



Infection, infection resistance ,wound infection (part 2)

INFECTION:

Is inflammatory response due to the presence or invading the tissue by microorganism.

BACTERIMIA:

Is the presence of viable bacteria in the blood.

SEPSIS:

Is the systemic response to infection, that manifested by one or more of the following.

- a) fever $> 38^{\circ}\text{C}$
- b) tachycardia $> 90 \text{ b/min}$
- c) respiratory rate $> 20 / \text{min}$
- d) WBC > 12000 or $< 4000 \text{ mm}^3$

SEVER SEPSIS:

Is sepsis associated with organ dysfunction or hypofunction

SEPTIC SHOCK:

Sever sepsis associated with signs of shock

The major & minor surgical site infection (SSI):

A major is defined as a wound that either discharges significant amount of pus spontaneously or needs a secondary procedure to drain it .The patient may have systemic signs such as tachycardia ,fever & raised WBC {systemic inflammatory response syndrome(SIRS)}.

Minor wound infections may discharge pus or infected serous fluid but should not be associated with excessive discomfort, systemic signs or delay return home



Table 4.1 Southampton wound grading system

Grade	Appearance
0	Normal healing
I	Normal healing with mild bruising or erythema
Ia	Some bruising
Ib	Considerable bruising
Ic	Mild erythema
II	Erythema plus other signs of inflammation
Ila	At one point
Ilb	Around sutures
Ilc	Along wound
IId	Around wound
III	Clear or haemoserous discharge
IIIa	At one point only (≤ 2 cm)
IIIb	Along wound (> 2 cm)
IIIc	Large volume
IIId	Prolonged (> 3 days)
Major complication	
IV	Pus
IVa	At one point only (≤ 2 cm)
IVb	Along wound (> 2 cm)
V	Deep or severe wound infection with or without tiss breakdown; haematoma requiring aspiration

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Figure 4.1 Major wound infection and delayed healing presenting as a faecal fistula in a patient with Crohn's disease.

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Figure 4.5 Minor wound infection that settled spontaneously without antibiotics.

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Abscess

An abscess (suppuration) is one of the major sequelae of acute wound infection; it represents all the clinical features of acute inflammation:

- Pain
- redness
- warm (heat)
- swelling
- loss of function

The pyogenic organisms ,predominantly *staphylococcus aureus* which can cause tissue necrosis & suppuration us is composed of dead & dying WBC that release damaging cytokines.

An abscess is surrounded by an acute inflammatory response & a pyogenic membrane, if it is not drained or resorbed completely, a chronic abscess may result. If it is partly sterilized with antibiotics, an antibioma may form.

If it spread, it usually tracks along plans of least resistance & points towards the skin. Wounds abscesses may discharge spontaneously by tracking to a surface, but may it need drainage through an incision .Most abscesses relating to surgical wounds take 7-10 days to form after surgery.

Abscess cavities need cleaning out after incision & drainage & are encouraged to heal by secondary intention

So treatment of abscesses including:

- a) Open or closed drainage.
- b) Antibiotics according to culture & sensitivity
- c) General systemic support.

Cellulitis :

Is the non-suppurative invasive infection of tissue.

There is poor localization, in addition to the cardinal signs of inflammation .Tissue destruction, gangrene & ulceration may follow.

Systemic signs are common, chills fever & rigors due to release of organisms, exotoxins& cytokines into the circulation.



Systemic inflammatory response & multiple organ dysfunction syndrome (MODS).

Sepsis is defined as the systemic manifestations of (SIRS) , with a documented infection , the signs & symptoms of which may also be caused by multiple trauma ,burns or pancreatitis without infection.

Serious infections may lead to SIRS through release of endotoxins from the walls of dying Gram-negative bacteria (*E.coli*) .

Septic manifestations & multiple organ dysfunction syndromes (MODS) are caused by the release of cytokines from the phagocytic cells. In its most severe form, MODS may progress into multiple systemic organ failure, in this state, the body's resistance to infection is reduced & death rate will be around 50%.