Performance Improvement in the Management of Sepsis

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KEYWORDS

• Guidelines • Sepsis • Bundles • Severe sepsis
• Performance improvement • Surviving Sepsis Campaign

There is abundant evidence of variation in the practice of medicine.[1] Despite our professed interest in providing best patient care, studies suggest that less than 60% of patients receive appropriate evidence based care.[2] Large variability in clinical practice plus the increasing awareness that certain processes of care are associated with improved medical outcomes has led to the development of clinical practice guidelines in a variety of areas related to infection and sepsis.[3] Initially, guidelines were controversial, but now data exist that support guideline use with some studies showing a statistically significant reduction in costs, length of hospital stay, and mortality.[4–9]

At a time when we are engaged in research to find new effective therapies for perceived areas of need, it is interesting that we are not grabbing the low hanging fruit, which is the effective timely delivery of existing accepted therapies.[10] Unfortunately, it may take 15 to 20 years for a newly proven therapy to become standard of care.[11] This process can be facilitated by transforming guidelines to key performance indicators, building protocols around these indicators and providing performance feedback by way of indicator measurement. This model is readily adaptable to severe sepsis because evidence-based guidelines exist in this area. Furthermore, there is general agreement among health care professionals, hospital management, and biostatisticians that severe sepsis is an area worthy of targeting performance improvement (PI).

GUIDELINE ADVANCEMENT TO CLINICAL PRACTICE

The quality of the data used to develop clinical guidelines has improved over time.[3] More than half of the guidelines published before 2000 were not based on randomized controlled trials.[12] Evidence from positive clinical trials fails to rapidly change clinical practice patterns and the persistent gap between intended and actual clinical behavior is marked.[13,14]

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Implementation of clinical practice guidelines in sepsis is challenging for many institutions for a variety of reasons including lack of administrative support, staff resistance, unfamiliar equipment, and inability to apply sepsis education in the clinical setting. Severe sepsis guideline implementation may be facilitated by delivering small blocks of information, building on initial successes, and using the bundle approach.

The Institute for Health Care Improvement (IHI) has pioneered the creation of valid and feasible process measures of quality of care for critically ill patients, developed standard data collection tools, and allowed institutions to enter data and monitor performance. For organizations new to quality improvement science, the IHI Web site introduces the model for improvement with an extensive Web site based education program.[15] Educational programs are designed to increase awareness and agreement with the recommendations. The use of decision support tools assists in standardizing assessment and interventions in a specific patient population.[3] Change bundles facilitate achievement of indicator performance measures and provide a feedback mechanism to clinicians with the improvement process. They have been demonstrated to be applicable to severe sepsis.[16]

Bundles are selected sets of interventions or processes of care distilled from evidence-based practice guidelines and targeted to be achieved over a fixed period of time. Bundles should act as a cohesive unit to ensure all steps of care are consistently delivered. The Surviving Sepsis Campaign (SSC) and the IHI used key recommendations from the 2004 SSC Guidelines for the Management of Severe Sepsis and Septic Shock to develop sepsis bundles containing a core set of quality indicators.[17,18] The SSC/IHI sepsis bundles are an innovative step in improving outcomes in severe sepsis. It is likely that the greatest opportunity to improve patient outcomes comes not from discovering new treatments but from more effective delivery of existing, best practice therapies.[10]

As new evidence is published, as experience is gained with the bundles, and as experts ponder how up-to-date sepsis guidelines should be best translated into the bundles, sepsis bundles will be optimized.

Bringing Sepsis Bundles into a PI Program

The SSC/IHI PI program includes not only bundles but also software for data collection, storage and analysis, and educational tools. This program facilitates integration of the SSC guidelines into clinical practice with performance measurement and feedback.[19] Bundles, when instituted over the same time frame for a specific diagnosis or process, are likely to improve outcome.[15] The sepsis bundles consist of a set of quality indicators to precisely evaluate a hospital's performance with respect to disease care. This allows hospitals to objectively assess the quality of care being rendered to the patient with severe sepsis at their institution.

The SSC sepsis resuscitation bundle is scored over 6 hours and includes blood cultures, antibiotics, and early goal-directed resuscitation indicators (**Fig. 1**). Three indicators in this bundle apply to all patients with severe sepsis: measure lactate, obtain blood cultures before antibiotics, and timely administration of antibiotics. One combined indicator (fluid challenge and maintaining adequate mean arterial blood pressure) applies only to patients with hypotension or a lactate greater than 4.0 mmol/L. The final two indicators apply only to patients with hypotension persisting after fluid challenge or a lactate greater than >4.0 mmol/L (CVP $\geq$ 8 mmHg and $ScvO_2 \geq 70\%$).