

Sepsis Part 1: Possible causes and high-risk groups

Demonstrated by Claire Walker, Lecturer, University of Liverpool

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Sepsis is defined as the body's reaction to infection that results in a dysregulated, life-threatening immune response causing organs to fail (UK Sepsis Trust, 2016). Sepsis can be triggered by any infection but is most commonly the result of bacterial infections of the lungs, abdominal organs, soft tissues, skin or urinary tract (UK Sepsis Trust, 2017). Sepsis is a time-critical condition: if detected and treated early, clinical outcome is good, but if left unchecked the patient can quickly develop septic shock, which causes multi-organ failure (UK Sepsis Trust, 2017). Septic shock is a subset of sepsis with circulatory, cellular and metabolic dysfunction, and is associated with a high risk of mortality (Surviving Sepsis Campaign, 2017).

Sepsis accounts for 7–9 million deaths annually worldwide (Global Sepsis Alliance, 2019). World Sepsis Day, held on 13 September every year, aims to increase global awareness of this poorly understood condition. In May 2017, the World Health Assembly and the World Health Organization made sepsis a global health priority and adopted a resolution to prevent, diagnose, manage and improve sepsis outcome (Global Sepsis Alliance, 2017).

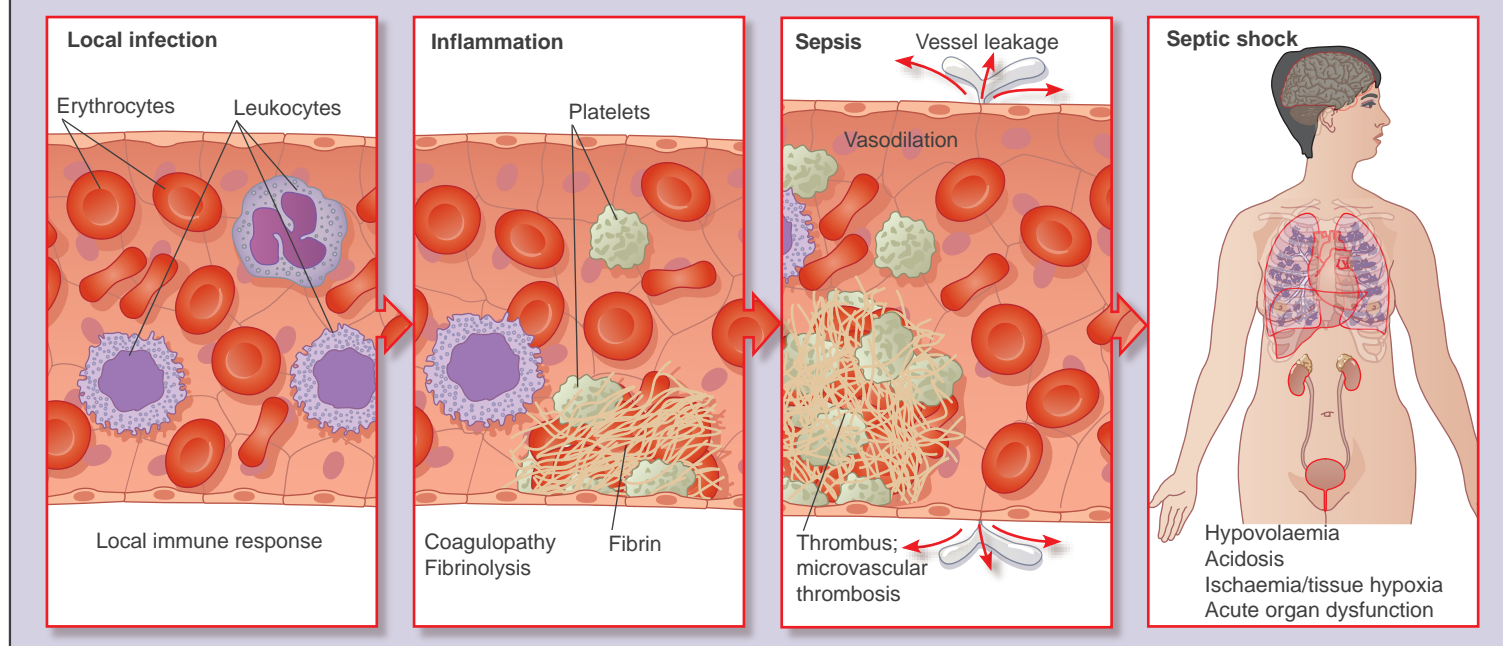
In the UK, 52,000 deaths are attributable to sepsis each year—more than lung, bowel and breast cancer combined—with a cost of £2 billion to the NHS (Nutbeam & Daniels, 2019). An estimated 65,000 patients each year survive sepsis but can be left with long-term complications, such as cognitive dysfunction, amputation and irreversible damage to the lungs, kidneys and heart, as well as post-traumatic stress disorder, often linked to their prolonged stay in intensive care units (NCEPOD, 2015).

Political and healthcare organisations have increased focus on better care and outcomes for patients with sepsis. Sepsis is a clinical priority in the UK (NHS England, 2015). It is now linked to the Commissioning for Quality and Innovation (CQUINs) payments framework, which focuses on preventing avoidable cases of sepsis, increasing awareness of sepsis among both public and professionals, improving standards, reporting mechanisms and the identification and treatment of sepsis, and highlighting appropriate and timely antibiotic use and antimicrobial stewardship. In the UK, many NHS trusts have implemented local and regional initiatives to improve outcomes for patients including the use of sepsis pathways.

The National Confidential Enquiry into Patient Outcome and Death (NCEPOD, 2015) recommends introducing a clinical lead for sepsis who will champion best practice, take responsibility for the clinical governance of management of sepsis and liaise with staff responsible for antimicrobial stewardship in their hospital. The National Institute for Health and Care Excellence (NICE, 2017) has published guidelines and recommendations on the recognition, diagnosis and early management of sepsis. Reports from the Parliamentary and Health Service Ombudsman (2013), the NCEPOD (2015) and Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries Across the UK (MBRRACE-UK, 2014) highlight failings in identifying sepsis and promote best practice in the assessment and timely initiation of treatment for sepsis.

This procedure explains the pathophysiology of sepsis, its possible causes and vulnerable patient groups.

Pathology of sepsis



The pathogenesis of sepsis is complex and remains poorly understood (Annane *et al.*, 2005). During sepsis, pathogens interact with the products released by the immune system as a response to infection (Rello & Restrepo, 2008). The goal of the immune system is to achieve homeostasis and destroy the pathogens, but if a local immune response is unable to do this, a systemic (whole body) inflammatory response occurs (McCormick, 2009), with the immune system releasing large amounts of leukocytes (white blood cells) and chemicals such as chemokines, cytokines and coagulation factors (Ward & Levy, 2017). This abnormal and dysregulated immune response causes complex changes in the body's inflammatory and coagulopathy function and leads to vasodilation, vessel leakage and an increase in metabolic function. The resultant increase in oxygen demand to the organs, coupled with intravascular loss of fluid into the interstitial space due to vasodilation and vessel leakage, causes tissue hypoperfusion, acidosis and ischaemia at the cellular level (McClelland & Moxon, 2014).

Do not undertake or attempt any procedure unless you are, or have supervision from, a properly trained, experienced and competent person. Always first explain the procedure to the patient and obtain their consent, in line with the policies of your employer or educational institution.

