A closed model on intensive care leads to a superior outcome in critical surgical patients

**PRO:**

The intensive care units (ICUs) must be used in the most efficient way, as they usually are the most expensive part in the hospital. High quality and cost effective performance can best be achieved when responsibility and management are given to those who have the special expertise.

**Who has special expertise?**

The acute, life threatening challenges in critical care are most often complex deteriorations wherein many serious problems converge and amplify each other, such as in severe sepsis, acute renal failure, hemodynamic shock and many others. Competent critical care of such complex deteriorations needs expertise which goes far beyond the knowledge and skills of one general specialty. Physicians with special expertise, educated and certified for critical care medicine (i.e. “intensivists”) are the experts for these problems.

In larger European hospitals, intensive care units (ICUs) are generally run as so-called “closed” units operating as functional entities with a competent on-site team (specialized physicians and nurses) under direct supervision of a full-time intensivist who is directly responsible for the treatment. Competent physicians maintain the service on-site around the clock. Internal management is well organized (“team model”) including implementation of quality improvement and education.

In this context, we are only considering ICUs in larger hospitals. In smaller hospitals the needs and the conditions are different.

**The essentials of critical care**

Critical care medicine is a highly proactive acute medicine. Today, there is good evidence that acute and timely effective reaction is mandatory for optimal outcome. The study of Rivers and co-workers shows impressively that early goal-directed therapy (optimal adjustment of cardiac function and oxygen delivery within the first six hours) is significantly more effective in treating severe sepsis.

Another analysis of organ dysfunction data includes 1036 patients from the placebo arms of two large controlled sepsis trials. Sequential Organ Failure Scores (SOFA) were analyzed daily: Improvement of cardiovascular, respiratory, or renal function within the first 24 hours reduced the 28-day mortality significantly. This shows convincingly that a fast, effective reaction is mandatory for good outcome.

**The advantage of intensivists**

Critical care medicine can be more efficient, when experts especially competent for critical care (i.e. “intensivists”) are involved in the treatment. Only two references shall be mentioned in detail: A consensus report from two task forces of the Society of Critical Care Medicine (SCCM) attempted to define a best practice model for the ICU. Their conclusion was (amongst others):

- Timely and personal intervention reduces mortality and LOS, and decreases cost of care.
- When an intensivist occupies an administrative role in the ICU providing benchmarking, clinical research, and standardization of care, this may further reduce LOS, cost of care and treatment complications.
- Standardized, optimized procedures and protocols can better be fulfilled by a closed team.
- Expert team on-site may be more effective in reducing mortality, length of stay, complications, and even costs (or more effective with higher expenses).
- Special expert consultation (e.g. clinical pharmacologist or bacteriologist) is more effective when cooperating with a team.
- Hygienic measures and other strategies of quality improvement can be better controlled in a closed team.
- A closed team can achieve uniform admission and discharge policies for the ICU.

Furthermore, postoperative complications occurred more frequently. So, at least for high-risk surgical procedures, the participation of ICU expert physicians improves the quality of care and reduces costs.

By a meta-analysis from MEDLINE and EMBASE (1965 – 2001), Pronovost and co-workers looked for the association between the ICU physician staffing and patient outcomes. In 26 relevant observational studies, they found that high-intensity ICU staffing, i.e. mandatory intensivist consultation or closed ICU (all care directed by intensivists), was associated with lower hospital mortality (in 16 from 17 studies, risk adjusted), lower ICU mortality (in 14 from 15 studies, risk adjusted), shorter hospital length of stay (LOS) (in 10 from 13 studies), and ICU LOS (in 14 from 18 studies), as compared to low-intensity ICU staffing (i.e. no intensivist consultation).

**Timely actions by the ICU team**

Unstable critically ill patients may deteriorate very quickly, requiring constant surveillance and continuous titration of therapy. Good critical care is continuously capable of acting. This cannot be realized by regular rounds when physicians see their patients only intermittently. Communication problems may be crucial in such situations. Therefore, critical care must be provided by physicians who thoroughly know the actual problems of their patients, that means by physicians who are present in the ICU, continuously dedicated to critical care and not responsible for any other service in the hospital. Thus, best critical care can only be provided by on-site physicians, within a multidisciplinary critical care team. The best ICU model is the “closed unit”.

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**The multidisciplinary approach**
The closed unit concept is a multidisciplinary approach with specialized physicians (intensivists), specialised nurses, respiratory therapists, and other experts working together in a team under the supervision of full-time directors. This multidisciplinary approach is characterized by:

- Medical and nursing directors with authority and co-responsibility for ICU management
- Medical, respiratory therapy and nursing collaboration in a team approach
- Use of standards protocols and guidelines to assure consistent approach to medical, nursing, and technical issues
- Dedication to coordination and communication for all aspects of ICU management
- Emphasis on practitioner certification, research, education, ethical issues, and patient advocacy.

The team dynamics in a multidisciplinary team is an essential precondition to ascertain the high quality of care, with the necessary reliability, promptness, and adaptation to the various demands. Creating a good team spirit depends very much on the social competence of the directors.

**Multidisciplinary cooperation**

But the concept of team care not only relies on the expertise of the ICU team. It is also necessary to include the admitting or primarily responsible physicians as well as the special expertise of other disciplines. So, the ICU team has the obligation to cooperate closely with the other physicians involved in the individual patient’s care. This cooperation must be based on a well-established mutual trust. Every care provider bears his/her own responsibility, but the providers must also learn from each other. Only then, the critical care service can be optimized providing better outcome at acceptable resource consumption, reduction of potential complications, and a shorter length of stay.

**References**