اجهزة التخدير النظري /المرحله الثانيه

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Lec:1

operating room design and functioning

An operation theatre complex is the “heart” of any major surgical hospital. An operating theatre, operating room, surgery suite or a surgery centre is a room within a hospital within which surgical and other operations are carried out.

Different zones of OT complex:

Four zones can be described in an OT complex , based on varying degrees of cleanliness, in which the bacteriological count progressively diminishes from the outer to the inner zones (operating area).

The four Operation Theatre zones are:

1.Unrestricted zone.
2. Semi-exclusion zone or semi-sterile area
3. Restricted or sterile area.
4. Disposal zone

1-Unrestricted Zone• This is an area where hospital staff, Surgeons, Operation Theatre technicians, patients and nurses can present in their normal clothing or attire.

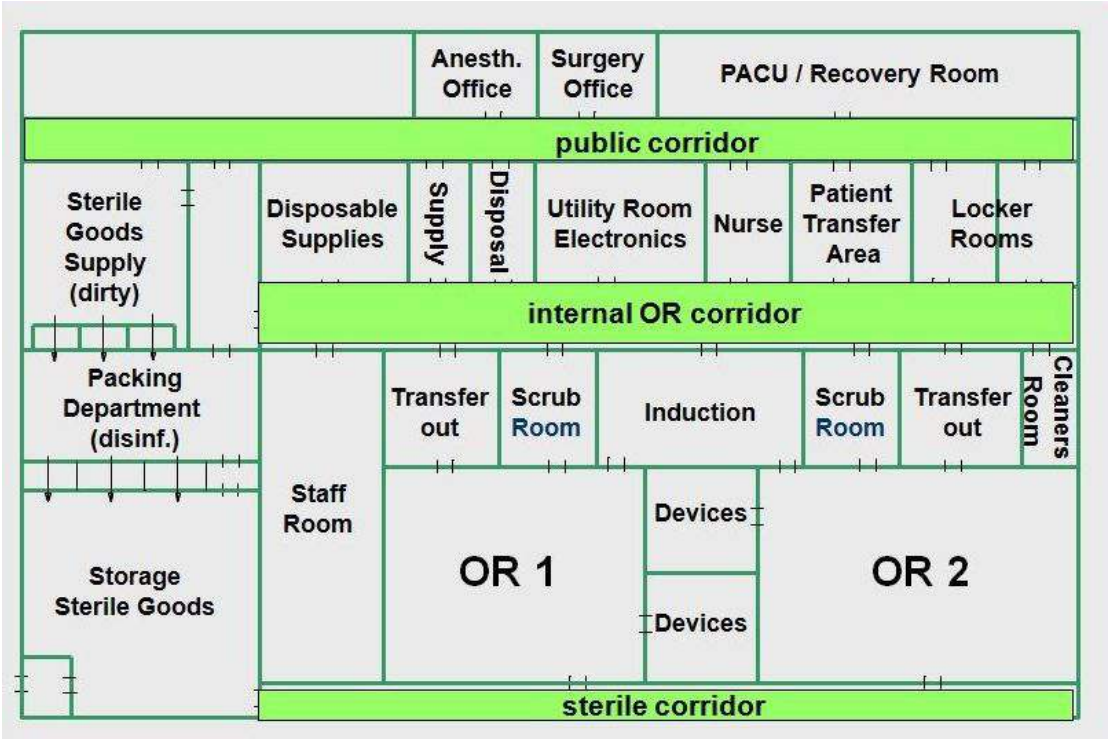
2-Semi-exclusion zone or protected zone or semi-sterile area • Surgical team enters this area after donning of PPE kit (Personal protective equipment) i.e. changing from normal attire into

hospital uniform, gloves, gowns, shoe covers, head covers, masks, respirators, eye protection, face shields.

3-Restricted/Sterile Area or Aseptic Area:
• Surgical procedures are performed in this area. Only surgeons, Operation Theatre technicians and Nursing staff are permitted in this zone.
4-Disposal Zone: Doffing of PPE kit, handling of used surgical instruments and biomedical waste disposal takes place in this area. The articles which require sterilization will be sent to the CSSD department (Central Sterile Services Department)

Sub areas (excluding OT place):
(1) Staff room – Men and women change dress from street cloth to OT attire.

(2) Holding area- This area is planned for IV line insertion, preparation, catheter / gastric tube insertion, connection of monitors, & shall have O2 and suction lines.
(3) Induction room – (anaesthetic room).
(4) Post anaesthetic care units (PACU) – preferably adjacent to recovery room.
(5) The anaesthesia gas / cylinder manifold room / storage area.
(6) Rest rooms
(7) Laboratory – Small lab. with refrigerator for pathologist to be arranged.



(8) Seminar room- Since staff can not leave an OT complex easily, it is better to have a seminar room within the OT complex.
(9) Store room
(10) Theatre sterile supply unit (TSSU)- Within this area.
(11) Scrub room- This is planned to be built within the restricted area.
Scrub Sinks- Washing hands and forearms with a surgical scrub before performing a procedure is vital to preventing infection in the surgical environment.

The Benefits of dividing Operation Theatre into zones are:

• To Minimize the risk of nosocomial infections
• To Minimize unnecessary movement of staff and patients to prevent contamination
• To Increase the efficiency of the operations theatre team

• To Minimize the risk of operating room hazards
• All the articles and equipments are placed in the appropriate zones to ensure a smooth work flow within Operation Theatre.

Operation rooms:
The number & size can be as per the requirement but recommended size is 6.5 m x 6.5m x 3.5 m.
Glass windows can be planned on one side only.

Doors : Main door to the OT complex has to be of adequate width (1.2 to 1.5 m) . The doors of each OT should be spring loaded flap type, but sliding doors are preferred as no air currents are generated.
The surface / flooring must be slip resistant.

Walls- Laminated polyester or smooth paint provides seamless wall; colour of paint should allow reflection of light and yet soothing to eyes. Light colour (light blue or green) washable paint will be ideal.
Operating room equipment
1- Operation table : The operating table in the



Surgical Tables

center of the room can be raised, lowered, and tilted in any direction. One operation table per OT.

2- Electric point : Adequate electric points on the wall (at < 1.5 m height from the floor)
3- X-Ray illuminators : There should be X-ray film illuminators preferably recessed into the wall.
4- The operating room lights are over the table to provide bright light, without shadows, during



surgery.: Overhead light should be shadowless and give 25000-125000 Lux of light.Lights should be freely movable both in horizontal and vertical ranges.

4- The anesthesia machine is at the head of the operating table. This machine has tubes that connect to the patient to assist them in breathing during surgery, and built-in monitors that help control the

mixture of gases in the breathing circuit.





5- The anesthesia cart is next to the anesthesia machine. It contains the medications, equipment, and other supplies that the anesthesiologist may need,

6- electronic monitor (which records the heart rate and respiratory rate , blood pressure, ECG.

7- electrocautery machine uses high frequency electrical signals to cauterize or seal off blood vessels and may also be used to cut through tissue with a minimal amount of bleeding.



8- If surgery requires, a heart-lung machine or other specialized equipment may be brought into the room
9- Supplementary portable air decontaminating equipment is sometimes placed in the OR.
10- Surgical Displays :surgical team members to visualize intricate patient anatomy on surgical



Surgical Displays and Large Format Displays

displays. They also provide visualization of the procedure to all team members.

11- warming cabinets ,also known as Blanket warmers , are used to store and warm intravenous (IV) fluid, linens, and blankets. Keeping fluids and



Warming Cabinets

linens warm for patient use help to decrease the risk of hypothermia.

13- Piped gases in the OT:
Nonflammable gases, such as O2, N2O, Air, CO2, can be delivered to operating rooms and other patient care areas via central piping system.





14-Scavenging:
is.the collection and removal of vented anesthetic gases from the OR . Since the amount of anesthetic gas supplied usually far exceeds the amount necessary for the patient.

15- line isolation monitor measures the potential for current flow from the isolated power supply to the ground.The use of electronic medical equipment subjects patients and health care personnel to the risk of shock and electrocution.

Environmental Factors in the Operating Room

TEMPERATURE:

temperatures should be maintained between 68°F (20°C) and 75°F (24°C). Hypothermia has been associated with wound infection, impaired coagulation, greater intraoperative blood loss, and prolonged hospitalization.

HUMIDITY:

Humidity levels in the operating room should be maintained between 20% and 60%. Below this range the dry air facilitates airborne mobility of particulate matter, which can be a vector for infection. At high humidity, dampness can affect the integrity of barrier devices such as sterile cloth drapes and pan liners.

VENTILATION:

A high rate of operating room airflow decreases contamination of the surgical site. These flow rates, usually achieved by blending up to 80% recirculated air with fresh air, are engineered in a manner to decrease turbulent flow and to be unidirectional.

NOISE:

Multiple studies have demonstrated that exposure to noise can have a detrimental effect on human cognitive function, and prolonged exposure may result in hearing impairment. Operating room noise

has been measured at 70 to 80 decibels (dB) with frequent sound peaks exceeding 80 dB.

IONIZING RADIATION

Anesthesia providers are exposed to radiation as a component of either diagnostic imaging or radiation therapy; examples include fluoroscopy, computed tomography, proton therapy, and diagnostic radiographs. Radiationsensitive organs such as eyes, thyroid, and gonads must be protected, as well as blood, bone marrow, and the fetus. Radiation levels must be monitored if individuals are exposed to greater than 40 REM.