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The efficacy of intensivist-led closed-system intensive care units in improving outcomes for cancer patients requiring emergent surgical intervention

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With the accelerated aging of the population and advancements in medical devices and therapies, there has been a rise in the number of high-risk patients and complex surgical procedures. This trend has underscored the importance of perioperative management and intensive care for severe postoperative complications, reflecting a growing societal demand for these services. Intensive care for critically ill patients necessitates a specialized approach that differs from that for general patients, involving complex pathophysiological considerations and the use of highly specialized, advanced, and costly equipment and interventions [1]. Therefore, numerous studies have explored how the organizational efficiency and operational frameworks of intensive care units (ICUs) affect clinical outcomes [2-4]. Specifically, analyses comparing open ICUs, where primary physicians manage patient care, to closed ICUs, where dedicated intensivists handle all ICU-related care and decision-making, have indicated that closed ICUs are associated with better clinical outcomes, particularly in units treating critically ill patients with high severity of illness. In the closed ICU model, the intensivist—a physician specialized in critical care—takes on comprehensive responsibility for the treatment planning, execution, and operational management of all ICU-admitted patients. The role of the intensivist is therefore central to the effectiveness of the closed ICU system [5-8].

The care of surgical patients requiring ICU admission, particularly those involved in perioperative and postoperative management, necessitates not only a medical approach to underlying conditions but also a deep understanding of the physiological changes and anatomical complexities introduced by surgery. Among these patients, those undergoing emergency surgery for malignancies account for over 60% of all ICU admissions among cancer patients. These individuals often have poor prognoses due to a combination of nutritional deficits, cachexia, general debilitation, organ dysfunction, and the immunosuppressive effects of cancer treatments, which predispose them to severe infectious complications [9]. Specifically, intra-abdominal complications following surgery can have a mortality rate as high as 20% [10,11]. This highlights the critical importance of specialized medical teams and efficient ICU organizational frameworks in managing the complex pathophysiological changes in these patients.

This study compared clinical outcomes between open and closed ICU systems for critically ill patients undergoing emergency surgery due to acute abdominal complications [12]. It was found that patients in closed ICUs experienced shorter times from diagnosis to ICU admis-

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sion, surgery, and antibiotic administration compared to those in open ICUs. Additionally, the closed ICU model was identified as an independent factor associated with reduced in-hospital mortality for patients requiring emergency surgery. In closed ICUs, intensivists take full responsibility for patient care from the time of ICU admission. This allows for the implementation of systematic and standardized treatment protocols, as well as the timely administration of specialized therapies such as mechanical ventilation and continuous renal replacement therapy. Although the reductions in time achieved in these processes did not independently correlate with lower in-hospital mortality in this study, the structured ICU model aims to improve clinical outcomes by facilitating earlier intensive treatments and timely interventions with antibiotics and other therapies to support organ function.

However, as the authors note, this retrospective study was limited by its reliance on medical records, which restricted the evaluation of patients' initial clinical conditions and precluded analysis of long-term outcomes. Additionally, the simultaneous implementation of both open and closed ICU models, without standardized criteria for assigning patients, introduces the possibility of selection bias. Most studies that compare open and closed ICU models use retrospective designs, inherently limiting the randomization of patient profiles between the two systems. Furthermore, the relatively low Sequential Organ Failure Assessment (SOFA) scores and lactate levels at ICU admission, juxtaposed with high in-hospital mortality rates, suggest limitations in applying these findings to critically ill cancer patients undergoing emergency surgery, who typically exhibit higher severity levels.

Although most ICU model comparison studies to date have concentrated on general ICU populations rather than on surgical oncology patients requiring emergency procedures, the findings of this study are nonetheless valuable. They indicate that a closed ICU system managed by intensivists can enhance outcomes for critically ill cancer patients who require emergency surgery by facilitating timely and specialized interventions. In light of the increasing number of cancer patients needing emergency surgical and ICU care annually, and in light of recent Korean policies that favor the adoption of intensivist-led ICU models to optimize resource use and improve patient outcomes, future research should prioritize prospective comparisons between open and closed ICU systems. These studies should incorporate standardized admission criteria and extend the analysis to longer-term outcomes to draw more definitive conclusions.

CONFLICT OF INTEREST

Eun Young Kim is an editorial board member of the journal but was not involved in the peer reviewer selection, evaluation, or decision process of this article. No other potential conflict of interest relevant to this article was reported.

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