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### SYSTEMATIC REVIEWS

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### META-ANALYSIS

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*WJGO* mainly publishes articles reporting research results and findings obtained in the field of gastrointestinal oncology and covering a wide range of topics including liver cell adenoma, gastric neoplasms, appendiceal neoplasms, biliary tract neoplasms, hepatocellular carcinoma, pancreatic carcinoma, cecal neoplasms, colonic neoplasms, colorectal neoplasms, duodenal neoplasms, esophageal neoplasms, gallbladder neoplasms, *etc.*

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## Prognosis of intensive care unit patients with colorectal cancer

Yu-Ting Liao, Wen-Liang Zhu

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### Abstract

This letter provides commentary on the manuscript "Intensive care unit outcomes and prognostic factors of colorectal cancer". The study is the first to present multicenter data on the 90-day mortality of patients with colorectal cancer admitted to the intensive care unit, and identifies chemotherapy history, elective surgery, and conventional oxygen therapy as independent prognostic factors. We propose three refinements to enhance the study's clinical utility: Clarify chemotherapy details, including regimen and treatment phase, along with the surgical approach (curative *vs* palliative) and how preoperative tumor staging influences prognosis; elucidate the relationship between intensive care unit admission etiologies and prognosis; and incorporate colorectal cancer-specific biomarkers to optimize prognostic scoring systems. The study's core contribution is substantial, and refinement of the details will further enhance its clinical translational relevance.

**Key Words:** Colorectal cancer; Intensive care unit; Prognosis; Prognosis factors; Multicenter study

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**Core Tip:** This letter comments on the article by Dong *et al* in the *World Journal of Gastrointestinal Oncology*, which presents the first multicenter analysis of 90-day mortality data among patients with colorectal cancer admitted to the intensive care unit, and identifies three independent prognostic factors. It proposes clarifying chemo/surgery details, examining the relationship between intensive care unit admission causes and prognosis, and optimizing scoring with colorectal cancer biomarkers to enhance clinical utility.

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## TO THE EDITOR

We read with particular interest the multicenter retrospective study by Dong *et al*[1]. The study addresses short-term mortality and prognostic indicators in patients with colorectal cancer (CRC) admitted to the intensive care unit (ICU), a topic of considerable clinical relevance given the growing number of patients with cancer requiring critical care interventions. In contemporary clinical practice, CRC ranks as the third most prevalent malignancy worldwide[2]. ICU admission among patients with CRC is increasingly common, typically prompted by postoperative complications, acute tumor-related emergencies (*e.g.*, acute intestinal obstruction or perforation), or treatment-related toxicities (such as chemotherapy-induced organ damage)[3,4]. However, systematic research on ICU outcomes for this patient population remains limited, largely due to an overreliance on single-center data, a limitation that hampers efforts to mitigate biases arising from regional variations in medical practice.

This study enrolled 189 patients with CRC aged 14 years and older, who had an ICU stay of at least 24 hours, across 37 cancer hospitals in China. This study is the first to report a multicenter-derived 90-day mortality rate of 12.2% in this population. Through univariate and multivariate Cox proportional hazards regression analyses, the authors identified three independent prognostic factors for 90-day mortality: Prior chemotherapy [hazard ratio (HR) = 2.66, 95% confidence interval (CI): 1.04-6.80,  $P = 0.041$ ], elective surgery (HR = 0.20, 95% CI: 0.07-0.58,  $P = 0.003$ ), and conventional oxygen therapy (HR = 0.21, 95% CI: 0.07-0.62,  $P = 0.005$ ). These findings address a critical gap between pan-cancer ICU outcome research and CRC-specific studies that have largely focused on postoperative cohorts. Furthermore, they provide clinicians with direct evidence-based insights for evaluating the benefit-risk profile of ICU admission in patients with CRC and formulating individualized monitoring protocols. While this study demonstrates commendable scientific rigor in data collection and methodological execution, several aspects warrant further refinement and exploration, particularly in light of the demands of clinical practice and the evolving scope of academic inquiry, with the goal of enhancing the clinical translational relevance of the study.

### **Three aspects for improvement**

**“Stratified refinement” of prognostic factors (precise prognostic associations between chemotherapy history and surgical type):** While this study identifies a history of chemotherapy as an independent prognostic factor for mortality, it does not clarify the key clinical characteristics underlying this association. Wang *et al*[5] suggest that chemotherapy recipients are frequently admitted to the ICU due to treatment-related severe secondary infections. However, it remains unclear whether toxicity, varying by chemotherapy regimen[6], contributes to ICU admission risk. Moreover, both the phase of chemotherapy administration and patients’ baseline physical status are well-established determinants of prognosis[4]. Similarly, we agree with the authors that patients deemed eligible for elective surgery generally present with a favorable overall condition, reinforcing its role as a protective prognostic factor. Nonetheless, the relationship between surgical type, preoperative tumor stage, and ICU outcomes in this patient population remains insufficiently explored. Future studies incorporating these stratified variables may enable more precise identification of high-risk, chemotherapy-exposed populations, thus offering more targeted guidance for optimizing the timing of ICU admission in clinical practice.

**“Attribution analysis” of ICU admission causes (clarifying distinct prognostic differences attributable to diverse underlying etiologies):** The study notes that “patients transferred from clinical wards to the ICU carry a higher mortality risk”, yet it does not specify the specific etiologies for such transfers, whether due to urgent events such as tumor progression[7], treatment-related complications[8,9], or acute exacerbations of underlying comorbid conditions. Notably, this aspect has also been underexplored in prior literature[10]. Importantly, distinct triggers for ICU admission are associated with fundamentally different pathophysiological mechanisms and varying degrees of responsiveness to interventions. For example, CRC complicated by perforation typically reflects disease progression[11]; the resulting peritonitis may further facilitate cancer cell adhesion[12]. In such scenarios, the extent of surgical resection is often limited to mitigate surgical stress, which nonetheless increases the risk of residual tumor[13]. Moreover, patients with solid tumors and comorbidities who are admitted to the ICU due to immune-related adverse events demonstrate significantly higher mortality rates than those admitted for other causes[14]. Stratified analysis of ICU admission etiologies, alongside evaluation of mortality disparities across distinct underlying causes, could help clinicians identify actionable targets for preventive strategies. For example, heightened postoperative surveillance for signs of intestinal obstruction and regular assessment of renal function during chemotherapy[15] may further reduce mortality risk following ICU admission.

**“Population calibration” for prognostic scoring tools (optimizing prediction models tailored to CRC for enhanced predictive performance):** The study reports that widely used prognostic tools, such as the Sequential Organ Failure Assessment and Acute Physiology and Chronic Health Evaluation (APACHE) II scores, exhibit only moderate predictive performance for short-term ICU mortality in patients with CRC, with an area under the curve of 0.797 for 80-day mortality prediction using APACHE II. This limitation suggests that existing general prognostic scoring tools may fail to

fully integrate CRC-specific tumor factors. Widely acknowledged factors influencing CRC prognosis include tumor-node-metastasis staging, tumor invasion and metastasis, tumor necrosis[16,17], carcinoembryonic antigen levels[18] and tumor molecular subtypes (*e.g.*, thyroid hormone receptor-interacting protein 6)[19]. Nevertheless, a critical unresolved question is whether these CRC-specific factors influence patients' capacity to compensate for organ dysfunction and respond to treatment during their ICU stay.

Wang *et al*[5] also have shown that chemotherapy recipients present with elevated serum lactate levels and high APACHE II scores, and these parameters show a statistically significant positive correlation with both prolonged ICU stays and increased 30-day mortality. Building on these insights, future investigations could aim to develop an integrated predictive model that combines general prognostic scores with CRC-specific indicators; for example, integrating Sequential Organ Failure Assessment scores with carcinoembryonic antigen levels and tumor-node-metastasis staging. Validating such a model through large-sample prospective studies could substantially enhance the accuracy of ICU prognosis in patients with CRC, helping to mitigate the risks of both "over-monitoring" and "under-monitoring" in critical care decision-making.

### **Expand reflections on the clinical implications of the research**

That this study identified conventional oxygen therapy as a protective factor (HR = 0.21,  $P = 0.005$ ) is particularly significant amid ongoing debates over respiratory support strategies in the ICU. In clinical practice, some patients with CRC, particularly those with mild respiratory insufficiency following surgery or chemotherapy, may be overly recommended for mechanical ventilation. However, if validated in larger cohorts, these findings may suggest that conventional oxygen therapy can, for eligible patients, provide sufficient oxygenation while reducing the risk of complications associated with mechanical ventilation, such as barotrauma-induced lung injury, and even right heart failure or shock[20]. This, in turn, may contribute to improved clinical outcomes. If this finding is further refined to incorporate specific criteria, such as PaO<sub>2</sub>/FiO<sub>2</sub> ratio and respiratory rate, it could offer crucial guidance for tailoring respiratory support strategies to individual patient profiles in the ICU.

Furthermore, the 90-day mortality rate of 12.2% reported in this study is lower than the 25% rate previously documented in a single-center study[3]. This discrepancy may reflect the specialized tumor-focused monitoring expertise of ICUs in Chinese cancer hospitals. Specifically, all of the participating institutions are specialized cancer hospitals, with healthcare teams possessing deep experience in recognizing and managing cancer-specific emergencies, such as chemotherapy-related toxicities and tumor perforation. If further examined in scholarly discourse, this inference could highlight the distinctive strengths of cancer hospital ICUs, thus laying a foundation for the rationalized allocation of critical care resources.

### **Conclusion**

This study makes a significant contribution to the growing body of research on ICU prognosis in patients with CRC. Its multicenter design, rigorous statistical analyses, and clear identification of key prognostic factors establish a robust foundation for future investigations in this domain.

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## **FOOTNOTES**

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