

Central Sterile Supply Department – Need Of The Hour.

Asima Banu¹, Subhas G.T.²,

¹Associate professor, Dept. of Microbiology, Bowring and Lady Curzon Hospitals, Bangalore Medical College and Research Institute

²Professor, Department of Neurology, Bangalore Medical College and Research Institute, Bangalore

Abstract: Central Sterile Supply Department(CSSD) is a service unit in a hospital that processes, issues, and controls the sterile stores supply to all departments of the hospital. The essentials of this department are correct design, appropriate equipments, skillful operators and a unidirectional work flow. The CSSD should have four zones – 1) The unclean and washing area, 2) The assembly and packing area, 3) The sterilization area and 4) The sterile area. Each of these has equipments in place in order to perform specific functions towards sterilization of articles for immediate use in patient care. All The hospitals should establish an adequate CSSD set-up and adopt strict quality control processes with the latest technology to mitigate hospital acquired infections.

Key words: Central Sterile Supply Department, Hospital Acquired Infections, Sterilization.

Introduction :

Central sterile supply department(CSSD) is a service unit in a hospital that processes, issues, and controls the sterile stores supply to all departments of the hospital. It can be defined as that service, with in the hospital, catering for the sterile supplies to all departments , both to specialized units as well as general wards and OPDs(Bhattacharjee definition). The last few years have witnessed an increasing interest in organizing sterilization¹. The purpose of such a CSSD is to provide all the departments of a hospital with guaranteed sterile equipment ready and available for immediate use in patient care – a step towards the prevention of hospital acquired infections(HAI)².

Ideally, CSSD is an independent department with facilities to receive, clean, pack, disinfect, sterilizes, store and distribute instruments as per well-delineated protocols. The essentials of this department are correct design, appropriate equipments, skilful operators and proper work flow² The history of CSSD starts in 1928 when American College Of Surgeons introduced the word CSSD. In 1955 the Cambridge Military Hospital established Regular CSSD in United Kingdom. In India, Safdarjang Hospital New Delhi, established the first CSSD in 1965.

The planning of a CSSD has to be steered by committee including representatives of departments of administration, infection control, anaesthesia, microbiology, nursing and housekeeping drawing upon

their knowledge and experience. The committee is required to meet monthly even during the running of a fully functional CSSD in order to discuss new procedures or alternations to existing procedures in the light of new knowledge and breakthroughs.

The objectives of the department are:

- To provide sterilized material from a central department where sterilizing practice is conducted under conditions, which are controlled, thereby contributing to a reduction in the incidence of hospital infection.
- To take some of the work of the Nursing staff so that they can devote more time to their patients.
- To avoid duplication of costly equipment's, which may be infrequently used.
- To maintain record of effectiveness of cleaning, disinfection and sterilization process.
- To monitor and enforce controls necessary to prevent cross infection according to infection control policy.
- To maintain an inventory of supplies and equipment.
- To stay updated regarding developments in the field in the interest of efficiency, economy, accuracy and provision of better patient care.
- To provide a safe environment for the patients and staff.

Designing of a CSSD:

The workload in a CSSD varies from hospital to hospital. The size and location usually depends on the number of the hospitals the CSSD will serve as well as the number of beds and the future expansion of the hospital. However 6 to 10 square feet per bed is recommended as an area of requirement for the CSSD. It should be located as close as

Address Correspondence to :

Dr. Asima Banu

Associate professor, Dept. of Microbiology,
Bowring and Lady Curzon Hospitals,
Bangalore Medical College and Research Institute, Bangalore
E-mail : asima.banu@gmail.com

possible to the major user areas such as Operation theatres, Accidents and Emergency department and wards.

The CSSD layout should be designed for a unidirectional flow. The CSSD should have four zones for a smooth work flow.

1. The unclean and washing area
2. The assembly and packing area
3. The sterilization area
4. The sterile area

The Layout

1. Entrance lobby
2. Reception and Cleaning room
3. Glove room
4. Work room (Preparation and assembling of packs)
5. Sterilisation room
6. Sterile store room
7. Nurses/Managers room
8. Staff changing room

Workflow in the CSSD

Receipt: The material that is to be sterilized coming from various departments arrives in the reception area using stainless steel trolleys via a dedicated elevator.

Cleaning: This function means cleaning of the used equipments/materials, rubber and plastic goods either manually or by machines eg., washer-disinfector, ultrasonic cleaner, jet glove washing machines and dryers.(Fig-1) This function may also include cleaning of the delivery trolleys..The common items handled by the CSSD stores are syringes and needles, Procedure sets which includes Lumbar puncture, Sternal puncture, venesection, paracentesis. aspiration, catheterization, tracheotomy, suturing, dressing, biopsy, incision & drainage, aortography cardiac resuscitation, gloves, I.V. Fluids, treatment Trays, O.T Instruments, O.T. Linen, infusion Fluids for Renal Dialysis and at times linen from wards etc.

Assembly and Packing: It includes checking of glass items for breakages, needles and instruments for sharpness and breakages, assembling of the equipment after washing and drying, making appropriate sets for use by various departments and packaging along with sealing either manually or using a machine before sterilization. Adequate documentation and labeling of each pack should be done and records should be maintained.(Fig 2 & 3)

Sterilisation: It renders materials sterile for quality patient care. It is achieved by steam sterilizers working at specified cycles of temperature and duration to attain adequate sterility assurance level (SAL). Advantage of steam sterilizers are rapid heating & penetration of loads,destruction of all forms of microbial life and no residual toxicity.Different types of Autoclaving machines that can be used are

1. Downward Displacement
2. Vacuum Assisted.
3. Pulsed Steam Dilution .

The capacity of the sterilizer is based on the load and the number of cycles per day. The load is calculated by estimating litres to each procedure and converting it into a standard unit i.e st.u(1 st.u = 54L). This value is then divided by the number of cycles that will be run per day to obtain a value of st.u/cycle. The capacity of the sterilizer is then selected based on the value obtained. It is better to have 2 sterilizers in case of breakdowns.(Fig-4)

Additionally an ethylene oxide sterilizer can be included in a separate compartment of this area in order to sterilize heat sensitive instruments.(Fig-5)

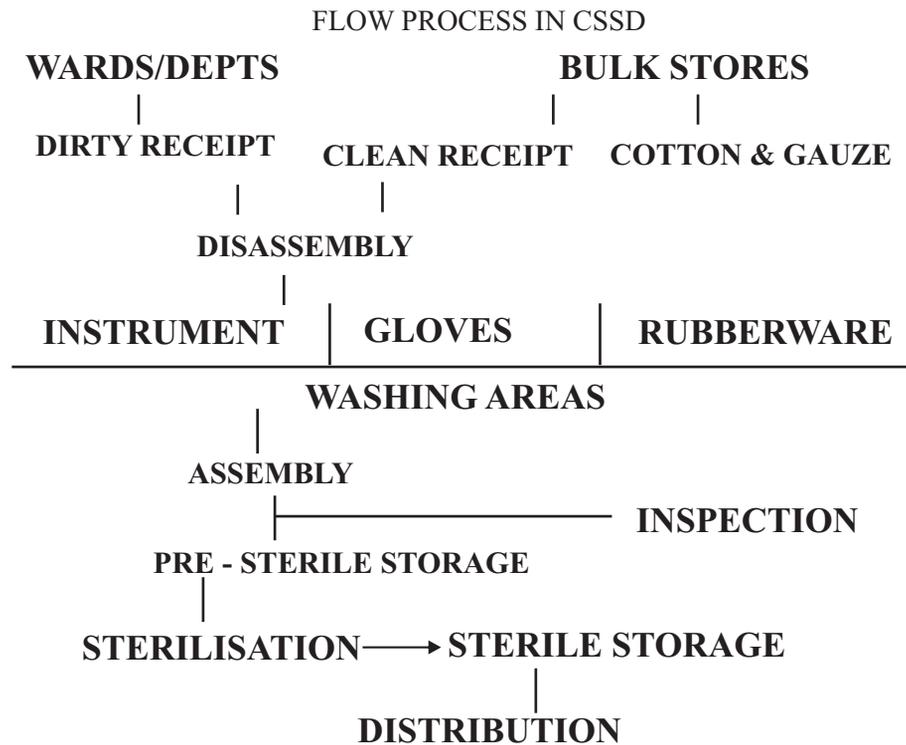
Storage: The function includes storage of sterilized materials where space is also provided for storing distribution trolleys. Sterile store maintains inventory of all types of sterile packs. At the end of the path of the treated material a computer terminal should be provided in order to manage delivery of materials and transport documentation.(Fig-6)

Issue and Distribution: The function entails issue of the sterilized packages, dressings, linen, instruments and disposables to various departments of the hospitals^{3,4}.

Process of sterilization:

The items to be sterilized at the Central Sterile Supply Department are washed (with detergent or chemical as applicable), sorted in the washing area. linen from wards and OT are to be sent directly to the laundry for cleaning. The laundry washed linen are to be received , packed and forwarded to the CSSD for sterilization.

The CSSD technicians or trained nurses shall receive the unsterile packs, inspect them to check the status of the item (torn, punctured, cracked etc) and place them at the unsterile packs storing platform. Entry must be made in CSSD receipts register including date, time, type of instruments in the pack, ward, its source, procedure used for, and case infected or not, name and signature of person handing over, and name and signature of person receiving it.



The autoclave indicator is pasted in the packs by the CSSD technician and the packs are taken to the main sterilizing area where the sterilizing units are placed. The CSSD technician places the unsterile packs under appropriate temperature and pressure specifications in the sterilizing units. The temperature, pressure specifications and accordingly the temperature period are for Normal Sterilization, temperature of 121^o C at 15 lb for 20 minutes, and for Rapid Sterilization, 140^o C at 20 lb for 15 minutes. At the end of the sterilization the packs are removed from the sterilizing units, the autoclave indicators are checked to confirm adequate sterilization of the packs, and in case the sterilization is not adequate the process is to be repeated. A material is pronounced sterile if it achieves 99.99% kill of bacterial spores. Packs which are adequately sterilized are stored in the sterile storage area. If the sterile packs are torn, if it has been opened, they are wet, etc, and then the whole process is to be repeated again.

In case the packs which are sterilized in the CSSD and issued to the departments remains unutilized in the respective user departments for a period of 72 hours, the same are returned to the CSSD department for re-sterilization. Registers to be maintained in the CSSD are CSSD receipt register, CSSD issue Register, Equipment Maintenance Record register and Equipment Calibration Register.

Maintenance of the equipments are to be done as per the annual maintenance contract (AMC) entered into with the

vendor of the respective CSSD equipments. All details in these regard are maintained by the Maintenance Department of the hospital.

All equipments used in the department are to be appropriately calibrated at periodic intervals to ascertain whether they are performing at the expected level and a record of the same is documented in the department as well as with the concerned case workers working in the administration.

Indent for setting up an ideal CSSD:

1. Washer disinfecter with accessories - The washer should perform pre-rinsing, cleaning, post-rinsing, thermal disinfection, final rinsing and drying phases. Validated programs are secured by access code. Detergents and rinse agents should be automatically dispensed during the cycle.

2. Steam Sterilizers - The sterilizer should meet the relevant standards. The chamber and doors should be made of solid, high quality 316L Stainless steel. The chamber should be jacketed to ensure the temperature uniformity in chamber. The chamber floor is slightly sloped towards an internal drain to facilitate drainage. A stainless steel mesh strainer should be provided to protect the drain port from blockage by debris. The chamber is mounted on a stainless steel framework with height adjustable feet.

The internal surface should be electro-chemically treated for high quality smooth finish to facilitate cleaning. The

resultant surface should be polished to less than 0.8 µm fineness to protect against corrosion. The internal corners should be rounded off to facilitate efficient cleaning. The sterilizer jacket and door should be completely insulated with mineral rock wool to keep the autoclave cool on the outside. The insulation should be completely encased in a rigid removable sheet housing. The jacket should be made of 316L quality stainless steel. The chamber should have a warranty for 10 years. The sterilizer should have inbuilt steam generator of adequate capacity. It should be mounted under the sterilizer chamber & should be made of 316 quality stainless steel. The steam generator should have insulation of thick chloride free mineral rock wool with rigid aluminum sheet housing. It should have a built in thermostat, pressure safety valve & water level glass gauge inspection device visible from service area. The heating element, not less than 36KW should also be made of stainless steel. It should also have the automatic blow down valve & degassing system for feed water to steam generator. To make the sterilization process faster the capacity of the heating element should not be less than 36 KW.

3. Ultrasonic cleaner (optional) - The units should be a compact free-standing bench model, with a built-in tank manufactured from high-quality (316) stainless steel and a solid-state generator that sends ultrasonic (approx 42,000 cycles per second) impulses through wash water containing detergent and electrical heating; microprocessor controlled display with memory time and temperature functions. The electrical energy should be transformed into sound waves by transducers, fixed to the bottom of the tank. The tank should be made of solid stainless steel (316).

The ultrasonic cleaner should have a display and control which could be easily seen and placed above any liquid for safety and reliability. It should have digital read out timer and temperature setting (up to +69° C (temperature adjustable from 20 to 69 °C) monitoring.-

4. Heat Sealing Machine - Rotary heat sealers should provide validated sealing of sterilization bags and clear-view pouches (paper/plastic laminate). These through feed-type sealers should be microprocessor-controlled for highest capacity and ease of operation. The rotary heat sealer should give documentation of process parameters via an integrated printer and could be integrated with

documentation system. The ergonomically design should be tilted forward for increased user convenience and space saving installation.

5. Inspection tables, lamps, cleaning equipment, interior water treatment facilities

6. Table top sterilizer with accessories - Table Top Sterilizers should be equipped with B-process as per latest international standards

7. Ethylene Oxide Sterilizer (optional)- Ethylene oxide sterilizer is defined as equipment which uses ethylene oxide as a biocide to destroy bacteria, viruses, fungi and other unwanted organisms. Ethylene oxide is used in sterilization of items that are heat and moisture sensitive. The ETO gas sterilizer should be fully automatic type for sterilization of heat sensitive goods such as anesthetic tubing and endoscopes.

8. Documentation labeller

9. Process challenge devices

10. Water treatment plant

11. All necessary furniture required for the facility

An alarming rate of hospital acquired infections (HAI) in Indian hospitals has highlighted the importance of CSSD. Despite all measures and advancements in technology, hospital acquired infections remain a challenge in healthcare scenario today. The hospitals are required to establish an adequate CSSD set-up and adopt strict quality control processes with the latest technology to mitigate hospital acquired infections. Hence the concept of infection control by FLORENCE NIGHTINGALE who said "No Stronger Condemnation of any hospital or ward could be pronounced than the simple fact that zymotic disease has originated in it or that such disease attack other patients than those brought-in with ". stands true for generations of healthcare to come.

Acknowledgement :

We are thankful to Medovation Products, Bangalore for their valuable technical inputs.

References :

1. Welch JD. The Organization of Central Supply Departments. *J Clin Path.* 1961; 14: 69-75
2. Allison VD. Hospital Central Sterile Supply Depts.. *BMJ.* 1960: 772-778
3. Gardner JF and Peel MM. Introduction to Sterilization, Disinfection and Infection control, Second Edition. Melbourne, Churchill Livingstone. 1991
4. Ayeliffe GAJ et al Control of Hospital Infection: A Practical Handbook. Third Edition. London, Chapman Hall. 1992.

Fig 1- The washing and disinfection area with fully automatic washer disinfecter.



Fig 3-Linen inspection and storage room.



Fig 2-Packing and assembly area- Clean Area



Fig 4- Steriisation Area having two fully automatic steam sterilisers



Fig 5- ETO Steriliser and Flash sterilisers.



Fig 6- Sterile area with storage racks.



How to Cite this article :
Banu A, Subhas GT. Central Sterile supply Department – Need of the hour. J Pub Health Med Res, 2013;1(2):58-62

Funding: Declared none
Conflict of interest: Declared none