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The Importance of Evaluation and Management of Sepsis, Severe Sepsis, and Septic Shock

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Introduction

Sepsis is a life-threatening complication that response to the presence of infection that is affecting millions of individuals around the world each year (Dellinger et al., 2013, p. 518). According to Gray et al. (2013), severe sepsis is an emerging public health threat that is likely to continue becoming worse (p. 583). Dellinger et al. (2013) believe “that the speed and appropriateness of administration of the initial therapy is likely to increase, and the mortality rate is likely to decrease” (p. 583). Additionally, Dellinger et al. (2014) were consistent with Dellinger’s findings and explained how early recognition and appropriate management will significantly reduce the extent of mortality related to severe sepsis and septic shock (p. 1572). Thus, it is essential that healthcare professionals, especially those in an intensive care unit (ICU), or emergency department nurses, become knowledgeable about this condition in order to stop it from progressing to septic shock and eventually death.

Signs & Symptoms

In 1991, “sepsis” was used to define the presence of infection along with two of the systemic inflammatory response syndrome (SIRS) criteria. These indicators include:

- Fever or Hypothermia
- Tachycardia
- Tachypnea
- Leukocytosis

According to Dellinger et al. (2013) “severe sepsis” is defined as sepsis in addition to two or more organ dysfunction or tissue hypoperfusion (p. 583).

Some examples of organ dysfunction include:
- Impaired liver function
- Arterial hypotension
- Capillary refill
- Skin mottling
- Increased lactate
- Coagulation abnormalities
- Hypoxia
- Paralytic failure
- Arterial Hypoxia

If the patients disease progresses to sepsis with persistent signs of sepsis-induced hypotension despite adequate fluid resuscitation they will be considered under a state of “septic shock” (Cawcutt & Peters, 2014, p. 1573)

These indicators include:

- Elevation in procalcitonin
- Elevation in C-reactive protein
- Hypoglycemia without diabetes diagnosis
- Altered mental status

According to Dellinger et al. (2013) “severe septic shock” is defined as sepsis in addition to hypotension despite adequate fluid resuscitation that is unresponsive to the administration of vasopressors, inotropic agents, and corticosteroids, as well as signs of multisystem organ failure resulting in death (Cawcutt & Peters, 2014, p. 1573).

Underlying Pathophysiology

The pathophysiology of sepsis is extremely multifaceted, however the systemic response must be triggered by an infection, which then activates pro-inflammatory and anti-inflammatory processes (Cawcutt & Peters, 2014, p. 1573).

There are three mechanisms associated with systemic inflammatory response:

1. The first mechanism is the pro-inflammatory process which releases mediators in response to an infectious agent, such as tumor necrosis factor alpha and interleukin 1, causing inflammation and the resulting SIRS symptoms (Sagy et al., 2013, p. 262). The main objective of the pro-inflammatory response is to eradicate the infectious pathogen whereas in the anti-inflammatory process the host is prompted to stimulate tissue repair and healing (Cawcutt & Peters, 2014, p. 1573). Additionally, the anti-inflammatory response works as a negative feedback mechanism to down-regulate the production of pro-inflammatory mediators and modulate their effects, thereby neutralizing homoeostasis and preventing SIRS (Sagy et al., 2013, p. 262).

2. The second mechanism related to the pathogenesis of sepsis is failure of this compensatory anti-inflammatory response (CARS) act (Sagy et al., p. 263). This compensatory and anti-inflammatory process imbalances causative masses of uncontrolled inflammatory mediators to be released which can result in severe organ damage. While the pro-inflammatory imbalances cause depression of the immune system and consequently increased vulnerability to secondary infections (Cawcutt & Peters, 2014, p. 1573).

3. The third and last mechanism is immunoparalysis, which is when the mediators of inflammation overrule the immune system, paralyzing it, resulting in a state of immune deficiency (Sagy et al., p. 261). This pernicious release of mediators causes symptoms consistent with Vicech’s trial resulting in changes in coagulopathy, endothelial cell injury, and abnormal blood flow (Remick, 2007, p. 1436). An individual could have too much pro-inflammatory response which is the dysregulation of pro-inflammatory and anti-inflammatory mediators due to acute infections.

These are some statistics and interesting facts regarding sepsis:

**Significance of Pathophysiology**

Understanding the pathophysiology of sepsis will help healthcare care professionals (HCP) become better at detecting patients who are developing sepsis in order to treat them quickly and appropriately. Additionally, learning the pathophysiological progression of SIRS, to sepsis, to septic shock, then to intractable septic shock can help HCP’s predict the next stage of possible disease and help properly treat the patient. Lastly, learning the consequences of an individual who is septic along with initial administration of the appropriate therapy have been proven to prevent and reduce mortality and morbidity rates (Sagy et al., 2013, p. 262). With the appropriate knowledge base about the cause of infection and pathophysiology of sepsis, a HCP will be able to develop the skills to recognize symptoms earlier, initiate treatment sooner, and improve the longevity of their patients.

Implications for Nursing Care

As mentioned earlier, understanding the pathophysiology of sepsis can even save the life of an individual. The earliest detection of sepsis for HCP’s, including nurses. As a profession, nurses are at the bedside with their patients more than the physician or the nurse’s practitioner, so it would not be uncommon for the nurse to be the first individual to recognize a patient who is displaying SIRS or sepsis criteria. Therefore, the nurse should be able to recognize and respond to early signs of sepsis as well as the need for resuscitation and antimicrobial therapy. Utilizing this knowledge early will ensure that the nurse is able to develop the necessary skills so these septic patients are treated quickly and can avoid multisystem organ failure.

Conclusion

Severe sepsis and septic shock are leading causes of morbidity and mortality and its responsibility is on HCP’s to recognize and treat sepsis in an appropriate and timely manner to improve the outcome of the patient’s condition (Cawcutt & Peters, 2014, p. 1573). Although an appropriate inflammatory response to invading pathogens would avoid damage to tissues and organs it is the opposite when dealing with sepsis (Remick, 2007, p. 1436). The imbalance between pro-inflammatory and anti-inflammatory responses to invading pathogens and microorganisms triggers a vast amount of devastating symptoms which can lead to inevitable multisystem organ failure and eventually death. Therefore, it is crucial for HCP’s to recognize the duty of every HCP to have a general understanding of the clinical features, and treatment of sepsis, to provide the best possible outcome for their patient (Cawcutt & Peters, 2014, p. 1577-1578).

References


Additional Sources


