WEEK 1- ACUTE INFLAMMATION

Define the following term

Inflammation: inflammation is the non-specific, second line of defence response to cell injury. The level of response will depend on the level of cell damage that has occurred. The purpose is to inhibit further cell destruction, clean-up site of injury and enable healing process

Describe the pathophysiology of the inflammation and identify where it may occur in the body

Pathophysiology of inflammation:

Vasodilation: leads to greater blood flow to the area of inflammation which results in redness and heat. The redness is RBC travelling to the area, and the heat is from the blood cells carrying heat from the bodies core to the peripheries

Vascular permeability: endothelial cells leak from either direct endothelial cell injury or by chemical mediators. The release of histamines causes tissues to leak causing phagocytes and clotting factors into the wound. There is a balance of fluid leaving the vascular space and tissue re-entering the system, inflammation disrupts this and causes an imbalance in interstitial fluid, which causes swelling

Exudation: fluid, proteins, RBC and WBC leave the intravascular space as a result of increased osmotic pressure extravascularly and increased hydrostatic pressure intravascularly

Vascular stasis: slowing of the blood in the bloodstream with vasodilation and fluid exudation to allow chemical mediators and inflammatory cells to collect and respond to the stimulus

Vascular vs. cellular response in inflammation:

VASCULAR RESPONSE	CELLULAR RESPONSE
• Tissue damage causes brief vasoconstriction, rapidly followed by vasodilation (redness and warmth) • Inflammatory mediators (histamine, prostaglandins) released in innate response and by the damaged tissue. Dilate local blood vessels and increased permeability of capillaries • Protein rich fluid (exudate) accumulates in interstitial spaces, causing swelling and pain • Oedema slows blood flow with clotting, helps to localise and prevent microorganisms spreading	• Less than 1 hour after injury phagocytic blood cells are brought into damaged tissue • Loss of serous fluid from capillaries increases blood viscosity in the area, slowing blood flow • Leukocytes move into vessel periphery, adhere to capillary of endothelium, endothelial cells separate, allowing leukocytes to migrate through vessel walls into tissue spaces • Chemotactic signals draw the leukocytes to the site of injury

Steps in the inflammatory response:

1. Damaged tissue releases histamines, leading to increased blood flow to the area
2. Histamines cause capillaries to leak, releasing phagocytes and clotting factors into the wound
3. Phagocytes engulf bacteria, dead cells and cellular debris
4. Platelets move out of the capillary to seal the wounded area

Acute inflammation vs. chronic inflammation:
Acute inflammation: the bodies initial response to harmful stimuli, happens because of the increased movement of plasma and leukocytes from the blood into the injured tissues. The aim of this is to limit the extent of tissue damage
Chronic inflammation: or prolonged inflammation. This causes a shift in the type of cells present and is characterised by simultaneous destruction and healing of the tissue

Chemical mediators of inflammation:

FACTOR	SOURCE	EFFECT
Histamine	Mast cells, basophils and platelets	Vasodilation, increased vascular permeability, tissue redness, warmth, oedema
Bradykinin	Plasma proteins	Histamine like effects, chemotaxis, pain inducer
Prostaglandins	Produced by nucleated cells	Histamine like effects, chemotaxis, pain, fever
Leukotrienes	Formed from arachidonic acid	Smooth muscle constriction (bronchoconstriction), increased vascular permeability, chemotaxis

Where inflammation occurs in the body: Any organ or body part can suffer from inflammation, it is then named by the body part followed by the suffix 'itis' e.g. tonsillitis, appendicitis, arthritis, dermatitis

Types of inflammation in the body:

- *Appendicitis*: inflammation of the vermiform appendix. Obstruction of the lumen causes pressure to increase, blood flow to decrease, inflammation, oedema, ulceration and infection.
- *Bursitis*: inflammation of a small sac of fluid (bursa) near a joint that are there to act as a cushion between tendons and bones. Inflammation is caused by repetitive movement or injury
- *Cellulitis*: inflammation of soft tissue under the skin. It is an infection that spreads and breaks down the fibrin network and barriers that normally contain an infection. The area is red, swollen, painful and sometimes vesicles might form
- *Dermatitis*: inflammation of the skin characterised by erythema, pain and/or pruritis. Caused by response to allergens, infections or chemicals
- *Endocarditis*: inflammation of the endocardium and can involve any of the endothelial lining of the heart, the valves are also affected. Caused by pathogens entering the bloodstream.
- *Gastritis*: inflammation of the stomach lining, resulting from irritation of the gastric mucosa. The disruption in the gastric mucosal barrier allows HCl to come into contact with gastric tissue which results in the irritation and inflammation
- *Hepatitis*: inflammation of the liver usually caused by a virus or alcohol/drugs. The inflammatory process damages hepatic cells and disrupts normal function. The inflammatory process can impair the flow of bile and cause jaundice in the person. Metabolism of drugs, alcohol, toxins and bile elimination are all disrupted by inflammation
- *Nephritis*: inflammation of the nephrons in the kidney. The inflammation can lead to kidneys having a reduced ability to filter blood

- *Otitis*: inflammation of the inner, middle or outer ear, often with an infection. The infection causes inflammation and fluid build-up which creates pressure on the eardrum
- *Pharyngitis*: inflammation of the throat that causes pain and a scratchiness feeling. Typically caused by viral infection and symptoms resolve within a week, sometimes longer
- *Thrombophlebitis*: inflammation of a vein where a blood clot has formed on the wall of the vein, causing inflammation of the vein wall and some degree of obstructed blood flow

Discuss the role of the nurse in patient management related to inflammation

The role of the nurse:

The nurse will focus on relieving pain, supporting tissue healing and preventing infection

- Assess pain using numerical scale
- Administer analgesic and anti-inflammatory agents as charted by the doctor
- Provide non-pharmacological relief through use of heat and cold packs, comfort measures
- Assess tissue perfusion as adequate perfusion and oxygen are needed for healing

What are the signs and symptoms of inflammation?

Signs and symptoms of inflammation:

- Redness
- Heat
- Pain
- Swelling
- Increased WBC
- Malaise
- Nausea
- Anorexia
- Fever
- Increased heart & respiratory rate
- Loss of function