Patient Safety Alert

Sepsis: Early Recognition and Treatment

The AMC|PSO recently performed an in-depth review of the risks associated with sepsis, with a particular focus on this diagnosis in the surgical population. Sepsis is a leading cause of mortality in the US.[1] Hospitalization rates related to sepsis (as either a primary or secondary diagnosis) rose 70% between 2000 and 2008.[1] A recent study revealed that sepsis is either present or develops in as many as 1 in 23 hospital admissions.[1] A 2008 Centers for Disease Control review reports that in-hospital deaths were more than eight times as likely among patients hospitalized for septicemia or sepsis (17%) compared with other diagnoses (2%).[2] A recent study conducted in the UK reported alarming rates of mortality associated with severe sepsis and septic shock with 30% of patients dying in the first month of diagnosis and 50% dying within six months.[3] The incidence of sepsis and associated mortality highlights the need for prompt recognition and treatment.

A review of CRICO's Comparative Benchmark Service reveals 81 surgical cases were asserted between 2007 and 2012 involving sepsis/septic shock. The total incurred costs associated with these cases exceeded 17 million dollars. One of the primary factors alleged in these cases was improper management of the surgical patient. The top three services responsible for surgical sepsis claims are general surgery (30%), orthopedic surgery (22%), and gynecologic surgery (9%). Significant factors identified in these cases include: patient assessment issues (41%) and selection and management of appropriate therapy (35%). Additional factors included poor communication among patients, families, and providers in 38% of these cases.

Not surprisingly, studies have found that an institution's ability to identify and "rescue" patients with postoperative complications is associated with improved outcome.

One recent study notes that "patients who developed surgical infections had the greatest increase in risk of failure to rescue" (7.0% to 19.3%). The authors report that "successful rescue of a patient who develops a postoperative complication relies heavily on hospital systems and teamwork. The sequence of events following the development of a complication can be very different depending on whether established hospital pathways or communication systems exist."[4]

Understanding the Warning Signs:

The first step in early recognition and treatment of sepsis is to recognize which patients are at high risk. Attending surgeons can be vulnerable to underestimating the risk of sepsis in their patients. Attendings need to be constantly evaluating the sepsis risk and communicating that to resident staff. The importance of intraoperative sepsis (like a challenging anastomosis which could leak) may only be seen by the surgeon. The entire care team must be aware.

Early recognition of sepsis is critical to effective treatment and management. Signs of sepsis can be subtle, particularly in young, elderly, chronically ill,

or immunosuppressed patients.[5] Patients with early signs of sepsis may have a normal temperature. The absence of a temperature greater than 99.6 ˚F in the first 24 hours of the sepsis process has been associated with an increased mortality rate.[5] Providers may be misled by this negative finding and overlook this diagnosis. An altered mental status or unexplained respiratory alkalosis may also be the presenting feature of sepsis. Tachypnea is also considered one of the most sensitive but often poorly recorded markers of deterioration. Serial lactate levels are also an important predictor in the outcome of patients with sepsis. Given the high risk potential for patients to quickly deteriorate from a state of Systemic Inflammatory Response Syndrome (SIRS) to severe sepsis to septic shock, all patients with an elevated lactate > 4 mmol/L (36 mg/dl) should receive early goal-directed therapy.[6] "Early protocolized resuscitation should be targeted to physiologic endpoints."[7] Subtle signs can often be missed, resulting in delays in referral to an ICU and poor management of the critically ill patient.[8] Treatment while awaiting diagnostic confirmation is imperative to avoid rapid deterioration.[3]

The spectrum of sepsis response is dependent on a clear understanding of this physiologic process. The American College of Chest Physicians (ACCP) and the Society of Critical Care Medicine (SCCM) have jointly developed consensus definitions.[9]

As mentioned, early recognition and goal directed therapy aimed at hemodynamic optimization is critical to decreasing morbidity and mortality. The ability to mobilize frontline caregivers and resources to implement aggressive therapy cannot be understated. Effective strategies for management of sepsis require prompt identification and treatment of sepsis along with reliable communication and clear accountability of all care providers. The following emphasizes some key strategies to address these issues.

Strategies for Prompt Identification:

Surveillance:

- Surveillance is defined as a process that is both behavioral and cognitive and includes "monitoring, evaluating, and acting upon emerging indicators of a change in a patient's condition."[10]
- Unlike a point in time assessment, surveillance involves an ongoing systematic collection of information about a patient's condition that includes critical analyses and decisions based on indicators and subtle changes in a patient's condition. In the above referenced article, the author notes two critical elements to surveillance: "time and parameter of focus."
    - <u>Time</u>: surveillance must be ongoing, repeated, frequent, and continuous.
    - <u>Focus</u>: Patient data and clinical parameters must be compared to a patient's baseline and previous observations to detect any pattern changes in order to apply and adjust interventions appropriately. Additionally, clinicians must incorporate multiple types and sources of data: diagnostic studies, laboratory data, physical assessments, information from family interactions, and careful review of documentation from all members of the care delivery team.
- Developing institutional protocols, pocket reference tools, and checklists based on internationally accepted guidelines can assist nurses and physicians in identifying signs of severe sepsis early and provide clear direction for prompt intervention and treatment.
- Hospitals should also consider developing automated decision-support algorithms that can be embedded into EMRs to alert clinicians at the point of care of a high suspicion of sepsis. Clinicians must apply critical thinking skills in processing and responding to this information to identify subsequent risks to the patient.

Supportive Environment

- Creating an environment that supports ongoing surveillance is key to identifying at-risk situations, anticipating potential complications, and enabling rapid and appropriate "rescue" of patients to prevent further clinical deterioration. The availability of adequate resources, additional clinical expertise, properly functioning and available equipment, and professional, collegial nurse-physician relationships are all characteristics of a necessary, supportive environment.[10]

Management and Treatment

The Surviving Sepsis Campaign has published international guidelines for the management of severe sepsis and septic shock. The full text of these guidelines can be found at:

www.survivingsepsis.org/SiteCollectionDocuments/2008%20Pocket%20Guides.pdf.

This management includes initial resuscitation (within 6hrs); diagnosis with appropriate cultures and imaging to confirm source of infection, initiation of broad spectrum antibiotics, establishing anatomic site of infection, and implementing control measures (such as abscess drainage or tissue debridement), fluid resuscitation with crystalloids or colloids, use of vasopressors to maintain mean arterial pressure >65mm. The guidelines also detail appropriate indications and use of inotropic agents, steroids, recombinant human activated protein C (rhAPC), blood products, mechanical ventilation, sedation, glucose control, renal replacement, bicarbonate therapy, DVT and stress ulcer prophylaxis, and the importance of discussing advance care planning with patients and families.[9]

Responsibility and Accountability

- Establishing clear roles and responsibilities for each provider involved in the care of the patient is crucial. This is particularly important when management and coverage includes multiple services and multiple disciplines. Clearly defining and communicating who "owns" responsibility for each aspect of the patient care plan is of utmost importance.

Communication

- A 2011 study on surgical resident and attending communication revealed approximately one-third of all critical events are not communicated by residents to attending physicians. The authors report that a random weekend review of patient records noted 20% of patients had not been seen by an attending physician in over 48hrs. Factors contributing to these communication breakdowns included unclear standards and expectations. In response to these findings, the CRICO/Harvard Surgical Chiefs Safety Collaborative, comprised of surgical chairs from the four largest academic institutions, approved a set of three communication standards to minimize the risk of communication breakdowns between residents and attending staff. These include:
  1. Communication to attendings should include daily updates from the hospital team on patient condition and progress and prompt notification of significant changes, including intensive care unit transfer, cardiac arrest, and unplanned blood transfusion.
  2. Attending-patient communication should occur daily or at a frequency that each surgical department explicitly defines.
  3. Attending-attending communication should occur for any coverage sign-out with complete transfer of responsibility whenever the primary surgeon is unavailable.[11]

The surgical teams at the participating institutions were educated on the new communication standards and the standards were adopted. This initiative proved to be a successful strategy in minimizing communication gaps. Results of the post intervention period revealed that the proportion of critical events not conveyed to an attending decreased from 33% to 2% and gaps in the frequency of attending notification of patient status on weekends were virtually eliminated. The proportion of

weekend patients not visited by an attending for greater than 24 hours decreased by half (from 61% to 33%). Even more striking is "that contact to the attending resulted in attending-led changes in patient management in one-third of cases." As part of implementing these standards, trigger cards – lists of conditions for which the attending should be contacted – were created. The card explicitly sets forth expectations for residents and attendings for better communication.[12]

- Extending the use of trigger cards to other members of the care delivery team, particularly nurses, can also improve notification and decrease communication breakdowns at critical points in patient care. Nurses are regarded as critical staff members for their ability to rescue a patient when clinical deterioration is noted. The frequency of *failure to rescue* has been endorsed by the Agency for Healthcare Research and Quality as a patient safety indicator and has been recognized by the National Quality Forum as a core measure for "evaluating the performance of nursing care in acute care hospitals" stressing the critical role of nurses in detection and intervention.[12] Elements of this trigger card can be found on CRICO's website at this link.

Supervision and Coverage

- Use of standard language and protocols for the transfer of critical information to **all** members of the care delivery team during **all** handoffs and sign-out periods; including handoffs within the patient's primary responsible service and all covering services should be emphasized. Team members need to be particularly cognizant of patients being cared for by many different physicians and ensure that information is communicated to all responsible staff.

- Adhering to existing policies for supervision and coverage of resident responsibilities should be emphasized. Developing audit tools similar to the review employed by Arriaga et al. can help serve to reinforce the principles and standards developed.

Education

- Conducting joint multi-disciplinary Mortality and Morbidity rounds that include all specialties involved in the care of patients can assist in proactively identifying system vulnerabilities, cognitive errors and opportunities for improvement as patients receive care across the continuum.

- Safety programs such as team training and simulation should to be supported to educate all members of the care delivery team on the importance of situational awareness and methods for utilizing the chain of command when appropriate.

Efforts for mitigation of risks associated with sepsis should be focused on educating providers about the early warning signs of diagnosis and treatment of sepsis. Creating an environment that supports proper surveillance and enhancing communication to alert responsible staff so that appropriate management and treatment can occur to "rescue" at risk patients from harm.

References:

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