ISSN: 2638-1605

Madridge Journal of Nursing

Commentary Article

Open Access

Clinical Simulation for Sepsis Treatment: A Quality Improvement Innovation

Julie A Lindenberg*

Associate Professor of Clinical Nursing, UT Health in Houston, USA

Article Info

***Corresponding author:**
Julie A Lindenberg
Associate Professor
UT Health in Houston
USA
E-mail: Julie.A.Lindenberg@uth.tmc.edu

Received: March 4, 2017
Accepted: April 20, 2017
Published: April 27, 2017

Citation: Lindenberg JA. Clinical Simulation for Sepsis Treatment: A Quality Improvement Innovation. *Madridge J Nurs.* 2017; 2(1): 32-33. doi: 10.18689/mjn-1000106

Published by Madridge Publishers

In an effort to advance oncology clinical pathways to the next level, a novel partnership was developed between the department of Clinical Effectiveness (CE) and the Clinical Simulation Center at a Comprehensive Cancer Center. The purpose of the project was to use high-fidelity clinical simulation in order to introduce sepsis treatment algorithm updates to a cohort of hematology/oncology nurses. A recent meta-analysis of sepsis estimated its annual global incidence at 31.5 million cases, with 19.4 million cases of severe sepsis, resulting in 5.3 million deaths [6]. Accurate diagnostic criteria and commonly agreed upon definitions have an important role in adult intensive care medicine in order to improve sepsis morbidity and mortality [6].

The identification of patients with possible sepsis is critically important because real-time recognition and evidence-based interventions substantially improves survival [3]. No point of care tests are currently available to accurately predict patients with, or those likely to imminently develop, sepsis; currently, however, nurses at the bedside must rely on clinical judgment, potentially augmented by patient metrics, in order to target sepsis among their patients with infection [3].

Because granulocytopenia is the greatest primary risk factor for the predisposition to sepsis, oncology patients are at particular risk for this development; additionally, the length of time of the low white blood cell count increases the sepsis risk [1]. Additional factors contributing to sepsis in the oncology patient include: malignancy-related immune suppression, cancer treatments (chemotherapy, radiation therapy, and surgery), comorbid conditions, indwelling lines/tubes, long intensive care stays, loss of skin/mucosal integrity, and an aging population [1].

The Clinical Effectiveness Department's mission is to support the implementation of the best and most current evidence through developing, maintaining, and evaluating patient care management tools (practice algorithms, electronic ordering tools, and plans of care). All patient care management tools are developed using current evidence, and they are maintained, implemented and evaluated ensuring the utmost safety and quality. They align with national and regulatory bodies for cancer and clinical management measures as well as with national quality and clinical measures requirements [4].

The vision of the Simulation Center is to be the bridge between knowledge acquisition and application to real life situations while promoting multidisciplinary collaboration, safety awareness and excellence in cancer care. Building on the learner's existing knowledge base allows the learner to relate new information in context with existing knowledge, which forms a broader knowledge base that can be transferred to new situations. Thus, clinical reasoning and problem solving are improved. Constructed knowledge can then be applied effectively in the health care environment [5].

The intended collaboration involves testing the application of selected clinical algorithms in a high-fidelity simulated setting in order to look at clinician decision

making during critical flow pathways. The results of the clinicians' responses determine whether the algorithm decision points are valid in a clinical scenario and should be retained, deleted or adapted. This is known as "simulation for innovation." Thus, the clinician-learner has an integral role in translating the evidence into practice.

Some of the initial algorithms undergoing testing in the simulation environment include *Early Intervention for Sepsis and Sepsis Management* (*Progressing to Septic Shock*).*Early Sepsis* or the new nomenclature, *Systemic Inflammatory Response Syndrome (SIRS)*, is marked by several clinical parameters, including: temperature, heart rate, respiratory rate, PaCO2 levels, and WBC count. These parameters are addressed in the algorithm and demonstrated on a test patient in the simulation environment. Sepsis in an oncology setting is a serious challenge, carrying a 29% mortality rate [2]; therefore, this is an ideal topic for a first effort at launching this collaboration.

The Sepsis Simulation was implemented as a partnership between the simulation center, in-patient nursing, and nursing education with approximately 40 nursing staff members across two units. This was an instructional design, high-fidelity simulation. The goal of this simulation was to optimize the treatment of early onset sepsis in a standardized patient environment. The nursing staff exercised the institutional core value of discovery by openly and actively participating in this simulation event.

The actual simulation was based on the SIRS criteria of measuring/monitoring temperature (>38 or <35 degrees Celcius), heart rate (>90 BPM), respiratory rate (>20), PaCO2 (<32) and WBC (>12 or <4) and noting a change in two or more of these parameters. Additionally, the nurses were expected to identify major signs (including laboratory value changes) for the following major organ systems: neurologic, respiratory, cardiac, hepatic, renal, hematologic and neurologic. They were expected to carry out expected interventions to include: increasing the frequency of their assessments, ensuring IV access, aggressive fluid resuscitation, administering oxygen, culturing all necessary sites, ordering stat labs including blood cultures, escalating the level of the patient's care (ICU admission – 1:1 care), and notifying the advanced practice nurse. Finally, the nurses were expected to know the various personnel, electronic and patient/family resources that are available within the institution [4].

Recognition of inclusion and exclusion criteria for sepsis was a primary intended learning outcome of the simulation exercise. The clinical nursing staff did an exceptional job of recognizing the signs and symptoms associated with early onset sepsis. During the physical assessment of the patient, the nurses noted the decreased breath sounds in the left lower lobe and associated productive cough, erythema around the central line insertion site, multiple decubiti and mucositis. These physical findings were directly related to possible sites of infection. Each group recognized, commented and intervened in regards to the abnormal vital signs, often recommending the on call physician be notified. The clinical nursing staff did an excellent job of notifying the on-call physician and recommending the patient be escalated to a higher level of care when the initial interventions did not improve the patient's condition.

A secondary learning outcome was for the nurses to request and perform early interventions, utilizing the Early Sepsis Intervention order set. This was the most frequent opportunity for improvement during the deliberate practice simulation. Locating the Sepsis Early Intervention order set, having the order set displayed while providing report in SBAR format to the physician or mid-level provider, and utilizing this tool to make informed suggestions regarding the interventions for the patient seemed to be an area the nursing staff were less familiar with yet very receptive to when guided by the simulation instructors.

Each nurse received credit in the simulation center's data base for their participation in this event. Each nurse will also be sent a survey to obtain feedback on the simulation in order to improve the practice in the future. The idea of being able to bring the simulation to the units has been proposed; it is difficult for nurses to leave the units for required classes and simulations. Moving forward, the plans for simulation in the Hematology Services are as follow:

- Lymphoma/Myeloma – Phase 2 simulation leading to Code Blue
- Lymphoma/Myeloma – Falls simulation
- Stem Cell - Sepsis simulation
- Leukemia – The nurse educators of the service will be contacted for their simulation needs

The intended primary outcome of this simulated training is improved in-hospital sepsis-associated mortality. A secondary outcome is a shortened sepsis-related ICU length of stay.

Conflicts of Interest: The author reports no conflict of interest.

References

1. Itano J, Taoka K.Core Curriculum for Oncology Nursing (4th Edition). 2005 Elsevier Saunders; St Louis Missouri.
2. Kuderer N, Dale DC, Crawford J, Cosler LE, Lyman GH. Mortality, morbidity, and cost associated with febrile neutropenia in adult cancer patients. *Cancer* .2006; 106*(10)*:2258-2266. doi: 10.1002/cncr.21847
3. Lamontagne F, David A Harrison, Kathryn M, Rowan. qSOFA for identifying patients with infection (editorial). *J. American Medi Association.* 2017; 317(3), 267-268. doi: 10.1001/jama.2016.19684
4. M.D. Anderson Cancer Center. Clinical Effectiveness Department .2016
5. M.D. Anderson Cancer Center. Simulation Center homepage. 2016
6. Raith E. Prognostic accuracy of the SOFA score, SIRS criteria, and qSOFA score for in-hospital mortality among adults with suspected infection admitted to the intensive care unit. *J American Medical Ass.* 2017; 317(3):290-300. doi: 10.1001/jama.2016.20328