ICU Squad: A possible solution for critical care service in low-resource areas

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ABSTRACT

Delivering critical care in low-resource settings presents significant challenges, including limited infrastructure, trained personnel, and logistical barriers. Ad hoc multidisciplinary teams, such as ICU Squads, offer a promising solution to these challenges. This communication highlights the role of an ICU Squad in the management of a critically ill patient in a resource-limited environment.

Keywords: ICU squad, critical care, low-resource settings, ad hoc team, patient stabilization.

Introduction

Delivering critical care in low-resource settings presents significant challenges due to limited infrastructure, trained personnel, and logistical barriers.[1] Ad hoc teams (ICU Squad)—temporary multidisciplinary groups formed to address specific emergencies—offer a promising solution to mitigate these challenges. This case highlights challenges encountered by ICU squad as a team approach, which enables the successful stabilization and management of a critically ill patient in a low resource area.

Case presentation

A 65-year-old male with a 12-year history of diabetes mellitus managed on oral hypoglycaemic agents transfers from a field clinic because of an acute surgical abdomen and clinical deterioration. The patient, a senior engineer at an oil corporation, was considered high-profile. The referral letter indicated stabilization in Juba, South Sudan, with a recommendation for urgent evacuation to Kenya for advanced care. On arrival, the patient was confused, irritable, and visibly dehydrated. Vital signs revealed a heart rate of 118 beats per minute, blood pressure of 80/50 mmHg, and a respiratory rate of 32 breaths per minute. Oxygen saturation could not be measured, likely due to circulatory shock. He exhibited deep, laboured breathing, suggestive of metabolic acidosis. The abdomen was distended and tender, with generalized guarding indicative of peritonitis.

Laboratory results showed a white blood cell count of 17,400/mm^3, predominantly neutrophils. Serum urea was 92 mg/dL, creatinine 3.2 mg/dL, sodium 131 mEq/L, potassium 3.2 mEq/L, and blood glucose 482 mg/dL. Urinalysis revealed 3+ ketones. Arterial blood gas, serum acetone, and lactate levels were not available. A working diagnosis was made of an acute surgical abdomen with shock, diabetic ketoacidosis (DKA), acute kidney injury (AKI), and probable sepsis of intra-abdominal origin.

Both the surgeon and intensivist agreed on the urgency for resuscitation, broad-spectrum antibiotics, ICU care, and an immediate laparotomy. However, the hospital's ICU was non-functional due to a lack of trained staff, despite having the necessary equipment.

A significant conflict arose between the medical team, the patient's family and the company administration. They insisted on transferring the patient to Kenya for superior care. The patient was deemed too unstable for commercial flight, and the earliest available air ambulance would take 18 hours to arrive. This delay raised concerns about missing the critical window for intervention, potentially leading to further organ failure and irreversible damage.

Intervention and team assembly (ICU Squad)

Resuscitation and optimization efforts continued. A critical care team (ICU squad) was rapidly assembled, The intensivist, a Sudanese internist trained in the United States, had been practicing critical care in Sudan for the past 15 years. He was well-acquainted with many ICU residents and nurses—both from South Sudan and Sudan—who had previously worked in various intensive care units in Khartoum but had relocated to South Sudan due to the ongoing conflict. With the approval of the hospital administration, the intensivist took the lead in organizing the response. He appointed an ICU resident and a nurse to coordinate the work schedule. The team decided to operate in 12-hour shifts and committed to preparing a three-day schedule in advance. Simultaneously, they began creating a database of individuals with relevant experience who were interested in participating.

Although the team had not worked together before, they were led by the intensivist, who remained with the patient until stabilization and transfer to the operating room. Within three hours of intensive care, the patient's condition improved, and he regained consciousness, enabling him to participate in decision-making. After a thorough explanation of the risks and benefits, the patient and his family opted for surgery and local care using available resources.

Surgical findings and postoperative course

Exploratory laparotomy revealed mesenteric ischemia, and the affected bowel segment was resected with primary anastomosis. Postoperatively, the patient was transferred to the ICU, where he recovered smoothly over the next three days. The team demonstrated strong technical skills but faced logistical challenges in obtaining supplies, medications, and assembling and operating some of the equipment. Team dynamic and hierarchical behaviour of other consultants were a source of conflict. To address these issues, the following interventions were implemented:

1. A general nurse from the hospital was assigned as a logistics facilitator.
2. A biomedical engineer provided quick in-service training and remained on call as needed.
3. The intensivist remained on-site, conducting rounds every 3-6 hours and as needed.
4. All involved consultants agreed to deliver their orders and suggestions through the intensivist.
5. Team was instructed to update the sign out sheet and medication reconciliation sheet at the end of each shift.

Discussion

This patient with severe sepsis and multiorgan failure was at risk of deterioration if source control would have been delayed. The severity of sepsis correlates with the number of failing organs, with mortality increasing substantially as more organs become dysfunctional.[2] The goals of managing this patient were to deliver appropriate organs support and source control. This required a functioning critical care team. There is no formal postgraduate critical or emergency medicine training for both doctors and nurses in South Sudan. This often leads to junior medical staff without formal residency training managing critically ill patients, underscoring the urgent need for targeted training and capacity-building initiatives.[3] For this patient, ICU Squad was assembled from doctors and nurses with previous ICU experience. The ICU Squad as an Ad hoc team is associated with many challenges. One of the problems was to coordinate the supply chains, since all of the staff were temporarily hired. This was overcome by signing one of the local staff as coordinator for medications, consumables, lab work and other hospital related troubleshooting.

One of the most significant challenges faced within the

ICU Squad was the misalignment in goal setting and decision-making between consultants and junior staff. This issue was previously recognized in open critical care models, where hierarchical dynamics often hindered effective collaboration. For instance, Bartlett et al reported that: a junior nurse with specialized expertise in ventilator management might refrain from offering valuable input due to perceived power imbalances or fear of overstepping boundaries.[4] To address this challenge, it was agreed on by all consultants to channel their suggestions and interventions through the intensivist. In addition to that, diverse professional backgrounds and the high-stress nature of critical care can lead to conflicts within the team. A study found, well-managed conflicts and disagreements facilitate critical thinking and generate new ideas.[5] Conversely, unresolved conflicts can reduce information sharing, hinder team relationships, and decrease psychological safety.[6] Psychological safety, which allows team members to express their ideas without fear of embarrassment or punishment, is essential for fostering collaboration and enhancing performance.[6]

ICU Squad was assembled from healthcare providers from different institutions, each with varying leadership styles and decision-making approaches. The absence of a designated leader can lead to power struggles and ambiguity in decision-making, which can negatively impact the team's responsiveness and efficiency. In emergency settings, unclear leadership can result in conflicts over authority and delays in critical decisions, ultimately compromising patient outcomes.[7] In resource-limited settings, the lack of experienced leaders and standardized leadership training further complicates coordination and task delegation.[8] In our ICU Squad, the intensivist provided leadership and facilitated coordination with other consultants. A senior nurse and a resident were appointed as charge officers with clear delegations and boundaries.

Transitions of care — defined as the movement of patients between healthcare settings or providers — represent a particularly vulnerable period in critical care. In the ICU squad model, these transitions often occur under suboptimal conditions, contributing to incomplete information exchange and increased risk of errors. Evidence indicates that 56% of patients are at risk of experiencing at least one medication discrepancy during these transitions, with 11–59% potentially facing harm.[9] To enhance medication safety during care transition, ICU Squad was instructed to cease and update medication reconciliation sheets at the end of each shift. It is well known that medication reconciliation can ensure transfer of accurate and complete medication information at care interfaces.[10]

Communication failures can lead to patient harm, especially in low-resource settings where team members may have limited training and experience. Implementing standardized communication frameworks, such as SBAR and I-PASS, has been shown to reduce miscommunication, improve clarity and enhance team coordination in a critical care setting.[11,12] In this ICU squad, the I-PASS (Patient summary, Action list, Situation awareness, Synthesis) method helped to improve communication and reduce discrepancies.

Conclusion and long-term strategy

In the short term, ad hoc teams can provide temporary solutions for managing critically ill patients. To be a viable intervention, this requires the establishment of a comprehensive database of skilled personnel and reliable channels of communication. These professionals must be oriented to the local context and familiar with the hospital's environment and culture. Continuous professional development programs are essential to maintain and enhance their competencies.

Developing structured, long-term training programs for both nurses and doctors is crucial for sustainable capacity building. The implementation of the WHO Emergency Care Curriculum[13] in medical and nursing schools can significantly strengthen skills in emergency and critical care.

Forward-thinking by stakeholders, including setting clear milestones for the implementation of the WHO's 2023 initiative on Integrated Emergency, Critical, and Operative Care (ECO), represents a vital step toward systemic improvement. This aligns with the broader global movement[14] to strengthen health systems and improve outcomes for critically ill patients.

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