

Transforming rapid response team through artificial intelligence

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The rapid response team (RRT) plays a crucial role in reducing the incidence of cardiopulmonary resuscitation among hospitalized patients in general wards. RRTs contribute to the prevention of cardiopulmonary arrest and help lower overall and unexpected hospital mortality rates. However, to make a tangible impact, RRTs must be effectively and frequently utilized. **Despite clear activation criteria, many clinicians hesitate to call RRTs, delaying or entirely omitting activation even when patients meet the necessary conditions. Such delays or failures to respond in time significantly increase patient morbidity and mortality [1].**

In this issue of *Acute and Critical Care*, Lim et al. [2] examined the perspectives of nurses and residents regarding RRTs in a 1,400-bed tertiary hospital in South Korea. Their findings suggest that while the majority acknowledge the importance of RRTs in preventing patient deterioration, several barriers hinder their optimal use. **One of the main challenges is a lack of awareness and confidence in activation protocols, with only 22% of respondents reporting familiarity with RRT criteria. Additionally, cultural dynamics—such as strong hierarchical structures—caused 85.7% of respondents to seek approval from senior physicians before initiating RRT activation. The reluctance to activate RRTs due to fear of criticism for unnecessary alerts further exacerbates the issue.** The authors emphasize that addressing these barriers through targeted educational initiatives, modifications in institutional culture, and structural enhancements is crucial to improving RRT efficiency and ensuring better patient outcomes.

Artificial intelligence (AI) and machine learning offer promising avenues to address these challenges. These advanced technologies enable more precise early warning systems, surpassing traditional detection methods for patient deterioration. AI-powered systems can eliminate human hesitations and inefficiencies by autonomously recognizing warning signs and triggering RRT activation, leading to improved patient care. Various AI-driven solutions have been designed to facilitate timely RRT activation and reduce delays. One such innovation is the Deep Learning-Based Cardiac Arrest Risk Management System (DeepCARS), which has demonstrated superior accuracy in predicting in-hospital cardiac arrest and unplanned intensive care unit admissions compared to conventional early warning score systems. DeepCARS integrates vast amounts of electronic health record data to provide real-time alerts, enabling proactive clinical interventions and improving patient survival rates [3]. Moreover, a recent study demonstrated the effectiveness of another AI-based deterioration detection model, which significantly reduced the likelihood of care escalation events—

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including RRT activations, intensive care unit transfers, and cardiopulmonary arrests. This provides strong evidence supporting the role of AI-driven innovations in enhancing RRT effectiveness and optimizing patient management [4].

The integration of AI and machine learning into RRT frameworks holds transformative potential for patient care by resolving long-standing barriers to RRT activation. By refining early warning systems, enhancing predictive accuracy, and enabling swift interventions, these technologies can substantially reduce the risks associated with delayed or missed RRT activations. Furthermore, the widespread adoption of AI-powered critical care platforms reflects a global trend toward leveraging digital innovations to promote equitable healthcare access and improve outcomes. Moving forward, continued investment in clinician education, cultural shifts, and technological advancements will be essential to ensuring that RRTs function optimally, safeguarding patient well-being, and elevating the standard of hospital care.

CONFLICT OF INTEREST

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