profile During Hospitalisation.

Stage of Care	Medication	Purpose
Chronic therapy	Amlodipine 5 mg	Hypertension
Inpatient management	Meropenem IV	Broad-spectrum antimicrobial cover
Inpatient management	Metronidazole IV	Anaerobic cover
Inpatient management	Rifaximin 550 mg	Gastrointestinal management
Inpatient management	Doxycycline	Adjunctive antimicrobial therapy
Discharge	Amoxicillin-clavulanate 625 mg	Infection prophylaxis
Discharge	Esomeprazole-D	Gastroprotection
Discharge	Bigspas-P	Pain and spasm control
Discharge	Rifaximin 550 mg	Gastrointestinal therapy
Discharge	Doxycycline	Antimicrobial therapy
Discharge	Amlodipine 5 mg	Hypertension

IV: Intravenous.

where the risk of surgical-site infection is high (de Lissoyoy *et al.*, 2009). Complementary interventions in pain management, discharge counselling and medication reconciliation strengthened continuity of care and reduced the risk of medication errors at care transitions (Mekonnen *et al.*, 2016).

Taken together, these interventions illustrate the expanding and increasingly evidence-based role of clinical pharmacists in surgical oncology. Multidisciplinary models that formally incorporate pharmacist-led pharmaceutical care have been shown to improve medication safety and patient outcomes, and the present case adds practical support to this body of evidence (Chisholm-Burns *et al.*, 2010; Kaboli *et al.*, 2006).

LIMITATIONS

This report has several limitations. The histopathological confirmation report was not available at the time of manuscript preparation, and the diagnosis therefore remained one of strong clinical and radiological suspicion. Certain perioperative medication details could not be retrieved from the medical records, and long-term follow-up information was unavailable. In addition, de-identified radiological and endoscopic images and a graphical abstract could not be included, as retrievable high-resolution image files were not available at the time of manuscript preparation; the imaging findings have therefore been described in narrative form. As a single-patient report, the findings are descriptive and cannot be generalised; nevertheless,

Table 4: Clinical Timeline.

Timeline	Event
4 months before admission	Onset of abdominal pain
Initial evaluation	Clinical examination performed
Diagnostic workup	Elevated CEA identified
Colonoscopy	Colonic growth with polyps detected; biopsy taken
CT abdomen and pelvis	Neoplastic colonic lesion suspected
Admission	Surgical evaluation and multidisciplinary review
Pharmacist review	Drug-related problems identified and documented
Preoperative period	Correction of anaemia and hypokalaemia initiated
Surgery	Extended right hemicolectomy performed
Postoperative period	Monitoring and medication optimisation
Discharge	Counselling and medication reconciliation

CEA: Carcinoembryonic antigen; CT: Computed tomography.

the case provides a detailed, transferable account of clinical pharmacist contributions to perioperative care.

CONCLUSION

Clinical pharmacist-led pharmaceutical care played an important role in the perioperative management of a patient undergoing extended right hemicolectomy for suspected colon adenocarcinoma. The systematic identification and management of anaemia, hypokalaemia, nutritional deficiency, infection risk and other medication-related problems contributed to the optimisation of patient outcomes. This case supports the inclusion of clinical pharmacists as essential members of multidisciplinary surgical oncology teams and highlights the value of structured pharmaceutical care in complex perioperative settings.

ACKNOWLEDGEMENT

The authors gratefully acknowledge the surgical, medical and nursing staff of the treating hospital for their cooperation in the multidisciplinary care of the patient.

ABBREVIATIONS

CEA: Carcinoembryonic antigen; **CT:** Computed tomography; **ECG:** Electrocardiogram; **ERAS:** Enhanced Recovery After Surgery; **Hb:** Haemoglobin; **IV:** Intravenous; **PCNE:** Pharmaceutical Care Network Europe.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

FINANCIAL SUPPORT AND SPONSORSHIP

Nil. This work received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

PATIENT CONSENT

Written informed consent was obtained from the patient for the publication of this case report and any accompanying clinical information. The report was prepared in accordance with the ethical principles of the Declaration of Helsinki, and all patient-identifying details have been removed to preserve confidentiality and anonymity.

AUTHOR CONTRIBUTIONS

Subhasis Mishra collected and compiled the clinical data, contributed to the pharmaceutical care assessment and drafted the manuscript. Dr. Raghavendra Shivaram Hegde conceived and supervised the case report, interpreted the clinical findings, critically revised the manuscript and approved the final version for submission as the corresponding author. Both authors have read and approved the final manuscript and take full responsibility for its content.

DECLARATION OF ARTIFICIAL INTELLIGENCE USE

The authors declare that artificial intelligence was not used for the generation of the case report, tables, results or any scientific data. Artificial intelligence was used solely to assist with formatting and language refinement (improving wording and readability). All clinical data, tables and results presented in this manuscript are original, genuine and derived directly from the patient's records, and the authors take full responsibility for the accuracy, integrity and authenticity of the entire content.

REFERENCES

- Bray, F., Laversanne, M., Sung, H., Ferlay, J., Siegel, R. L., Soerjomataram, I., & Jemal, A. (2024). Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: A Cancer Journal for Clinicians*, 74(3), 229–263. <https://doi.org/10.3322/caac.21834>
- Chisholm-Burns, M. A., Kim Lee, J., Spivey, C. A., Slack, M., Herrier, R. N., Hall-Lipsy, E., Graff Zivin, J., Abraham, I., Palmer, J., Martin, J. R., Kramer, S. S., & Wunz, T. (2010). US pharmacists' effect as team members on patient care: Systematic review and meta-analyses. *Medical Care*, 48(10), 923–933. <https://doi.org/10.1097/MLR.0b013e3181e57962>
- Dalton, K., & Byrne, S. (2017). Role of the pharmacist in reducing healthcare costs: Current insights. *Integrated Pharmacy Research and Practice*, 6, 37–46. <https://doi.org/10.2147/IPRP.S108047>
- de Lisssoy, G., Fraeman, K., Hutchins, V., Murphy, D., Song, D., & Vaughn, B. B. (2009). Surgical site infection: Incidence and impact on hospital utilization and treatment costs. *American Journal of Infection Control*, 37(5), 387–397. <https://doi.org/10.1016/j.ajic.2008.12.010>
- Dekker, E., Tanis, P. J., Vleugels, J. L. A., Kasi, P. M., & Wallace, M. B. (2019). Colorectal cancer. *The Lancet*, 394(10207), 1467–1480. [https://doi.org/10.1016/S0140-6736\(19\)32319-0](https://doi.org/10.1016/S0140-6736(19)32319-0)
- Fowler, A. J., Ahmad, T., Phull, M. K., Allard, S., Gillies, M. A., & Pearce, R. M. (2015). Meta-analysis of the association between preoperative anaemia and mortality after surgery. *British Journal of Surgery*, 102(11), 1314–1324. <https://doi.org/10.1002/bjs.9861>
- Govaert, J. A., Fiocco, M., van Dijk, W. A., Scheffer, A. C., de Graaf, E. J. R., Tollenaar, R. A. E. M., & Wouters, M. W. J. M. (2015). Costs of complications after colorectal cancer surgery in the Netherlands: Building the business case for hospitals. *European Journal of Surgical Oncology*, 41(8), 1059–1067. <https://doi.org/10.1016/j.ejso.2015.03.236>
- Gupta, R., & Gan, T. J. (2016). Preoperative nutrition and prehabilitation. *Anesthesiology Clinics*, 34(1), 143–153. <https://doi.org/10.1016/j.janclin.2015.10.012>
- Gustafsson, U. O., Scott, M. J., Hubner, M., Nygren, J., Demartines, N., Francis, N., Rockall, T. A., Young-Fadok, T. M., Hill, A. G., Soop, M., de Boer, H. D., Urman, R. D., Chang, G. J., Fichera, A., Kessler, H., Grass, F., Whang, E. E., Fawcett, W. J., Carli, F., ... Ljungqvist, O. (2019). Guidelines for perioperative care in elective colorectal surgery: Enhanced Recovery After Surgery (ERAS) Society recommendations: 2018. *World Journal of Surgery*, 43(3), 659–695. <https://doi.org/10.1007/s00268-018-4844-y>
- Kaboli, P. J., Hoth, A. B., McClimon, B. J., & Schnipper, J. L. (2006). Clinical pharmacists and inpatient medical care: A systematic review. *Archives of Internal Medicine*, 166(9), 955–964. <https://doi.org/10.1001/archinte.166.9.955>
- Kardalas, E., Paschou, S. A., Anagnostis, P., Muscogiuri, G., Siasos, G., & Vryonidou, A. (2018). Hypokalemia: A clinical update. *Endocrine Connections*, 7(4), R135–R146. <https://doi.org/10.1530/EC-18-0109>
- Mekonnen, A. B., McLachlan, A. J., & Brien, J. E. (2016). Effectiveness of pharmacist-led medication reconciliation programmes on clinical outcomes at hospital transitions: A systematic review and meta-analysis. *BMJ Open*, 6(2), e010003. <https://doi.org/10.1136/bmjopen-2015-010003>
- Munk-Madsen, P., Eriksen, C. F., Ekeloef, S., & Gögenur, I. (2019). Why still in hospital after laparoscopic colorectal surgery within an enhanced recovery programme? *Colorectal Disease*, 21(12), 1438–1444. <https://doi.org/10.1111/codi.14762>
- Pharmaceutical Care Network Europe Foundation. (2020). PCNE classification for drug-related problems V9.1. Pharmaceutical Care Network Europe.
- Weimann, A., Braga, M., Carli, F., Higashiguchi, T., Hübner, M., Klek, S., Laviano, A., Ljungqvist, O., Lobo, D. N., Martindale, R., Waitzberg, D. L., Bischoff, S. C., & Singer, P. (2017). ESPEN guideline: Clinical nutrition in surgery. *Clinical Nutrition*, 36(3), 623–650. <https://doi.org/10.1016/j.clnu.2017.02.013>

Cite this article: Mishra S, Hegde RS. Clinical Pharmacist-Led Perioperative Management and Pharmaceutical Care in a Patient Undergoing Extended Right Hemicolectomy for Suspected Colon Adenocarcinoma: A Case Report. *Indian J Pharmacy Practice*. 2026;19(4):561-5.