



IMPROVING SAFETY IN THE ICU USING PRINCIPLES FROM HIGH RELIABILITY INDUSTRIES: DR. NAGA SIRIKONDA, AN ELITE INTENSIVIST

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KEYWORDS :

Decision-making in the Intensive Care Units (ICU) is considered as a continuum, with factors depending on the situation which are emergent, critical and merits analysis of multiple features, usually dotted with incomplete information. ICU based hospital stays are like roller coaster rides for patients and their families, with curves going up and down, hoping for better days. The sickest patients are in the intensive care unit (ICU); conditions like strokes, heart attacks, major respiratory problems, sepsis, shock and surgical complications, trauma, severe wounds, accidents and burns. The lead intensivists come in action with fast progression of decisions, which is a key requirement for efficient functioning in the ICU. The aviation industry has made significant contributions in identifying the skills and behaviors that results in effective teamwork. Taking cues from this high performance industry, Dr. Naga Sirikonda has introduced conceptualization of teamwork at a superior level, development of training programs for staff performance in a pressured environment, and designed assessment tools to obtain quantitative markers of the high performance quotients within an intensive care unit (ICU). Team skills are very important for maintaining safety in both domains, as multidisciplinary teams must work effectively under highly complex, stressful, and uncertain conditions. However, there are many differences in the nature of work and structure of teams in the ICU in comparison with those in aviation. Dr. Sirikonda has made important advances in utilizing interventions tailored to the highly specific demands of the ICU. Dr. Naga Sirikonda at Good Samaritan Hospital (SSM Health Care) in Mt. Vernon, Illinois, United States, is the Medical Director of the Intensive Care Unit (ICU), whose active and leading role in the ICU has brought forward his strong ability in decision making in the ICU in the backdrop of an ambiguous environment, which has helped many patients to recover completely after their often-arduous medical journey through the ICU. He is also the Chairman of Medical Staff Quality Control Committee. He is well-known nationally for bringing in unique principles to increase high-efficiency functioning in the ICU. Dr. Sirikonda is a Fellow of the illustrious organization, the American College of Chest Physicians. Earlier, Dr. Sirikonda accomplished his residency training in Internal Medicine and served a Fellowship in Pulmonary and Critical Care Medicine at the prestigious West Virginia University.

Q: Welcome Dr. Sirikonda

NSS: Thank you.

Q: How important is decision making in ICU?

NSS: Decision-making for patients admitted to intensive care units is a challenging situation. There is a lack of clear guidelines to help this difficult decision-making process and depends on clinical experience and judgement. Intensivists need to make accurate and appropriate decisions in situations where the patient's condition is critical. The situation is always fluid, dynamic and unpredictable. Diagnostic decisions can be harmful if not correct where therapeutic strategies are being implemented. However, the situation depends on the experience of the clinician and the in situ situation.

Q: What are the unique viewpoints of an above-and-beyond decision maker in the ICU?

NSS: Decision-making in the critical care unit involves frequent interactions between patients, their families, and multiple strata of

health care providers. The most important decisions may be preventing illness from getting worse, help them with more invasive treatment or even to decide when treatment needs to be stopped so as not to overdo in a guarded situation. Decisions can take time but making the appropriate and timely decision is the key. Sometimes the treatment may not work because the patient is critically ill to survive. In these cases, decision for life support system may be needed and fast communication with the families can enhance the decision. The role of advanced directives also become important. Other challenges that could happen in the ICU are infections from the ventilators, intravenous lines, dialysis lines, catheters. The occurrence of blood clots, strokes or heart attacks is common as well because of critical illness and decision making in management of these situations must be done proactively.

Q: You have incorporated principles of high quality anesthesia administration to elevate the performance in an ICU. Please discuss these aspects.

NSS: In high-risk industries such as aviation, the skills not related directly to technical expertise, but crucial for maintaining safety (e.g. teamwork), have been elaborated as non-technical skills. Recently, research in anesthesia has identified and in fact proposed a taxonomy of the non-technical skills requisite for safety in the operating theatre. Although many of the principles related to performance and safety within anesthesia are relevant to the intensive care unit (ICU), relatively little research has been done to identify the non-technical skills required for safe practice within the ICU. For the first time, I am examining whether the contributory factors identified as underlying the critical incidents are in fact associated with the skill categories (e.g. task management, teamwork, situation awareness and decision making). In fact, the findings indicate that a large proportion of the contributory factors underlying critical incidents could actually be delegated to a non-technical skill category, involving soft factors. This is informative both for future critical incident reporting, and also as an indication that appraisal of these skills may provide a good starting point for the development of a human performance checklist for intensive care. The ICU presents a range of unique challenges to practitioners working within it. It is therefore necessary to conduct further research, using human factors techniques such as root-cause analyses, observation of behavior, attitudinal surveys, studies of cognition, and structured interviews to develop a better understanding of the skills important for safety within the ICU. Other hospitals, both within the US, and globally, are adopting my approaches in their own practice in the ICU.

Q. What are the key issues that you advocate for developing each of these skill sets?

NSS: Mainly, they may be divided into four strategic categories. They are as follows: (i) Task Management: 'Managing resources and organizing tasks to achieve goals...' (ii) Team Work: 'Skills for working in a group context, in any role, to ensure joint task completion and team satisfaction...' (iii) Situation Awareness: 'Developing and maintaining an overall dynamic awareness of the situation based on perceiving the elements in the environment... understanding what they mean and thinking ahead...', leading to the final issue of (iv) Effective Decision Making: 'Making decisions to reach a judgement or diagnosis about a situation, or to select a course of action, based on experience or new information...'

Q. Can these skills be quantified?

NSS: Yes. These competencies can be studied by observation and documentation of real-life environments, mainly using a non-judgmental fashion. Simulation environments may be used to study these aspects. Once these skills are imbibed within the work ethics, it will impact high quality provision of care. It decreases judgment and fixation errors (common while looking on at monitors!), increase vigilance, periodic checking, enhanced communication among all members of the medical team, improved task management. This also helps to set priorities, doing work oneself without being exhausted and delegating everything to nurses, performing all tasks in a timely manner and help identify forgotten requests. Overall, this all leads to a superior work environment in the ICU.

Q: Give some example of situations where challenges in decision making becomes the bottleneck in the ICU environment.

NSS: The first situation is the identification of patients who really needs the ICU care. This is usually done by referring from emergency and other departments. A challenge of the intensivist is to identify the patient's critical condition and allot him a bed in the ICU. Other factors are like severity of illness, patient wishes, DNR (do not resuscitate) status, age and availability of ICU beds. The coordination with critical care nurses, respiratory therapists, and other specialty physicians are most important part of the ICU management.

Q: What are the limitations that can affect decision making in the ICU?

NSS: There are limitations of care in the ICU. Triage of critically ill patients who do not need any further ICU treatment should be discharged or transferred from the ICU. Ideally the ability to predict which patients will not survive can provide for the allocation of expensive and limited ICU resources and put them in ICU admission. Conflicts can occur at times between critical care physicians and family members regarding patient outcomes. Limitation of life-sustaining treatment (LLST) is recommended in certain situations for patients with guarded prognosis. Intensivists have always had attention on the ethical aspects of end-of-life care.

Q: How does effective decision making enhance the performance of the ICU unit?

NSS: Intensive Care Unit demands often exceeds its limit; shortage of ICU beds and staff persists. Decision making and triaging imparts a vital part in ICU admissions. It must be ensured that patients admitted in the ICU must benefit from specialized care. Preferences should be given to patients who are critically ill and have a greater chance of survival. These decisions require unbiased approaches, but clinical finesse combined with experience and cross-consulting with colleagues. Critical care physicians provide ICU triage decisions for admission with the help of input from nurses, emergency medicine professional, hospitalist and other staff. The decision is taken after obtaining polydimensional inputs from the multidisciplinary teams. The importance of admission to an ICU is based on the principle of distributive justice.

Once the decision to admit patient to the ICU has been made, the stay in the emergency department should be minimized. This helps in fast treatment plans for other patients as well. The flow in and out of the Intensive Care Unit should be optimized, early admission must be ensured when needed, adequate treatment must be provided in the ICU, and optimizing criteria for discharge.

Q: What are the stresses of a critical care physician and how do you tackle them?

NSS: The most important characteristic of an intensivist is to stay calm and maintain poise, even in the face of uncertainties. Communication with the patients' family to explain them the situation is a key part of this role. My expertise in pulmonary care enhances the treatment plan of patients from lung disease, this is an added advantage in my clinical diagnosis. Providing care for critically ill patients is stressful where there is always life or death situation. Burnout syndromes are common in an intensivist due to

excessive stress level, but it is my years of expertise in the ICU that I stay positive and consider it a great privilege to serve the critically ill patients.

Q. How does staffing issues impact the functioning of an ICU?

NSS: I actively seek out error traps, eliminate error producing factors and brainstorm issues with both staff and act as a liaison with the executive management of the hospital. I have created an environment that risk management and continuously improving performance is not an oubliette but a cherished culture. I am constantly encouraging my staff. For example, we have a high preference for medicine reconciliation to avoid any errors relating to medicines. As you know, this is a huge arena of preventable errors in the ICU setting. One of my key approaches is to maintain the intensity of staffing, so that workflow and distribution of services is not impeded at any time. I ensure daily rounds for every patient in the ICU by an intensivist so that any emergent condition is immediately identified and followed-up. Adequate staffing has surely helped us to lower the odds for 30-day mortality, also reflected on our records on *Health Safety Grade* data. Efficient staffing is at the root of preventing falls in the ICU. Changing the matrix to teamwork has significantly lead to satisfaction at all fonts, empowered all staff in the ICU and fiscal efficacy.

Q: How does being a pulmonologist help in administering critical care in the ICU?

NSS: Respiratory failure and acute respiratory distress syndrome is common in the ICU. Formal assessment of lung function is most commonly required for patients who are admitted to the ICU. Patients with acute respiratory failure (ARF) require intensive care through mechanical ventilatory support; also respiratory complications like nosocomial infection, pulmonary edema, and pneumothorax are common in the critically ill. The expertise of pulmonary care and securing the airways encompasses in critical care as well. My scholarly publications deal with these overlap issues.

Q: How are your roles important in a broader context of delivering high quality critical care?

NSS: The highly advanced, integrated system of care in modern day health care helps to ensure the safest environment possible in ICU patients, and eICU (electronic ICU) provides this unique tool for efficient care while not being present at the scene. The eICUs exist in centers that usually have healthcare professionals and provide continuous monitoring to audit best practices. Identifying the patient instability and analyzing the deterioration in important in critical care. This remote monitoring can be performed in a 24/7 fashion or just at nights/weekends when less health care staffs are available. The night-time support is very important to cover the limited critical care physicians and nurses. So this is the most innovative work that I perform with my keen sight as a critical care physician. Additionally, this has helped me to offer critical care services at remote locations in India, which would otherwise have been deprived of these medical services. Rural areas with limited access to routine care tends to benefit highly from the utilization and implementation of tele-ICU services.

Fig.1 Dr. Naga Sirikonda