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Sepsis

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Sepsis in the Adult Population

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Introduction to Sepsis

- Dysregulation of the inflammatory response caused by stimulation from an infectious process (Taeb, Hooper & Marik, 2017).
- Often leads to organ dysfunction and increased morbidity, mortality and financial burdens (Taeb, Hooper & Marik, 2017).
- Mortality rates for severe sepsis range from twenty-five to thirty-five percent (LaGauer, 2013).
- Most common sites of infection include skin and soft tissues, respiratory, gastrointestinal and genitourinary (LaGauer, 2013).
- Common symptoms include cool, clammy, diaphoretic skin, fever, malaise, tachycardia, tachypnea, abnormal blood counts and coagulopathies, altered mental status, localized tenderness or visible wounds (LaGauer, 2013).
- Work up includes a complete blood count with differential, basic metabolic panel, lactate and liver enzyme levels, coagulation studies, blood cultures and a urinalysis (LaGauer, 2013).

Pathophysiology

Vaughan & Parry (2016), explain that with sepsis, the body responds to an infection by increasing metabolic rates. There is an abnormal distribution of body fluid which causes an exaggerated inflammatory response leading to vasodilation, capillary leakage and a state of distributive shock.

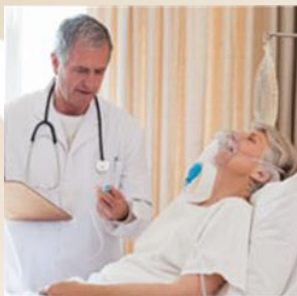
During the exaggerated inflammatory state, phagocytic cells become activated when triggered by the invasion of a microorganism. Innate immunity causes macrophages to bind to microbes which undergo phagocytosis. Proinflammatory cytokines are then released. When the body is unable to maintain a steady balance of inflammation, a more systemic response occurs. The body attempts to further compensate by initiating an anti-inflammatory response, which results in immunosuppression. This process further progresses to the activation of leukocytes, which in turn produce another proinflammatory response. Once inflammation becomes less localized, hypoperfusion and hypoxia occur due to vasodilation, capillary leakage, diffuse endothelial injury and microvascular thrombosis, resulting in organ dysfunction (Taeb, et. al, 2017)

Recognizing Sepsis

According to Miller, (2014), a patient with a temperature greater than 100.4° F (38.0° C) or less than 96.8° F (36° C), a heart rate greater than ninety beats per minute, a respiratory rate greater than twenty breaths per minute and a white blood cell count higher than 12,000 are signs that indicate possible sepsis. If a patient meets two of the above criteria, a work-up and treatment should be initiated promptly as time is critical to achieve a better outcome.

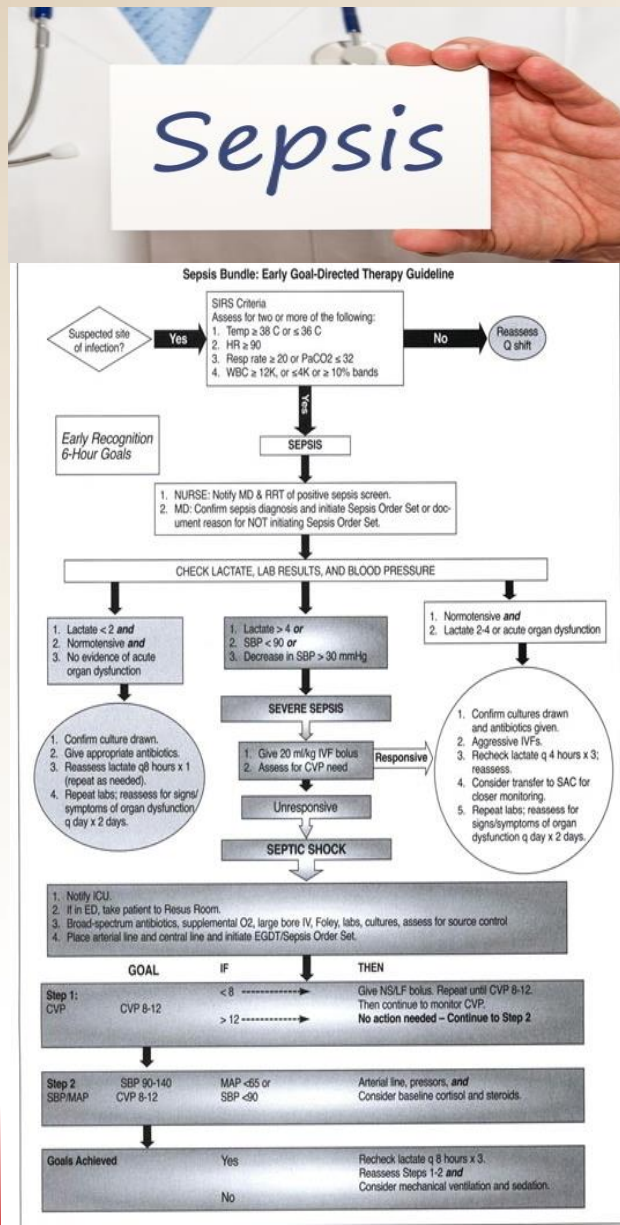
Sepsis is more likely to occur in the elderly population because of the increase in comorbidities and chronic disease. (Bermejo-Martin, Andaluz-Ojeda, Almansa, Gandía, Gómez-Herreras, Gomez-Sanchez, 2016)

"In older patients, platelets are hyper responsive and upon activation may more readily aggregate with or bind to platelets, leukocytes, and endothelial cells. This binding results in amplified inflammatory and thrombotic responses in sepsis, potentially contributing to an excess risk of organ failure, disability, and death" (Rondina, et. al, 2015, pp 226).



Significance of Pathophysiology and Treatment

- Several studies have been done and continue to be conducted that aim to better understand the inflammatory and immune responses
- A lactate level greater than two is cause for closer monitoring and prompt treatment. (Singer, Taylor, LeBlanc, Williams, & Thode 2014)
- WBC count, absolute neutrophil count, percentage of neutrophils, and increases in bands and immature neutrophils are used to predict bacterial infection. A newer study is looking at mean neutrophil volume as another, possibly more accurate, indicator, according to Purohit, Kumar, Sharma, Kapil, Gupta, & Mukhopadhyay, (2015).
- Goal is returning the body to its normal state of homeostasis.
- Understanding the inflammatory and immunological responses which stem from the invasion of a pathogen and triggers an exaggerated reaction is key.
- Treatment includes eliminating the microorganism, maintaining organ perfusion, oxygenation and hydrating the body, which are done to reverse the pathological process.



Nursing Implications

Nurses play an extremely important role in understanding the pathophysiology and the importance of the physical assessment, as they are often the first person to assess the patient and physicians rely heavily upon the findings to guide the plan of care. In addition to having the proper knowledge base, being an advocate is equally important, as this can affect the promptness of care delivery. The Surviving Sepsis Campaign (Rhodes, et. AL, 2017), guidelines recommend care in two bundles. The first to be initiated in the first three hours and the second to be initiated in the first six hours.

To be achieved within 3 hours of identification of sepsis;

- Lactate measurement
- Blood culture sampling before antibiotic administration
- Antibiotic administration
- Fluid resuscitation 30 ml/kg of crystalloid if hypotensive or lactate ≥ 4 mmol/liter

To be achieved within 6 hours;

- If hypotensive despite adequate fluid resuscitation commence vasopressors (target mean arterial pressure: ≥ 65 mmHg)
- If arterial hypotension despite adequate fluid resuscitation or original lactate ≥ 4 mmol/litre: Central venous pressure (CVP) measurement (target ≥ 8 mmHg) Central venous oxygen saturation (Scvo2) measurement (target Scvo2 ≥ 70%)
- If original lactate ≥ 4 mmol/litre re-measure lactate

Other important considerations for nurses caring for a patient who suffers from sepsis are understanding the long-term effects, educating and supporting the patients and families and helping them cope. It is likely that further care beyond hospitalization may be indicated, whether it be in home or in a skilled nursing facility. These patients are more likely to develop functional limitations both physically and cognitively and have shown to have a lower quality of life when compared to other critically hospitalized patients. (Bateson & Patton, 2015).

After personally living with a family member who almost died from septic shock and seeing how much it effects patients and their families lives, I chose this topic to hopefully help others recognize and better care for sepsis patients.

Conclusion

Sepsis is a common, life-threatening, debilitating response to infection that effects many patients, especially the elderly, every year. Current practices are failing patients in many cases and the push for improvements has become a focus as the pathophysiology of the disease and how to manage and preserve organ function are being closely investigated and trial treatment bundles and diagnostic guidelines are being reevaluated and improved upon.

Outcomes have shown improvements in the past couple of years with the implementation of newer guidelines that provide more timely initiation of treatment. More hospitals are taking responsibility for better care, but many more need to follow suit. Nurses can positively impact outcomes by understanding what to look for to identify sepsis and knowing how the patient should be treated. Advocating for prompt intervention and ensuring timely reporting of abnormalities, as well as facilitating patient education and long-term support during the recovery process is also an extremely important component.

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