Central Sterile Supply Department : A Concept

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The Maxillofacial Department in my college does on an average two hundred fifty cases a month either under local or general anaesthesia.The various instruments used, were made sterile in autoclaves inside the Operation Theatre complex. In May 2009 ,the concept of a Central Sterile Supply Department (CSSD) , for sterilisation of goods was set pattern. In hospitals with no CSSD, the job of sterilisation is given to people like OT attendants who are not well qualified for the job thereby affecting the quality of work. CSSD is considered today, integral to the function of Out Patient Department (OPDs), wards and other departments.

The scope of CSSD has enlarged from that of a department [1], which was similar to an autoclave sterilisation unit to encompass hospital infection control and stands for a dedicated workflow of sterile supplies and goods. Ideally, CSSD is an independent department with facilities to receive, clean, pack, disinfect, sterilise, store and distribute instruments (both multi-use and single-use device), as per well-delineated protocols and standardised procedures. In this age of cost cutting and space constraints, having separate CSSD, we can decrease the cost of sterilizers through centralisation of equipment in one department.

The rise in incidence of nosocomial infection with corresponding increase in mortality, length of stay and cost can be brought down by establishing a good CSSD set-up. Moreover, the fatal disease AIDS became so powerful and spread world wide, the demand for proper procedures for infection control gained momentum enormously. Diseases such as Hepatitis B & C, known to be transmitted through contaminated surgical instruments, stimulated the need for stricter guidelines for disinfection and sterilization

The essentials of the department are correct design,modern plant,skilful operators, proper work-flow,regular skilled maintenance to avoid breakdowns of plant.

The main objectives of the C.S.S.D. are [2]

- 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 equipments, 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

The functional flow of activities in CSSD may be generally specified as follows:

Rinsing : Rinsing of articles after use should not be permitted in patient care areas unless carried out by a trained member of the staff.

Cleaning: All reusable medical devices should be thoroughly cleaned prior to disinfection or sterilization

Drying: All articles should be dried appropriately

Inspection And Assembly: Each item should be inspected for functionality, defects, breakage and then appropriately assembled.

Packaging: Articles should preferably be packed in porous material

Labelling: Each pack should be marked with nomenclature of the article, contents of the pack, initials of the person who packed it, date and initials of the person who carried out the sterilization.

Sterilization: The operation of the sterilizer should be entrusted to a responsible and fully trained person. It should be kept in a state of good maintenance and repair.

Storage: Should be properly managed separately for sterile and non-sterile stores. For sterile goods, clean room conditions should be followed

Distribution: Refers to clean and dirty articles exchange system. A program should be established for the collection of used items from patient care areas and distribution of sterilized goods.

What are the techniques followed in sterilisation technology? [3]

The existing methods of sterilisation are Steam (High Vaccum Pulsing), Chemical, Gamma Irradiation, Ethylene Dioxide and Gas Plasma.

Steam And Hot Air : Steam under pressure is the classical agent for sterilizing most of the needs of hospitals. But, there are advantages in using hot air for certain articles such as syringes and instruments.

Chemical Sterilization : This is far from sure; it takes a long time; it must be done wet. Although a number of new and improved chemicals have been produced, it will generally be agreed that since chemicals disinfect rather than sterilize they should be used only if no other methods are possible.e.g.Gluteraldehyde

Gamma Irradiation : Recent increases in the peaceful use of atomic energy have brought the possibilities of irradiation to the fore. Over more traditional methods irradiation has certain advantages. It is sure in operation. It does not require heat. But irradiation also has important disadvantages so far as hospital products are concerned. It turns glass brown and, in time, breaks up the fibres of textiles. But the chief disadvantage of irradiation is that to be economical in operation the product to be sterilized should be fairly standard and a vast initial capital outlay is necessary It is concluded, therefore, that, although sterilization by irradiation has considerable advantages for large scale manufactured products, it is unlikely to be of much practical value in hospitals for some time to come.

Ethylene Dioxide, Gaseous Sterilization : This was developed in Germany and the U.S.A. during the second world war, the gas which proved most promising being ethylene oxide. But here again difficulties and disadvantages are apparent. To be properly effective ethylene oxide requires to be of a high concentration, and humidity and temperature need to be carefully controlled. Ethylene oxide at high concentration is highly explosive, so under hospital conditions it is usual to use

a mixture of 20 % ethylene oxide and 800% carbon dioxide So far as hospitals are concerned, therefore, this gas is likely to be of more value for the sterilization of things which cannot be sterilized any other way. Gas is unlikely to prove a substitute for steam under pressure or hot air.

Gas Plasma Sterilizer : Low temperature sterilization is fast, safe and cost-effective which is designed to sterilize heat-sensitive instruments and materials with Plasma sterilization technology. Its speed and space-efficient chamber help process high volume demand, with instruments including endoscopes being available for immediate use after sterilization.

Safety features

- No hazardous or odourous emissions
- Low temperature and pressure during sterilization
- The hydrogen peroxide (H_2O_2) sterilizing agent produces residuals that are non-toxic
- The sterilization process results in water and oxygen by-products
- Door is locked during cycle operation

Floor Area

The C.S.S.D. should have a floor area of 2,210 sq. ft.(205 sq. m.) four four main rooms and five ancilliary rooms

1.Ingress: This is the entry to the C.S.S.D. and has a Dutch door. All used goods, except fabrics, are collected from the wards by C.S.S.D. staff in stainless-steel trolleys, kept for this purpose; trolleys are disinfected with " savlon "(hospital concentrate, 1-200). Returned equipment has been rinsed in the wards or theatres after use. Material from the theatres on the floor immediately above the C.S.S.D. is returned in a " dirty " lift, which opens into this room; beside the lift is a hatchway which opens to the outside for transport of used or soiled linen from the theatres to the laundry.The room is fitted with a stainless-steel bench and double sinks used for disassembling, cleaning, and processing.

2. Work Room: This room is fitted with benches, with drawers and kneehole spaces underneath and wall-attached cupboards above. The drawers and cupboards contain all the items required for assembling packs, which is done on the benches and also on stainless-steel trolleys.In this room packs for theatres and wards are assembled and wrapped. Assembled packs and miscellaneous items for wards and theatres are filled into special stainless-steel baskets on low trolleys and transported to the autoclave room.

3. Autoclave Room: The filled baskets are to be loaded into the sterilizers by two male orderlies. The steam sterilizers are high-vacuum, operating at 28-29.5 in.(71-75 cm.) Hg, and a sterilizing temperature of 273^0 F.(134^0 C.). They should be fully automatic and can be altered if desired, to operate at a sterilizing temperature of250° F. (121^0 C.). The cycle of changes during the sterilizing procedureis visible on temperature and pressure gauges and a coloured lighting system, and is recorded on a time-temperature chart. At the end of the cycle the chart is inspected by the sister-in-charge in order to check that the correct cycle has been followed.The sterilizer is then opened and the baskets are unloaded by the male orderlies, wearing asbestos gloves, and taken to the sterile store to cool. When cool the packs are placed in their designated positions on the shelves.

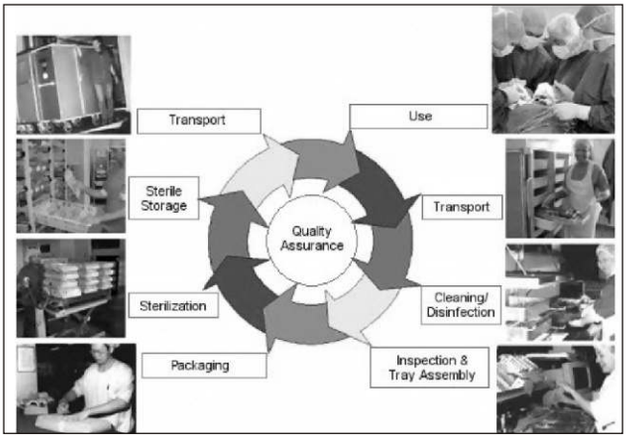
4. Sterile Store : Here the sterilized packs are held ready for issue, stored on "dexion " shelving which can be adjusted as required. The different packs and miscellaneous items for wards and theatres all have their designated positions on the shelves. As a result of experience, no packs, with the exception of a few miscellaneous items infrequently asked for, remain on the shelves longer than 48 hours, as the preparation of the various packs is based on the rate of turnover.Packs are issued from the store to wards or theatres via a Dutch door against a written requisition, loaded on to trolleys, and protected during transport with a plastic cover. Emergency packs for the theatres on the floor above the C.S.S.D. are placed in a " clean " lift in the evening. At 8 a.m. packs for the morning's operations are placed in the lift against a written requisition.Arrangements have been made for emergency supplies during the night and off-duty hours.

There are also five ancillary rooms or areas.

(a) At the entrance to the C.S.S.D. is a trolley bay
(b) Glove-processing room
(c) Linen Store
(d) Office
(e) Egress -distribution

Changing, washing, and toilet accommodation,adjacent to the unit, is also provided for the C.S.S.D.staff.

The Sterile Supply Cycle



Today, the upcoming advanced sterilizers are all computer controlled with a backup that leaves no margin for error. Theoretically, one can achieve 100 per cent sterility, but practically achievement of true sterility is a factor that follows the law of chance. Hence achieving 99.99 per cent log kill of bacterial spores is considered good enough to pronounce the material as sterile.

The latest trends in the West are to use single use devices (SUDs) and automated equipment in CSSD. A single use device is a medical device to be used only on one patient for a single procedure. The high cost of SUDs and CSSD automation is, however, a constraint in developing countries like India, Indian hospitals are generally known to clean, disinfect or sterilising SUDs. This practice should be adopted only very judiciously to reduce disposable medical waste and costs, without compromising on patient safety

Costs

Setting up a CSSD costs Rs three lakh to five lakh for a small hospital and around one crore for a big hospital.

Reference

1. S.S.Harsoor,S.Bala Bhaskar. Designing an ideal operating room complex.IJA:2007;51(3):193-199
2. Alilson VD.Hospital Central Sterile Supply Department.Br Med J :1960 Sept.10;2(5201):772-778
3. J.D.Welch.The Organisation of Central Sterile Supply Departments.J Clin.Path.(1961);14:69