Prompt and aggressive management of sepsis gives patients the best chance of survival

Poor knowledge can result in a missed or delayed diagnosis of septic shock or severe sepsis, as well as inappropriate or delayed patient management.

INTRODUCTION
The management of patients has become more complex in general as they are becoming older, sicker and more dependent. This places an increased pressure on healthcare staff (Smith, 2003). Evidence suggests that nurses’ knowledge about the signs of acute illness and their response to these signs are poor (Robson et al, 2007). Gaps in knowledge can result in a missed or delayed diagnosis of septic shock or severe sepsis and lead to inappropriate or delayed management; prompt treatment is crucial to survival.

There is evidence that up to 50% of patients admitted to intensive care units received suboptimal care before referral because of a failure to identify signs of deterioration and lack of skills in responding to acute deterioration (National Patient Safety Agency, 2007).

Doctors also appear to have poor knowledge. Poeze et al (2004) interviewed 1,058 doctors and found that only 17% agreed on a definition of sepsis, but 83% agreed it was frequently missed.

Lack of clarity about the definition of sepsis may contribute to delays in diagnosis and early treatment and increase the risk of patient deterioration and mortality (Ziglam et al, 2006).

It is estimated that patients with sepsis take up 45% of intensive care bed days and 33% of hospital bed days in the UK (Padkin et al, 2003). Forty per cent of intensive care budgets are spent managing sepsis and the average cost of treating a patient admitted to hospital is £10,000 (Dellinger et al, 2004).

Nurses have a key role in identifying patients with sepsis or septic shock and providing appropriate treatment. As such, they need to be knowledgeable about sepsis and nursing guidelines that provide a format for systematic assessment and management.

LEARNING OUTCOMES
- Understand and differentiate between sepsis, severe sepsis and septic shock.
- Identify the initial treatment required in managing septic patients.

SURVIVING SEPSIS CAMPAIGN
Worldwide, sepsis kills more people than lung cancer, and more people than bowel and breast cancer combined. Its incidence is rising at a rate of 1.5% per year (Daniels, 2009). Concern about these figures led to the launch of Surviving Sepsis in 2004 – an international campaign to improve survival. Although now officially concluded, the campaign demonstrated that it was possible to change clinical practice and improve patient outcomes using evidence based guidelines.

The campaign’s main aims were to improve the management, diagnosis and treatment of sepsis. These aims were met by:
- Increasing awareness, understanding and knowledge;
- Changing perceptions and behaviour;
- Influencing public policy;
- Defining standards of care (Dellinger et al, 2004).

The campaign concluded that the greatest improvement to patient outcomes had been made through education and changing the process of care for patients with sepsis.

DEFINING SEPSIS
Sepsis typically starts with systemic inflammatory response syndrome (SIRS). This is the cascade of inflammatory events that are part of the body’s response to an insult in an attempt to maintain homeostasis (Lever and Mackenzie, 2007).

SIRS is defined by the presence of two or more of the following symptoms:
- Temperature >38°C or <36°C;
- Heart rate >90 beats per minute;
- Respiratory rate >20 breaths per minute;
- White blood count >12,000 or <4,000 per ml (Levy et al, 2003).

Sepsis is defined as a known or suspected infection accompanied by evidence of two or more of the SIRS criteria (Robson and Daniels, 2008). It is a continuum from a
simple uncomplicated infection to severe sepsis (Fig 1). Changes in patients’ condition can be subtle and early indicators of sepsis can be missed. Careful and frequent assessment is the key to spotting deterioration. Respiratory rate is considered to be one of the most sensitive indicators of critical illness, yet it is a vital sign that is often neglected (Stevenson, 2004).

**Severe sepsis**

Severe sepsis is the presence of sepsis with organ dysfunction, hypotension or poor perfusion (Peel, 2008). All organs, including the cardiovascular system, lungs, liver, kidneys and brain, can be affected.

Signs include:

- **Hypotension**: a systolic blood pressure of <90mmHg or a mean arterial pressure of <60mmHg. Changes in blood pressure may be a late indicator of deterioration as the body has compensatory mechanisms to maintain it. Fluid resuscitation must be given with the aim of improving blood pressure and cardiac output (Dellinger et al, 2004);
- **Altered mental state**: the AVPU system (A – alert; V – responsive to voice; P – responsive to pain; U – unresponsive) or the Glasgow Coma Scale (GCS) can be used to assess patients’ neurological status rapidly. Consciousness levels may be decreased due to hypoxaemia, hypoglycaemia or cerebral hypoperfusion due to shock or medications such as sedatives or analgesics;
- **Hyperglycaemia in the absence of diabetes**: this results from the metabolic and hormonal changes that are part of the stress response (Ruffell, 2004). It occurs in critically ill patients and insulin treatment may be required to maintain normoglycaemia;
- **Hypoxaemia**: oxygen saturations <93% or PaO2 <9kPa on an arterial blood gas analysis. Pulse oximetry must only be used as a guide as the saturation recording may not be a true reflection of gaseous activity. British Thoracic Society (2008) guidelines recommend that arterial blood gases should be checked in all critically ill patients;
- **Acute oliguria**: urine output of <0.5ml/kg/hr. Poor urine output is an early sign that a patient’s condition may be deteriorating. Urine output is a sensitive measure of blood flow to the kidneys and other organs. It is essential that patients have an adequate circulating blood volume; the presence of hypotension, tachycardia and cool peripheries may indicate that extra fluid is required (Smith, 2003);
- **Coagulopathy**: International normalised ratio (INR) >1.5 or platelets <100. The combination of hypotension, slow blood flow, hypoxaemia and metabolic acidosis will interfere with normal clotting mechanisms. Microthrombi form in small vessels, interfering with blood flow to the tissues and the organs, which, combined with hypotension and hypovolaemia, can cause organ failure (Robson and Newell, 2005);
- **Raised serum lactate**: >2mmol/L. Raised lactate is a sign of severe sepsis and indicates that tissues are not receiving enough oxygen and have to rely on anaerobic metabolism, producing lactic acid.

**SEPTIC SHOCK**

Sepsis is defined as severe sepsis with hypotension that does not respond to intravenous fluid resuscitation of 500-2,000ml given rapidly (Dellinger et al, 2004). Hypotension is not always a reliable indicator of shock, as some patients may maintain a systolic blood pressure above 90mmHg, so further signs and symptoms need to be considered before a diagnosis of septic shock can be made. These include:

- A positive fluid balance;
- An unexplained metabolic acidosis;
- Decreased capillary refill time; >2 seconds (Lever and Mackenzie, 2007). This indicates poor perfusion.

**EARLY IDENTIFICATION OF SIGNS AND SYMPTOMS**

Early identification and treatment within the “golden hour” is the key to reducing mortality (Dellinger et al, 2004). The first six hours after diagnosis present a small window of opportunity in which to reverse tissue hypoxia and prevent established organ failure.

The Surviving Sepsis campaign produced a six hour resuscitation bundle (Dellinger et al, 2004); aspects of patient care that can be carried out at ward level are known as the “sepsis six” (Box 1).

**NURSES’ ROLE**

By increasing their own knowledge and awareness of sepsis, nurses are in an ideal position to ensure patients are reviewed, thereby preventing deterioration into severe sepsis or septic shock. For every hour’s delay in beginning treatment, a patient’s risk of death increases by 7.6% (Kumar et al, 2006). The process of increasing awareness of sepsis needs a proactive, multidisciplinary approach. Educational programmes have the potential to increase awareness as well as identify advocates, such as link nurses, to champion sepsis awareness.

The critical care outreach team has a pivotal role in supporting nurses to identify and manage sepsis, and in facilitating escalation of care (Carter, 2007).
By developing and using a sepsis screening tool (Fig 2), nurses can use patient observations to identify whether patients have sepsis, severe sepsis or septic shock. Using the “sepsis six” (Box 1) will empower nurses to take action and ensure patients are promptly reviewed and management is initiated.

**CONCLUSION**

Introducing the concepts of sepsis pathophysiology and treatment using an evidence based approach increases awareness of sepsis, leading to reductions in mortality, length of stay and cost. It creates a sense of responsibility so that the problem is addressed through early identification and treatment.

Increasing nurses’ knowledge and awareness of sepsis will help to improve recognition and prompt aggressive management, ensuring that patients are given the best possible chance of survival.

**REFERENCES**


