

Week 1: Inflammation

Definition:

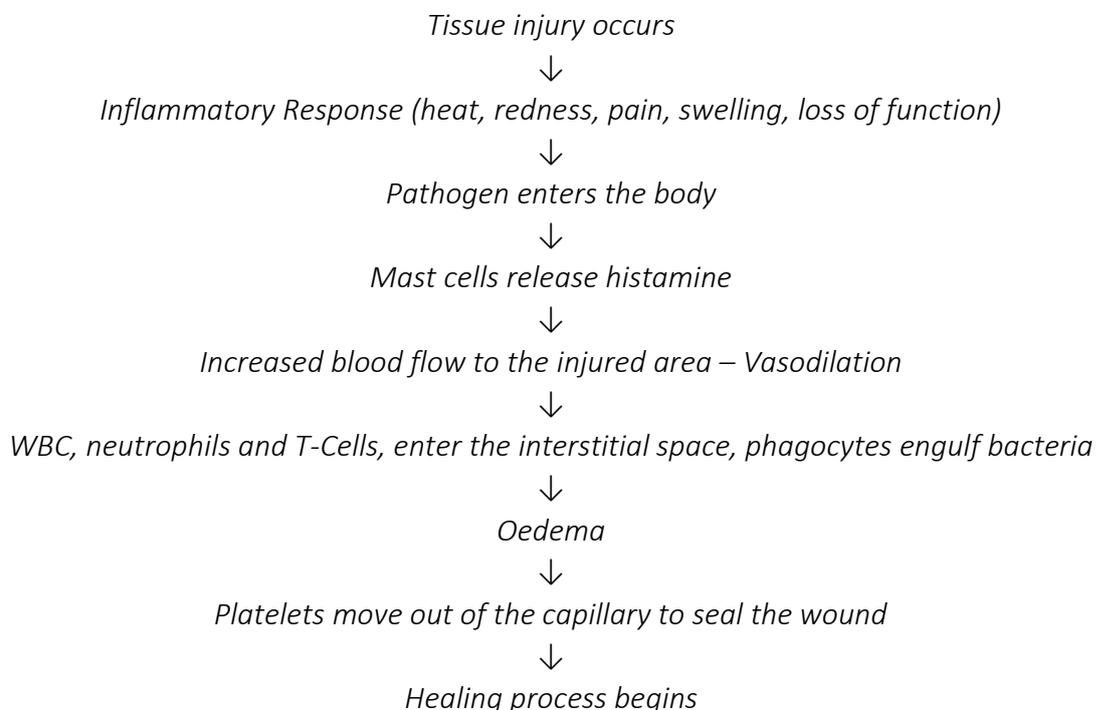
Inflammation is an adaptive response to injury that brings fluid, dissolved substances and blood cells into the interstitial tissues where the invasion or damage has occurred, resulting in pain, redness, swelling, heat and loss of function.

Pathophysiology of the Inflammation Response:

The inflammatory response has 3 stages: (1) a vascular response characterised by vasodilation and increased permeability of the blood vessels; (2) a cellular response and phagocytosis; (3) healing and tissue repair.

Phagocytosis is a process by which a foreign agent or target cell is engulfed, destroyed and digested. Neutrophils, macrophages and dendritic cells (phagocytes) are the primary cells involved in phagocytosis. Once attracted to the inflammatory site, phagocytes select and engulf foreign material (i.e. bacteria).

The neutrophils, followed by other types of phagocytes, are attracted to the damaged site by chemotactic substances released by bacteria and tissue breakdown products. They ingest and destroy the invading bacteria, and then the healing process begins.



Inflammation is the 1st phase of the healing process. During the inflammatory process, bacteria, damaged cells and inflammatory exudate are removed by phagocytosis. This process is called *debridement*, prepares the wound for healing. Adequate nutrition is essential for inflammation and

healing to proceed. The 2nd phase is called *reconstruction*. The 3rd phase and ideal outcome of the healing process is called *resolution*, the restoration of the original structure and function of the damaged tissue.

Pathophysiology of Tissue Inflammation:

The tissue damage that evokes an inflammatory response may be caused by specific or non-specific agents. These agents may be exogenous (external from the body) or endogenous (within the body). Causes of inflammation include:

- Mechanical injuries (i.e. cuts or surgical incisions)
- Physical damage such as burns
- Chemical injury from toxins and poisons
- Microorganisms such as bacteria, viruses or fungi
- Extremes of heat or cold
- Immunological responses, such as hypersensitivity reactions
- Ischaemic damage or trauma, such as a stroke or myocardial infarction

Acute Inflammation:

Acute inflammation is a short term reaction of the body to all types of tissue damage. It is immediate and aimed at protecting the body and preventing further invasion or injury.

Chronic Inflammation:

Chronic inflammation is slower in onset and may not have an acute phase. It involves cell proliferation and is debilitating with long-term adverse effects and pain. There is an increase in cellular exudate, necrosis, fibrosis and sometimes tissue scarring, resulting in severe tissue damage.

Anti-Inflammatory Drugs:

1. NSAIDs
 - a. Aspirin (Salicylates)
 - Inhibit prostaglandins, partially converted to salicylic acid.
 - High dose (600-900mg) 4 to 5 times a day, is required to reach anti-inflammatory effects.
2. Corticosteroid
 - Binding to glucocorticoid receptors, suppression of inflammation and immune responses
 - Good for asthma
 - Better administer directly at inflammation site

Cellulitis:

Cellulitis is an infection of the skin and subcutaneous tissues caused by bacteria, usually staph and group A streptococcus. Smoking, diabetes or poor circulation will increase the risk of development.

Nursing Care Plans: Problems and Interventions:

Problem	Interventions	Rationale	Evaluation
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Pain – result of Inflammation	<ul style="list-style-type: none"> - Pain Assessment (PQRST) - Pharmacological: analgesia and anti-inflammatory drugs. - Non-Pharmacological: rest, ice, compression, elevation, nutrition, fluids 	<ul style="list-style-type: none"> - Assess the needs for intervention - To relieve the pain caused by inflammation and reduce inflammation - To reduce the symptoms of the inflammatory process. 	<ul style="list-style-type: none"> - Pain score is less than 3. - Patient is comfortable.
Problem	Interventions	Rationale	Evaluation
Impaired Skin Integrity resulting from inflammation.	<ul style="list-style-type: none"> - Skin and nutrition assessment - Inflamed site care: regular wound cleaning, dressing - Wound assessment - Pressure Injury assessment 	<ul style="list-style-type: none"> - To assess the patient's nutritional status and skin integrity - To prevent infection & promote healing - To document the wound daily, so any changes can be noted - To prevent further damage to the patient's skin integrity. 	<ul style="list-style-type: none"> - The patient will not develop an open lesion - The patient will not develop an infection - The wound will be dry and promote healing
Problem	Interventions	Rationale	Evaluation
Risk of Infection resulting from inflammation	<ul style="list-style-type: none"> - Monitor for signs of infection (i.e. redness, swelling, pain, fever – monitor temp) - Use aseptic technique when providing wound care - Provide patient education and hygiene (i.e. handwashing, trim nails, nutrition, wound care, signs of infection) - Adequate nutrition and hydration 	<ul style="list-style-type: none"> - A temp of 38.3°C or above usually indicates infection. - To prevent further contamination & to prevent the spread of infection to others - To inform the patient of the S&S and what to look for upon discharge - Promotes blood flow and nutrient supply to the inflamed tissue, promoting healing 	<ul style="list-style-type: none"> - The patient will not develop an infection - The patient will not become dehydration or lethargic - The patient's temp will be less than 38.3°C

Diabetes Impairs the Healing Process:

1. Blood Glucose Levels:

- An elevated blood glucose level stiffens the arteries and causes narrowing of the blood vessels.

2. Poor Circulation:

- Narrowed blood vessels ↓ blood flow and oxygen to a wound. An elevated blood glucose level ↓ the function of RBCs that carry nutrients to the tissue. Insufficient nutrients and oxygen prolong wound healing.

3. Immune System Deficiency:

- A high blood glucose level causes the WBCs to function ineffectively and ↑ the risk of infection.