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**DEPARTMENT OF CARDIO PULMONARY PERFUSION CARE**  
**TECHNOLOGY**

**COURSE NAME : CPB & ITS COMPLICATIONS**

**3<sup>RD</sup> YEAR**

**TOPIC : STERILE TECHNIQUES**



# SURGICAL ASEPSIS



- Refers to the procedures used to keep the **object or areas sterile or completely free from micro organisms.**
- In surgical asepsis all practices are directed to the elimination of both pathogenic and nonpathogenic micro - organisms.



# Microbiologic contamination in Cardiac Surgery



- The operating room environment, operating room personnel, patient, and equipment represent sources of microbiologic contamination.
- **Inappropriate ventilation and inadequate filtration systems** may increase the number of airborne organisms.
- Inattention **to disinfection of floors, walls, and ceilings** can lead to contamination of operating room surfaces by bacterial or spore-forming organisms.



# Microbiologic contamination in Cardiac Surgery (cont)



- Airborne bacteria are an important consideration in longer operations, as 30,000 to 40,000 organisms settle on a 3m<sup>2</sup> sterile field every hour.
- Cardiotomy suction units entrain bacteria that have contaminated the surgical field at the blood-air interface, thus allowing them entrance into the CPB circuit.
- Intraoperative monitoring devices, such as **intravascular catheters and pressure monitoring systems**, also provide sources of bacterial contamination



# Pre operative considerations



- A careful preoperative evaluation of the patient's respiratory system, dentition, urinary tract, and skin, as well as laboratory and radiographic studies, minimizes the risk of an unidentified, occult infection

## **Patient factors that increase the risk of infection following cardiac surgery.**

1. Occult infection
2. Chronic obstructive pulmonary disease
3. Chronic bronchitis
4. Diabetes mellitus
5. Obesity
6. Malnutrition
7. Chronic corticosteroid therapy
8. Blood transfusions



# Management of Patient Risks



- Intensified pulmonary education
- Physiotherapy for bronchitis
- Smoking cessation
- Treatment of urinary tract infection
- Control of diabetes mellitus
- Taper from steroid



# Skin Preparation



- To decrease skin colonization includes **chlorhexidine shower** the evening prior to and the morning of the operation.
- Shaving the evening before an operation is associated with an **increased incidence of postoperative wound infection**, presumably secondary to **contamination of razor abrasions**.
- Hair removal should be postponed until **immediately before surgical scrub and preparation of the operative site**.
- Mechanical cleansing by vigorous scrubbing with antiseptic soap, followed by the application of antiseptic solution, is appropriate for skin preparation.
- **Iodophor agents** are the traditional and proven antiseptics for operative site preparation.



# Action of chlorhexidine in skin preparation



- Chlorhexidine is an antiseptic antibacterial agent used to clean skin before surgery, injections, or injuries.
- It also cleans hands before procedures.
- Chlorhexidine works by killing bacteria on the skin or preventing it from growing.

## **To prepare skin with chlorhexidine**

1. Wet the skin in the shower or bath
2. Apply chlorhexidine skin cleanser directly to the skin with a clean cloth or sponge
3. Pay special attention to the groin, armpits, buttocks, and umbilicus
4. Leave the solution on the skin for about three minutes
5. Rinse off thoroughly





# Intraoperative Considerations



- Airborne contamination must be minimized by **limiting operating room traffic**
- **Horizontal ventilation systems with high-efficiency particulate filters** have been successfully employed to diminish airborne contamination and reduce infection in major orthopedic prosthetic joint replacement surgeries.
- An expeditious, technically precise operation, with efficient use of CPB time, is paramount for infection risk reduction



## Intraoperative Considerations (cont)



- Precise control of sternal bleeding is necessary to avoid devascularization of the sternum.
- Bone wax should be regarded as an undesirable foreign body.
- Bone wax application can cause direct contamination of the sternum from glove perforation by bone spicules



# Postoperative Considerations



- Careful attention to aseptic technique during postoperative care diminishes the risk of **nosocomial infections**.
- Scrupulous handwashing between patient encounters and aseptic wound, pulmonary, and genitourinary care will **diminish cross-contamination**.
- **Prompt removal** of endotracheal tubes, urethral catheters, chest tubes, intravascular catheters, and temporary pacing wires will **eliminate portals of entry**.
- These fundamental measures should be combined with a **timely transfer from the intensive care unit**, as prolonged intensive care unit stay is associated with a greater risk of infection.



# Measures to prevent the immunologic consequences



- **Use of anti-inflammatory drugs**
- **Use of heparin-coated bypass circuit** (The use of heparin coated bypass circuits reduces the activation of blood components and consumption of complement.)
- **Use of membrane oxygenators** (Membrane oxygenators constructed with polypropylene materials cause less activation of leukocytes, platelets, and complement than do bubble oxygenators)



# Measures to prevent the immunologic consequences



- **Aprotinin** (Aprotinin may prevent the consumption of serologic proteins by inhibiting both plasmin and kallikrein activity)
- **Erythropoietin** (administered to increase red cell mass, improves the immunologic function in the early postoperative period)
- **Thyroprotein** (enhances immune system function.)



# Methods to decrease the incidence of postoperative infection in the cardiac surgery patient.



## **Preoperative period**

- Control occult infection (bronchitis, dental caries, urinary tract infection)
- Treat diabetes mellitus
- Taper steroids
- Administer appropriate antibiotics
- Prepare skin

## **Intraoperative period**

- Strict aseptic technique
- Efficient use of operative time

## **Postoperative period**

- Aseptic techniques
- Prompt removal of indwelling catheters and tubes
- Timely transfer from intensive care unit



THANK YOU