

## **4.2 CENTRAL STERILIZATION AND SUPPLY DEPARTMENT**

### **4.2.1 Overview**

Despite the unprecedented advances made in the medical field, hospital-acquired infection remains the hospital's single most serious concern that negates some of its otherwise good work.

It is acknowledged that even in advanced countries, approximately five percent of all hospital patients develop infection after being admitted.

Given the poor standards in our hospitals, this figure is likely to be much higher in India.

The intangible and tangible cost of this by way of unnecessary suffering, extra hospitalization and loss of working days can be high.

To combat this ubiquitous menace of infections caused by pathogenic micro-organisms, hospitals have over the years developed a scientific method commonly referred to as the central sterile and supply system.

The method basically involves cleaning, disinfecting and sterilizing before use all instruments, materials and equipment utilized in patient care.

From various parts of the hospital like operating room, wards, outpatient clinics and other departments, all soiled items are collected in the CSSD for processing, and then transported back to the end users.

In the CSSD, the process of cleaning, disinfecting, packing, sterilizing and distributing is carried out by specially trained personnel.

This ensures better control and reliable result and reduced risk of infection.

Sterilization of instruments, operating packs, trays, etc. is performed by heating them with pressurized steam or by gas sterilization.

Steam sterilization is called **autoclaving**.

However, certain items such as rubber, plastic and delicate instruments cannot be autoclaved and so have to be sterilized by using ethylene oxide or similar gases.

Gas sterilization requires certain safety precautions such as aeration prior to use and special exhaust ventilation.

Under both systems, sterilization is performed on cleaned instruments wrapped in special linen.

In the decentralized system, the sterilization facility is located near the area where the sterilized items are used.

This is called **Theatre Sterile Supply Unit (TSSU)**.

The advantage of this system is that it allows for direct communication, the number of instruments in small and transportation is more or less eliminated.

The CSSD services the nursing units, the operating rooms, ICUs, labour-delivery suites, the nursery,

outpatient department, radiology, pharmacy and the clinical laboratories.

The primary activities of the department are sterilizing, storing and distributing the dressings, needles and syringes, rubber goods (gloves, catheters, and tubing), instruments, treatment trays and sets, sterile linen packs, etc.

Disposable sterile supplies are being increasingly used in hospitals They need only to be stored and not processed for reuse.

Since these disposable items are expensive, their use in Indian hospitals has not significantly affected the workload of the CSSD.

#### **4.2.2 Objectives**

- Process and sterilize equipments and materials under controlled conditions by trained and experienced personnel thereby contributing to total environment control in the hospital.
- Effect greater economy by keeping and operating the expensive processing equipments in one central area.
- Achieve greater uniformity by standardizing techniques of operations.
- Gain a higher level of efficiency in the operations by training personnel in correct processing procedures.

#### **4.2.3 Functions**

- Receiving and storing soiled material used in the hospital.
- Determining whether the item should be reused or discarded.
- Carrying out the process of decontamination or disinfection prior to sterilizing.
- Carrying out specialized cleaning of equipment and supplies.
- Inspecting and testing instruments, equipment and linen.
- Assembling treatment trays, instruments sets, liner packs, etc.
- Packing all materials for sterilizing.
- Sterilizing.
- Labelling and dating materials.

10. Storing and controlling inventory.

11. Issuing and distributing.

#### **4.2.4 Location**

Accessibility to elevators, dumb waiters and stairs is of utmost importance in determining the location of CSSD.

It should be close to the depth which use its services the most.

Generally, the largest users are the surgical department, including the recovery room, and the nursing units.

Hospitals are continuously searching for new ideas to maintain aseptic condition of the highest order, particularly in the surgical suites.

In advanced countries CSSD is located in a lower floor directly under the surgical suite. The surgical suite and the CSSD are connected by means of two dedicated dumb waiters – small elevators that deliver trays, medicines, etc. – one sterile and the other soiled.

The sterile dumb waiter, located in the sterile area of the CSSD, opens into the sterile area of the surgical suite and transports all sterile items without being contaminated in transit.

The solid dumb waiter is located in the less sterile area of the surgical suite and brings down the soiled items to the soiled area of the CSSD for reprocessing.

#### **4.2.5 Design**

The workflow pattern should be planned in such a manner that the personnel traffic and the movement of supplies and equipment is accomplished in an efficient manner, the flow of work is continuous from receiving to issuing without retracing steps, and the receiving and clean up areas are physically separated from the rest of the department.

Workflow must be so planned as to allow a separate entrance to receive soiled and contaminated materials from departments, and another for issuing clean and sterile supplies and instrument.

There could be a third entrance, if necessary to receive materials from general stories and laundry.

In a well-designed, state of the art CSSD, there are three organized zones:

- Soiled area
- Clean area
- Sterile area

Soiled items from various departments of the hospital are received at the solid reception area in the same trolleys, instrument trays, baskets or containers as they were delivered in.

Most of them are loaded straight onto the pass-through washer-disinfector. Trolleys and some instruments are cleaned and disinfected manually.

Steam and hot water are the most common of disinfection agents used in hospitals. In the clean area, clean disinfected materials are sorted, inspected and packed.

After packing, the instrument trays are put into baskets for sterilization in the double-door, pan-through autoclaves.

Fabrics are sorted out and packed in a separate area before sterilization.

The double-door pan-through autoclaves of the required size are built into the wall between the

clean and sterile areas.

Materials are loaded on the clean side and unload on the sterile side.

Both automatic and manual loading and unloading autoclaves are available.

Autoclaves with formaldehyde and ethylene oxide for heat-sensitive goods and cycles for fluid production are also available.

After sterilization, the autoclaves are unloaded in the sterile area and the materials stored there. The storage area should be dry and free of dust.

It is advisable to have one high-speed autoclave, preferably in the operating room, to re-sterilize the instruments needed immediately or those that have been dropped accidentally.

Flash sterilization is autoclaving an instrument when it is unwrapped. Plan of CSSD is given in Fig. 2.1.

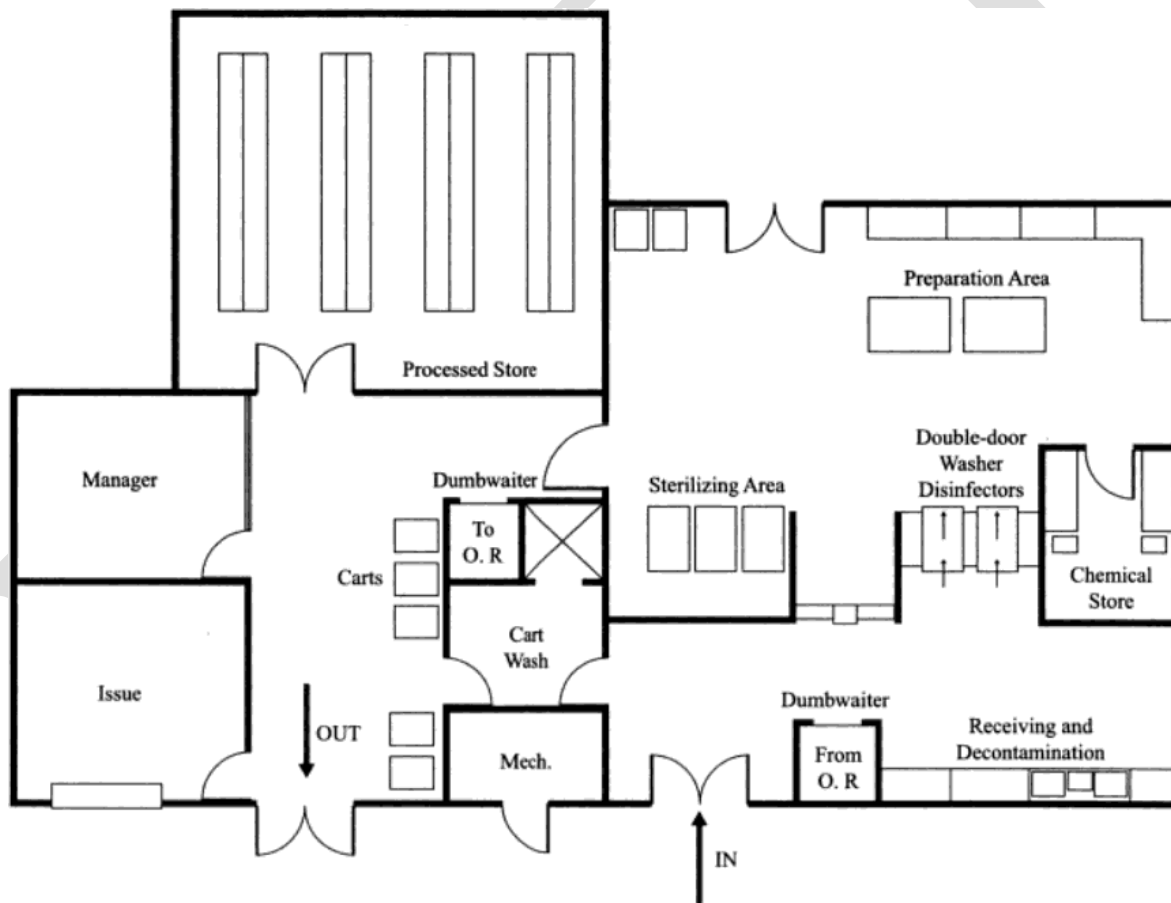


Fig. 2.1 Plan of CSSD

#### 4.2.6 Some procedures

- Cleaning and working of instruments, trays, etc., should be performed before reassembling and wrapping instrument kits.
  - Cleaning and waiting can be done wither manually or by automatic washers.

- Ultrasonic cleaners are considered most effective in cleaning joints, hinges, etc.
- They, however, erode the surface of instruments and shorten their life.
- Surgical linen is inspected before wrapping instruments or linen packs to check for holes, tears or rips by passing it over a light table.
- Linen packs of sheets, drapes, wraps, etc. are assembled for operating room, labour rooms and delivery suites.
  - Special linen packs are prepared to suit special procedures such as laparoscopy, mastectomy and orthopaedic hip surgery.
- Processing of instruments, one of the activities of the CSSD, includes assembling appropriate instruments and supplies into kits and wrapping the kits with sterile linen.
  - Kits and trays may be of various types, such as surgical instrument kits for operating room, suture kits for nursing units and emergency departments, cut down trays for nursing with and special trays for radiology.
- Instruments used regularly are sometimes assembled to make pre-wrapped kits and stocked, or they are prepared when needed as per order.
- Sterilization is done in batches, which means that several packages are sterilized in a single load.
  - For infection control, these packages are labelled, and dated, and later reviewed periodically against test indicators.
  - If a batch is found to be below standard, the packages are removed from the shelves.
  - A wrapped and sterilized kit is considered sterile for a certain length of time after which it has to be re-sterilized.
  - The length of time a kit remains sterile depends on the type of wrap used, that is whether the kit is wrapped with single or double thickness surgical quality linen.
  - Labelling and dating of package is one of the important steps in the sterilization process.
- The CSSD may also be engaged in the manufacture of parenteral solutions, normal sterile saline solution and sterile distilled water.
  - However, because of risks involved, only a few hospitals prepare parenteral solution.
  - Even in the case of saline solutions and sterile water, the trend is to purchase them from outside in plastic pouch containers.
  - These reduce breakage and are also convenient to handle.

#### **4.2.7 Organization**

Traditionally, CSSD has been a part of the nursing service department supervised by a nurse or a

person with para medical training and reporting to the director of nursing or the nursing superintendent.

This pattern prevails in many hospitals.

It is also not uncommon for operating rooms to perform their own sterilization and not have much interaction with the CSSD.

The sterilization room is located next to the operating rooms so that sterile packs are transported easily.

In developed countries, the department goes by the name of “Central Service Department” and encompasses many other functions in addition to sterilization, such as purchasing, stocking and distribution of supplies under a materials manager or an assistant administrator.

Personnel in the CSSD comprise a supervisor who may be a nurse and one or two nurses.

The remaining staff typically consists of assistants, technicians, aides, orderlies and messengers who are trained on the job.

Usually in a new set-up with sophisticated equipment the firm that supplies the equipment trains personnel in handling it as part of a package deal.

There is now a growing trend towards putting the CSSD in the charge of an experienced manager.

The chief of CSSD is generally a member of the hospital infection control committee.

#### **4.2.8 Facilities and Space Requirements**

- Reception control and disinfection area workspace and equipment are needed to clean and disinfected medical and surgical instruments that are sorted, racked and passed through washer-sterilizers to the clean area.
- Facilities for washing and sanitizing carts.
- Staff change rooms, lockers, toilets, etc.
- Supervisor’s office. It should be out of the flow of activities but provide unobstructed view of the processing area. For this a glass-walled office is recommended.
- Clean work area. Space for preparing special instruments, inspecting and testing instruments, equipment and linen for assembling treatment trays and linen packs for preparing gloves and for packing materials for sterilizing.
- Assembling area. Requires workstations for assembling medical-surgical treatment packs, sets and trays, work benches with multiple drawers for instruments and supplies should be provided. The linen pack area requires large work tables, and for inspection, a special inspection (light) table for examining linen wrappers for minute instrument holes.
- Supply storage area.
- Double-door, pass-through autoclaves. These are high-vacuum steam and gas sterilizers.

- Adequate space for loaded sterilizer carts or trolleys prior to sterilization for carts during the cooling period following sterilization and wherever applicable for carts for sterilized supplies for the surgical suites and labour-delivery suits prior to delivery of these supplies.
- Sterile store.
- Issue counter.
- Clean cart storage area.
- Provision for supply of steam, hot and cold water and other utilities and services.

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