

Surgical intensive care – current and future challenges?

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EDITORIAL

Bjorn Ibsen, an anesthetist who pioneered positive pressure ventilation as a treatment option during the Copenhagen polio epidemic of 1952, set up the first Intensive Care Unit (ICU) in Europe in 1953. He managed polio patients on positive pressure ventilation together with physicians and physiologists in a dedicated ward, where one nurse was assigned to each patient. In that sense Ibsen is more or less the father of intensive care medicine as a specialty and also an advocate of the one-to-one nursing ratio for critically ill patients.

Nowadays, the Surgical Intensive Care Unit (SICU) offers critical care treatment to unstable, severely, or potentially severely ill patients in the perioperative setting, who have life-threatening conditions and require comprehensive care, constant monitoring, and possible emergency interventions. Hence there is one very specific challenge in the surgical setting: the intensivist has to manage the patient flow starting from admission to the hospital through to the operating theater, in the SICU, and postoperatively for the discharge to the ward. In other words, the planning of the resources (most frequently availability of beds) has to be optimized to prevent cancellations of elective surgical procedures but also to facilitate other

emergency admissions. SICU intensivists take the role of arbitrators between surgical demand and patient's interests. This means they supervise the safety, efficacy, and workability of the process with respect to all stakeholders. This notion was reported in 2007 when Stawicki and co-workers performed a small prospective study concluding that it appears safe if the dedicated intensivist takes over the role of the last arbitrator supported by a multidisciplinary team.¹

However, demographic changes in many countries during the last few decades have given rise to populations which are more elderly and sicker than before. This impacts on the healthcare system in general but on the intensivist and the ICU team too. In addition, in a society with an increased life expectancy, the balance between treatable disease, outcome, and utilization of resources must be maintained. This fact gains even more importance as patients and their families claim "high end" treatment.

Such a demand is reflected looking at the developments that have taken place over the last 25 years. Mainly, the focus of intensive care medicine was on technical support or even replacement of failing organ systems such as the lungs, the heart, or the kidneys by veno-venous extracorporeal membrane oxygenation (VV-ECMO), veno-arterial ECMO (VA-ECMO), and continuous veno-venous hemofiltration (CVVH) respectively. This means "technical care" became a core capability and expectation of critical care medicine. In parallel, medical treatment became more standardized. For example, lung protective ventilation strategies, early enteral feeding, and daily sedation vacation are part of modern protocols. As a consequence, ventilator time has been reduced and patients therefore develop delirium less frequently. These measures, beside others, are implemented in

care bundles to improve the quality of care of patients by the whole ICU team.

The importance of specialty trained teams was already pointed out 35 years ago when Li et al.,² demonstrated in a study performed in a community hospital that the mortality was decreased if an ICU was managed 24/7 by an on-site physician. The association of improved outcomes and presence of a critical care trained physician (intensivist) has been shown in several studies since that time.^{3,4,5,6} A modern multidisciplinary critical care team consists at least of an intensivist, ICU nurse, pharmacist, respiratory therapist, physiotherapist, and the primary team physician. Based on clinical needs, the team can be supplemented by oncologists, cardiologists, or other specialties. Again, this approach is supported by research: a recent retrospective cohort study from the California Hospital Assessment and Reporting Taskforce (CHART) on 60,330 patients confirmed the association between improved patient outcome and such a multidisciplinary team.⁷

If such an intensive care team makes a difference, why do not all patients at risk receive advanced ICU-care? It was already demonstrated by Esteban et al., in a prospective study that patients with severe sepsis had a mortality rate of 26% when not admitted to an ICU in comparison to 11% when they were admitted to an ICU.⁸ Meanwhile, we know that early referral is particularly important, because for ischemic diseases the timing appears to make a difference in terms of full recovery.

So, the following questions arise: Should intensive care be rolled out to each ward and physical admission to an ICU or be restricted to special cases only? For this purpose, the so-called "Rapid Response Teams" (RRT) or "Medical Emergency Team" (MET), which essentially are a form of an ICU outreach team, were implemented. The name, composition, or exact role of such team varies

from institution to institution and country to country. Alternatively, should all ward staff be educated to recognize sick patients earlier for a timely transfer to a dedicated area? This would mean that ICU-care would be introduced in the ward.

A first attempt to answer this question, whether to deploy critical care resources to deteriorating patients outside the ICU 24/7, was given by Churpek et al.⁹ The success of the rapid response teams could be related to decreased rates of cardiac arrest outside the ICU setting and in-hospital mortality. Interestingly, an analysis of the registry database of the RRT calls in this study showed that the lowest frequency of calls occurred between 1:00 AM to 6:59 AM time period. In contrast, the mortality was highest around 7 AM and lowest during noon hour. This indicates that not simply the availability of such a team makes a difference but also the alertness of the ward-teams is of high importance to identify deteriorating patients in a timely manner. Essentially, this would necessitate ward staff being trained to provide a higher level of care enabling them to better recognize when patients become sicker to avoid a delayed call to the ICU.

Alternatively, a system in which the intensivist plays a major role in daily ward rounds could be beneficial. So, the ward doctor should become an intensivist. However, the latter means the ICU is rolled out across the whole hospital which would consume a huge amount of resources.

Another option would be 24/7 remote monitoring of patients at risk that notifies the intensivist or RRT in case of need. The infrastructure, technology, and manpower to put this in place also has associated costs.

As the demand for ICU care will rise further in the future, intensivists will play an even more important role in the healthcare system that itself is under enormous economic pressure to ensure the best quality of care for critically ill patients. Besides excellent knowledge and hard skills, intensivists need to be team players, communicators, facilitators, and arbitrators to achieve the best results in collaboration with all involved in patient treatment.

Keywords: critical care, surgical, demographic, changes, SICU, intensivist, challenges, multidisciplinary, development, outcome

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