**wound infection &antimicrobial use**

**surgical site infection :-**  occur anywhere in the operative field following surgical intervention. It can be divided into **incisional** versus **organ/ space infections**. Incisional infections are subdivided into **superficial** versus **deep** .

**Superficial** infection is limited to the skin and subcutaneous tissue only .

**Deep** extends into the deeper tissues such as the fascial and muscular layers of the body wall.

**Organ/ space** infections occur in any part of the body other than the skin, fascia, or muscle that is manipulated during the operative procedure. Examples include osteomyelitis or joint infection following an orthopedic procedure or peritonitis following an abdominal procedure.

**RISK FACTORS FOR SURGICAL SITE INFECTION**

1. **Degree of Bacterial Contamination:-** operative procedures are classified on the basis of the expected degree of bacterial contamination
* **Clean :** operativeWounds Respiratory, gastrointestinal, genitourinary, and oropharyngeal tracts are not entered.
* **Clean-contaminated:-** Operative wounds in whichrespiratory, gastrointestinal, or genitourinary tracts are entered under controlled conditions, without unusual contamination**.** An otherwise clean procedure in which a drain is placed **.**

**Contaminated •** Operations on traumatic wounds without purulent discharge Procedures in which spillage of gastrointestinal contents or spillage of infected urine occurs Procedures in which a major break in aseptic technique occur.

**Dirty**: Operations on traumatic wounds with purulent discharge, devitalized tissues, or foreign bodies .Procedures in which a perforated viscus or fecal contamination occurs.

**2- Clipping of the surgical site :-** Clipping of the surgical site anytime other than immediately preoperatively is associated with development of surgical wound infection

**3-** **Duration of surgery :**

* Lengthier operations expose the wound to a microbiologic environment for a longer period of time and generally involve more extensive tissue handling with increased use of suture material and electrocoagulation, which can reduce the local immune resistance of the wound.
* Suppression of the immune system results in part from a significant decrease in total lymphocytes, CD4+ T-lymphocytes, and CD8+ lymphocytes, and is directly correlated with the duration of surgery.

**4- Duration of Anesthesia :-** 30%greater risk of wound infection for each additional hour of anesthesia. The duration of anesthesia is dependent on the duration of surgery. prolonged exposure to anesthetic drugs may predispose to increased wound infection rates. For example, halothane anesthesia depresses neutrophil chemotaxis, phagocytosis, and oxidative function in proportion to anesthetic duration.

Other mechanisms by which anesthesia could affect the immune response and the incidence of wound infection include extrinsic contamination of anesthetic drugs, particularly propofol,\* inhibition or stimulation of cytokine secretion increased numbers of CD8+ suppressor/cytotoxic lymphocytes,and impairment of neutrophil chemotactic, phagocytic, and oxidative function

**5- Propofol :-** It can increase the risk of surgical site infection in dogs and cats due to the fact that lipid-based emulsions such as propofol are capable of supporting rapid microbial growth and endotoxin production.

**6-Endocrinopathies:-**

The presence of an endocrinopathy, particularly diabetes mellitus, has been associated with increased rates of infection for several conditions, including urinary tract infection and dermatologic disorders.

Animals with hyperadrenocorticism and hypothyroidism have been shown, in one study, to be more likely to develop surgical site infection.

Human patients with hyperadrenocorticism have alterations in natural killer (NK) cell activity and a total decrease in T-lymphocytes characterized by decreased numbers of T-helper cells (CD4), with an increase in T-suppressor cells (CD8) that is thought to result from down regulation of signal transduction through the interleukin (IL)-2 receptor.

**7-Number of People in the Operating Room**

For each additional person in the surgical suite, the risk of surgical site infection can increase by as much as 30%.Greater amounts of airborne contamination can be expected with increased numbers and activity of personnel.

**8- Sex :-**

The risk of developing surgical site infection can be greater for intact male dogs and cats. This parallels what is reported in men, who have more than a 50% greater risk of developing a major infection after surgery compared with women. This increased risk is believed to be a direct immunomodulating effect of androgenic hormones.

**Prophylactic Perioperative Antibiotic Use**

perioperative antimicrobial prophylaxis is recommended:

 (1) when the risk of infection is relatively high, as it is for many clean-contaminated or contaminated operations.

 (2) when the subsequent development of a surgical site infection could have disastrous consequences, such as in procedures involving orthopedic hardware.

Appropriate use of prophylactic antibiotics includes three core elements: **appropriate selection**, **timing of the first dose**, and **discontinuation postoperatively.**

**Selection of the Antimicrobial Agent**

Preoperative prophylactic antibiotics must be effective against organisms expected to be encountered during the surgical procedure. Cephalosporins preferred prophylactic antimicrobial for most surgical procedures.

For clean procedures, the primary consideration is activity against staphylococci, and for clean-contaminated procedures, typically of the upper gastrointestinal and reproductive tracts, coverage of Gram negative Enterobacteriaceae must be considered.

**Timing of Antibiotic Administration**

* The antibiotic is administered within a 1 hour period before the surgical incision is made.
* Intravenous administration of 22 mg/kg at induction of general anesthesia and repeated every 2 hours during surgery is often used to achieve an adequate concentration at the surgical site that is maintained for the duration of the procedure.
* An additional dose or two of antibiotic following surgery may be warranted to suppress the late growth of contaminating organisms that were not killed by the initial doses given during surgery, and to minimize the risk of wound infection caused by environmental microorganisms contaminating the fresh surgical incision before the surface of the wound is sealed

**Discontinuation of Antibiotic Administration**

antibiotic should not be administered beyond 24 hours post surgery, unless a major break in sterile technique or an unexpected change in contamination classification (e.g., cleancontaminated to contaminated) during surgery warrants a change from prophylactic to therapeutic use of the antibiotic.