A Survey of Sepsis Treatment Protocols in West Virginia Critical Access Hospitals

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Funding: This project was internally funded by the School of Pharmacy.
Disclosures: The authors have no financial conflicts of interest related to this project.
Acknowledgements: Hannah Hutchinson, Pharm.D., and Ashley Rife, Pharm.D. Candidate 2017 contributed significantly to the data collection process.
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Abstract

Purpose
Severe sepsis and septic shock, if treated appropriately, have high rates of survival. However, just as in MI and stroke, sepsis survival rates decrease hourly. Protocols are tools which help clinicians expedite both diagnosis and treatment of these time critical conditions. The primary purpose of this research was to assess West Virginia’s 20 critical access hospitals to determine the presence and location of protocols used when a patient presents with signs of sepsis and to compare this with the presence of protocols used when a patient presents with chest pain.

Methods
Each of West Virginia’s 20 critical access hospitals’ infection control officers was contacted either by phone or in person and asked to complete a 15 question survey designed to assess whether their hospital had protocolized care for patients who present with chest pain and/or signs of infection.

Findings
All of West Virginia’s 20 critical access hospitals responded to the survey and reported having protocols addressing diagnosis and treatment of cardiac emergencies for both ED and already admitted patients. Eight of 20 hospitals (40%) reported use of sepsis protocols for patients presenting to the ED. Six of the 20 hospitals (30%) also used sepsis protocols for already admitted patients.

Conclusion
Within the critical access hospital community, clinicians are comfortable with protocols for early detection and treatment of heart attack. Use of sepsis protocols was lower although respondents indicated that they were interested in learning more about their institutional ability to protocolize the diagnosis and treatment of sepsis, severe sepsis and septic shock.

Background/Introduction
Patients in rural areas may be at a higher risk for sepsis for a variety of reasons; higher proportion of elderly, longer transit times to hospital, more likely to live in poverty, less likely to have access to preventative care. In West Virginia, between 1999 and 2005, there were 7,611 deaths attributed to sepsis. More recent data shows that in 2009 there were an estimated 2.7 million cases of sepsis diagnosed in the United States with an 8.5% mortality rate. In a 2014 study of two large health systems, sepsis was found to contribute to 1 in every 2 to 3 deaths. Most of those patients had sepsis on admission. Interestingly, patients with initially less severe sepsis made up the majority of the sepsis deaths.
Sepsis, just like heart attack, stroke and trauma, is highly time sensitive, with one study showing that for patients with septic shock, every hour delay in administering antibiotics results in a nearly 8% increase in mortality.¹

Fourteen years ago, a quality initiative at a single hospital showed that timely, protocolized (goal directed) care can make a significant impact on the survivability of sepsis.⁵ In the years following, mortality for patients admitted to ICU’s with severe sepsis and septic shock has been reduced by one percentage point per year on average.⁶ This suggests that the techniques used in ‘usual care’ have improved over the years as evidenced by more recent studies. ProCESS in 2014, ProMISE in 2015⁸, ARISE in 2014⁶, show that there is very little mortality difference between ‘usual care’ and protocolized treatment of sepsis, especially when sepsis is detected early and treatment is initiated promptly.

The majority of research focusing on the treatment of sepsis has been focused on large, tertiary institutions. In this body of work, prompt detection of sepsis is assumed. The DHHS defines critical access hospitals as having on-site or on-call staff with specific response times, however DHHS does not define the response time. Therefore, in rural critical access hospitals, prompt detection of sepsis should not be taken for granted. Standing orders or other IF-THEN forms of reflexive patient care are often used to minimize potential delays.

The Surviving Sepsis Campaign published its first set of guidelines related to detection of sepsis in 2002, and since 2005 has focused on helping hospital staff implement those guidelines even as they are continuously updated. Highlighted recommendations from the campaign include using “bundles” to simplify the complexity of sepsis care. The Surviving Sepsis Campaign defines a bundle as “a selected set of elements of care that, when implemented as a group, have an effect on outcomes beyond implementing the individual elements alone.”⁹ Examples of these elements include obtaining a lactate level and a blood culture and administering a broad spectrum antibiotic.

Sepsis, severe sepsis and septic shock are similar to heart attack and stroke in that they are all time critical conditions. Protocolized care of the treatment of heart attack is the gold standard. When EMT’s show up at the ED with a patient who is experiencing chest pain, the critical access team has a protocol in place to facilitate prompt diagnosis and treatment. This protocolized care has been found to speed diagnosis and decrease the variability of treatment.

Our research is designed to answer the following questions: Do critical accesses hospitals of WV have protocolised care for chest pain? Are there similar protocols in place for patients who present with sepsis, severe sepsis or septic shock? Are patients who rely on critical access hospitals receiving the best care possible, including a focus on early detection and treatment of sepsis?

**Methods**

A standard survey was administered to all of the critical access hospitals of WV (Table 1). Identification of the hospitals and contact information was provided by the West Virginia Rural
Health Association. Surveys were administered to the identified infection control officer or risk manager by phone or in person.

Table 1: Questions within the survey

Demographic Questions
- Does your hospital have a dedicated Infection Control Officer?
- What other duties, if any, does your infection control officer carry out?
- How many beds does your hospital have?
- What is your average daily census?
- How many patients does your hospital have with signs of infection or infectious disease per month?
- How many of those admitted to the ED, and how many are directly admitted?

Sepsis Questions
- Is sepsis tracked at your hospital?
- Is sepsis an area of special concern in your hospital? For example, have you had any special training with the SSC (Surviving Sepsis Campaign), CAMC, WVU, or other hospital or institution?

Protocol Questions
- Are there (standing orders / order sets / protocols) used at your hospital for patients who present with chest pain?
  - If yes, are these used for in-patient as well as ED?
- Are there (standing orders / order sets / protocols) used at your hospital for patients who develop signs of sepsis during their hospital stay?
- Do you have standing orders / order sets / or protocols for patients who present with signs of sepsis in the ED or as direct admit?
  - If no, how enthusiastic would your providers be in instituting an order set / protocol for patients presenting with signs of sepsis? (not enthusiastic / neutral / enthusiastic)

“A grant has been made available through the West Virginia Rural Health Association and the University of Charleston Pharmacy Fellows to conduct some follow-up research to assess the effectiveness of critical access hospitals in diagnosing and treating sepsis. This would be done via a retrospective chart review tailored to the individual institution. The data collected would be processed by HIPAA certified student researchers and only released to the participating institution.”

- If your institution was selected to receive this grant, how interested would you be in receiving this service? (not interested / neutral / interested)

Results from individual surveys were entered into a spreadsheet by the principal investigator (JD). The University of Charleston IRB approved this project in March of 2014.
Study Definitions
Department of Health and Human Services defines a Critical Access Hospital (From [www.cms.gov](http://www.cms.gov))

- Be located in a rural area or be treated as rural under a special provision that allows qualified hospital providers in urban areas to be treated as rural.
- Furnish 24-hour emergency care services 7 days a week, using either on-site or on-call staff, with specific on-site response timeframes for on-call staff.

In this research, protocolized Care was defined as having in place standing orders, order sets, or protocols for patients who meet a predefined set of criteria as defined by the institution surveyed.

Data Analysis

Results
Survey administration was from April 2nd 2014 to September 15th 2015. Each of the 20 respondents (100%) reported having protocols in place addressing the diagnosis and treatment of patients with chest pain, both in the emergency department and for patients already admitted.

Only 8 of the 20 respondents (40%) reported having protocols in place for patients who present to the emergency department with signs of infection or infectious disease. Six of the 20 respondents (30%) reported having sepsis protocols in place for already admitted patients. Five respondents (25%) had sepsis protocols in place throughout the institution, both in the emergency department and for currently admitted patients (Figure 1).
Forty-five percent of the critical access hospitals reported already having sepsis protocols in place (either in the ED, for already admitted patients, or both). Of the critical access hospitals who were lacking a sepsis protocol forty percent report interest in implementing one (Figure 2).
Discussion

The complexity of decision making and the time sensitive nature of myocardial infarction, cerebrovascular accident, or sepsis make for a dangerous intersection in any setting. For rural hospitals there may be the added complication of delays in medical evaluation and assessment if laboratory tests or initial presumptive treatments must wait for the arrival of the already thinly spread cadre of physicians and nurse practitioners. While the medical literature is sparse concerning sepsis mortality rates in critical access hospitals, a 2013 report comparing critical access hospitals with non-critical access hospitals has shown progressively worsening mortality statistics for patients in the critical access system. The authors concluded that “new efforts may be needed to help [critical access hospitals] improve”.10

Per our results, all of the critical access hospitals in West Virginia have in place a protocol for patients who present with chest pain. This allows these rural hospitals to reduce the dangerous nature of this intersection with regards to possible myocardial infarction. These protocols reduce variability and allow the care team to begin treatment without waiting for the physician to micromanage the scene.

In the 55% of West Virginia critical access hospitals that lack a sepsis protocol, evaluation and treatment of patients presenting with signs of sepsis may be highly variable and/or delayed. A sepsis protocol could allow the care team to initiate sepsis specific diagnostic testing such as

Figure 2. Enthusiasm for Adopting a Sepsis Protocol
blood cultures and lactate. It could also allow for the administration of appropriate care such as fluid resuscitation and broad spectrum antibiotics while awaiting the arrival of the medical practitioner.

In 2001, Rivers, et al. found that early goal-directed care, with its protocolized approach to the treatment of sepsis reduced mortality from 46.5% to 30.5%. The more recent sepsis studies such as ProMISE, ProCESS and ARISE, were all performed in tertiary care medical centers and did not show a significant survival benefit from the use of protocolized care compared to ‘usual care’. In the 13 years between Rivers, et al. and ARISE, ‘usual care’ has likely changed as evidenced by the continual, progressive decreases in sepsis mortality among patients in tertiary care centers. Implicit in this literature is the assumption that the patient is being evaluated and treated by a medical practitioner at the initial moment they present to the healthcare system. In the critical access setting, prompt evaluation and treatment cannot be assumed. Because of this, we feel the afore mentioned findings are not generalizable to the rural setting. It is unclear whether these reductions in mortality are a function of the immediacy of the treatment, or the protocolized nature of the care. However, instituting protocolized care in the critical access setting allows addresses both relevant factors.

The presence of and adherence to a diagnostic and/or treatment protocol or set of standing orders has been shown repeatedly to decrease variability and is routinely instituted to make better use of the practitioner's time. By using protocols, it may be possible for patients in rural hospitals to receive the same diagnostic evaluation and presumptive treatments that would be expected in a tertiary care center. For the patient with chest pain, it is very unlikely that any US hospital would delay performing a cardiac enzyme assay while awaiting a physician’s order. Similarly with the presence of a sepsis management protocol, it will become unlikely that obtaining a blood culture or lactate level would be delayed. There is currently no published data comparing sepsis mortality between critical access hospitals with or without protocolized care. However, we do have data showing that delays in care increase mortality. We would like to see the critical access hospital community in West Virginia adopt sepsis detection and treatment protocols customized to fit the critical access model of care. We believe that these protocols will facilitate prompt diagnosis and treatment, decrease variability of care, and ultimately result in improved patient outcomes.

These findings are limited by the following: the surveys were completed over 18 months. In the setting of rapidly evolving care, this is a potential limitation in that the information collected from the institutions may have changed by the completion date. The presumption that the infection control office would know whether the hospital has/had a chest pain protocol may have caused a problem in data collection. For the one hospital that initially reported no chest pain protocol, a follow-up telephone call to the head nurse in the ED confirmed that the hospital in question does indeed have such a protocol. Because our research determined that the infection control officers surveyed had on average two additional job responsibilities, it may not be unreasonable to expect that these medical professionals know about the presence of cardiac protocols. Examples of these additional responsibilities include, employee education, risk management and cardiac rehab. Additional limitations of the study are that the survey instrument does not
assess the motivations behind the adoption of sepsis protocols nor does it identify barriers to their implementation. Additionally this study did not explore the specific details of the protocols already in place.

This research shows widespread acceptance of treatment protocols for chest/pain and the emerging acceptance of such protocols for the detection and treatment of sepsis. Forty-five percent of the critical access hospitals reported already having sepsis protocols in place (either in the ED, for already admitted patients, or both). Of the critical access hospitals who were lacking a sepsis protocol, forty percent report enthusiasm for implementing one. Areas for future research exploring this issue could include the following: a comparison of existing protocols with the Surviving Sepsis Campaign guidelines, measuring differences in outcomes between critical access hospitals with or without protocols, and determining whether outcomes improve once protocols are put in place.

Works Cited


