

Establishment of A Postmortem Centre Mortuary-I: Basic Infrastructure

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Abstract

The postmortems (PM) are generally conducted in the Mortuary of a hospital and hold a very key position in this chain and most of the times the cradle for evidence collection, which is the life line of entire investigation process but in most of the Hospitals it is very poorly equipped due to chronic neglect by authorities. Even the Honorable court has also expressed anguish over the state of Mortuaries. Keeping in view the above fact, a series of articles has been planned which will cover different aspects of functioning of Mortuaries including basic infrastructure, standardization, staffing pattern, protocols, welfare measures and futuristic vision. The present article aims to act as an introductory guide to basic layout, infrastructure and equipment in Mortuaries. Effective work output will not be achieved till the doctors and staff will have basic facilities. The policy makers should feel the need of the hour to upgrade all existing mortuaries and build new mortuaries in required places to match with the advancement of Medical and Criminology fields.

Keywords: Mortuary Management, Postmortem, Autopsy, Forensic Medicine.

Introduction

Forensic Medicine is one of the most important specialties of Medical Science acting as a bridge between the Medical and Legal System. The postmortems (PM) are generally conducted in the Mortuary of a hospital and hold a very key position in this chain and most of the times the cradle for evidence collection, which is the life line of entire investigation process. Even though Mortuary holds a very vital position but in most of the Hospitals it is very poorly equipped. The reason is the chronic

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neglect of mortuaries, which comes under least priority of Hospitals/ Health department of any state, when it comes to the holistic development. Even the Honorable courts has also expressed anguish over the state of Mortuaries [1] and Delhi High court even appointed an amicus curiae to oversee the condition of Mortuaries in Delhi [2]. Keeping in view the above fact, a series of articles has been planned which will cover different aspects of functioning of Mortuaries including basic infrastructure, standardization, staffing pattern, protocols, welfare measures and futuristic vision. The article aims to act as an introductory guide to basic layout, infrastructure and equipment in Mortuaries.

Layout and Infrastructure [2-5]

1. Location:

The location of a mortuary with PM facility is very important and the following factors should be considered:

- Adequate vehicular access from the service road.
- Connected to the hospital site with passages for smooth transfer of the bodies.
- Convenience of access by the various users (staff, visitors and Police personnel)
- To ensure that the exhaust from ventilation

systems servicing the mortuary can be discharged safely.

2. *Layout*

- The front and reception of Mortuary should have an aesthetic design to give a soothing appearance for already grieved relatives.
- The immediate entrance for the bodies should be preferably screened from public interaction place and accessible via a separate area.
- The mortuary should have a Modular scientific infrastructure so as to ensure minimum health risks to the doctors and staff with an odourless environment.
- The mortuary should be designed so as to ensure the effective delivery of Medicolegal services along with comfort of the relatives and organ retrieval facility.
- The Mortuary should be designed for the purpose of infection control in a manner, and work-flow should be planned so as to minimize the movement of people and materials from dirty activity areas to clean areas.
- 'Dirty' activity areas include Body Storage, autopsy hall, dirty utility room/instrument store, Forensic Histopathology and Forensic Radiology.
- 'Clean' activity areas include the reception area, waiting rooms, doctor interaction room, Organ donation counseling room, offices, staff changing areas, stores etc.
- 'Transit' activity areas include the body handling area, pathways connecting to Dirty and clean areas.

3. *Entrance of the Mortuary*

- Three entrances are preferably required: one for staff, one for receiving & handing over of bodies and one for relatives.
- Body movement area should not be taken within sight of the relatives/outside public.
- The body entrance area should be screened from public view.
- The layout should also prevent overlooking of the body handling area from outside.
- The external entrance should be overlooked by

the technician's/Morgue attendant office.

- All external entrances should normally be kept locked.
- The entrance for relatives should lead into the waiting area only.
- A public address system should be provided in the visitor/waiting area.

4. *Waiting Areas*

- This should comprise at least a separate entrance, waiting room, working areas for police, doctor interaction room, organ donation counseling room and access to sanitary facilities.
- A calm and soothing environment should be present
- Ventilation should be such that comfortable conditions are maintained in these areas and should prevent the entry of odours from other parts of the mortuary.
- The waiting room should contain comfortable chairs.
- It should also be readily accessible to mortuary staff.
- The interaction room should be used by the Doctor or mortuary staff to explain findings from PMs or to comfort relatives of the deceased, retrieval of the deceased's belongings, organizing tissue donations etc.

5. *Cold Storage*

- The body cold storage may consists of cold chambers for multiple bodies, cold cabinets for single or multiple bodies depending upon the work load, available space and preference. Then cold chambers are more useful in providing more body storage capacity in less space whereas the cold cabinets are more effective in separate storage of bodies. There should be two doors so as to preserve the body from one end and access to PM room on other side for reasons of hygiene and efficiency.
- All doors should be fitted with locks.
- All cold storage compartment bays should be capable of being drained.
- The refrigeration plant must be fully accessible for maintenance.

6. *Body Handling Area*

- The body handling area should be adjacent to the PM room.
 - Space is required in the body handling area for parking and maneuvering trolleys.
 - Body weighing facilities are required. Body weighing may be carried out either on a separate weighing machine or on a trolley which incorporates a weighing mechanism. The former will create greater space requirements.
 - The trolley area is for the parking of trolleys and the hoist when not in use.
 - The floor of the body handling area must be hard-wearing, non-slip and impervious to water and disinfectant.
 - The walls should be capable of withstanding regular washing and disinfection.
 - Ceilings/false ceiling should be capable of withstanding frequent washing down.
 - Mechanical ventilation should be provided to the body handling area so that air flows from this area into the PM room.
- Walls and floors must be finished with hard and durable surfaces, which are easy to clean, impervious to liquids and resistant to disinfectants.
 - Floors must be very hard-wearing, non-slip, raised at the junction with the walls.
 - Plastic laminate on wood, and wooden fittings, are not suitable as fixed work surfaces and Porcelain and stainless steel should be used.
 - All taps should be elbow-operated or hands-free.
 - The PM room should have adequate light by the use of natural light/LED and OT LED lights over the PM tables.
 - Special attention must be given to the need for adequate ventilation in the PM Room to minimize the spread of offensive odours, the possibility of infection of staff and visitors by contaminated airborne droplets so as to maintain a comfortable working environment.
 - The control of air movement in the PM room should be controlled so as the dirty air do not get supplied to the clean areas..
 - The entrance of dissection hall should have an air curtain to prevent the outflow of infecting aerosols. No naturally ventilated space should communicate with the PM room without an intervening lobby or corridor.
 - The examinations of malodorous, decomposing bodies, or bodies of patients of known or suspected infection risk should be undertaken in separate enclosure.

7. *Postmortem Dissection/Autopsy Hall (Image-1) [6]*

- Postmortem examination of the bodies is conducted in this area.
- A minimum of two PM tables are required so that a minimum of two autopsies can be conducted at a time. The number of tables may be increased depending upon the workload of the centre.
- Post-mortem tables must be easily cleanable with efficient drainage.
- Down-draught ventilated PM tables offer microbiological improvements over conventional PM tables.
- Autopsy dissection sinks with detachable Autopsy carts are also preferred because of the effective cleaning of the hall after autopsies.
- Each table should have a hot and cold water supply and a waste outlet fitted with a trap and drainpipe. A filter trap is necessary at the outlet to prevent human tissues going into the drainage as per the Biomedical waste management rules.



Image 1: Postmortem Dissection/Autopsy Hall

8. *Changing Area*

- Entry to the Autopsy hall will be via the changing area.
- Staff entering the Autopsy hall will need to

change into protective clothing.

- Suitable shelving, racks and hooks should be provided for the storage of protective clothing and boots.
- Staff should discard used protective clothing within the changing area while leaving the Autopsy hall.
- Separate bins for the disposal of single-use items and collection of reusable items pending cleaning should be provided.
- Hand hygiene facilities with hands-free tap control should be provided for the washing of hands following the removal of protective clothing.

9. *Observation Area*

- The Mortuaries in Medical colleges require an observation area, which is physically separate from the PM room, for students and other trainees to observe a PM examination.
- The only entrance should therefore be from outside the PM room.
- A separating screen, either full height or partially open to the PM room, should be designed for the demonstration of findings of the dissection bench.
- The availability of an observation area will obviate the need for clinical staff and others observing a PM demonstration to change into protective clothing.
- Audio-visual aids should be for demonstration/teaching purposes, for recording in the PM room.

10. *Mortuary Office*

Mortuary office deals with day to day activities of Mortuary. The office deals with all the day to day proceedings of the Mortuary, store management and equipment maintenance. The Postmortem details are noted in the Mortuary register vide a postmortem number. The embalming register and record is also maintained in the Mortuary office.

11. *Medico-legal Record Room*

This room serves as the hold for all the medico-legal cases dealt in the Mortuary by Doctors of

the Department. Medical Record Technician and attendants should be deputed to maintain MLC records. The subsequent opinion cases are submitted and received by the police from this room. The postmortem reports are handed over to the Police officers by this section.

12. *Mortuary In-Charge Room*

The room is used for the administrative work by the Mortuary Incharge.

13. *Doctor's Room*

The room to be used by the doctors of the department and should have computers with internet facility for report typing.

14. *Clinical Forensic Examination Room*

The cases relating to Clinical Forensic Medicine like examination of accused in sexual assaults, Injury examination, sample Preservation for DNA cases are conducted in this particular area.

15. *Histopathology Lab*

The histopathology lab deals with the processing of the Medicolegal samples of the Jurisdictional area.

16. *Forensic Photographic Section*

The department should have has a dedicated photography section which deals with the still photography of postmortem and other medicolegal cases. The record of the photographs has to be maintained in this section. The photographs should be taken for academic, teaching, research, audit and record purposes of the Forensic Medicine Department.

17. *Radiological Imaging Facility*

The Forensic Radiology unit is required for radiological imaging of dead bodies and other medicolegal cases. The facility preferably should have a fixed Digital Flat Panel Radiography Unit with lateral detector which can be used for foreign body detection in autopsy, age determination/skeletal examination and other Medicolegal work.

If there are budget constraints a portable digital X-ray unit is still essential for radiological imaging.

18. Store Rooms

A store room for the equipment and material storage is required in the Mortuary. Another storage space should be present with access from inside of the autopsy hall where the day to day items are provided by the central hospital store.

19. Morgue Attendant Room

This room should have access to the body handling. It should be situated near the body handling area so that bodies may be registered and labeled before being deposited in the body storage.

20. Staff Rooms

A staff room with facility for relaxing like beds/sofa, Refrigerators, Microwave, TV etc should be provided within a designated area. Food consumption must be strictly confined within these areas.

21. Sanitation Room

A Sanitation room should be provided to service the whole accommodation. There should be lockable cupboard space for secure storage of stock and shelves for holding in-use materials. There should be adequate space for maneuvering machines, for emptying and filling buckets and bowls, and the routine servicing and cleaning of equipment.

Equipment and Instruments

The following is the minimum requirement of equipment in a Mortuary:

1. Mortuary management Software should be developed to interlink all the movement of the dead body from the preservation to the submission of postmortem report.
2. Postmortem Report writing software.
3. Cold Cabinets (Preferably)/Cold Chambers having Four times the capacity of average Daily intake.
4. Hydraulic Autopsy Carts compatible to Cold Chambers and Autopsy Tables.
5. Automatic Mechanism of Shifting of the body from the cold chambers to the tables.
6. Stainless steel Autopsy Tables/Autopsy Sinks with Negative Pressure Ventilations so as to create and odourless environment.
7. Grossing Station.
8. Electric Autopsy Saw with Vacuum cleaner.
9. Electric Autopsy saw without vacuum.
10. Instrument Trolleys.
11. Laboratory Refrigerators.
12. Refrigerators.
13. Suction machine.
14. Dissection Instruments Boxes.
15. Body weighing machine, preferable floor mounted/ Installed on Autopsy tables.
16. Digital Weighing machine for organs
17. Steam Sanitization system.
18. UV Lights.
19. Foggers/ Fumigators for disinfection.
20. Air purifiers.
21. Shoe covering machine.
22. Shoe cover remover.
23. Fluid Transfer Pretaltic Pump for embalming.
24. Induction chulla.
25. Photographic Equipments
26. Computers with printers.
27. Scanners.
28. Coloured Printers.
29. Laser Printers.
30. LED TVs
31. Multifunctional Photocopier.
32. UV Lamp.
33. Metal detector.
34. Folding Metal scale.
35. Instrument trays.
36. Dissection boards.
37. Folding metal scale to measure up to 7 ft.

38. Vernier Calipers
39. Public announcement system.
40. Routine Hospital Supplies.

The above list consists of mandatory equipments only for autopsy dissection Procedures. The Equipments and Instruments for forensic Histopathology, Forensic Radiology and DNA Laboratory are required separately.

Dissection sets consisting of cutting instruments-stainless steel:

- a) Organ knife 10" blade , solid forged -1
- b) Organ knife 6" blade , solid forged -1
- c) Catlin solid forged -1
- d) Cartilage knife 5 -1/2" blade solid forged- 2
- e) Rib cutter
- f) Brain knife 10" blade ,solid forged -1
- g) Resection knife 3" blade , solid forged -2
- h) Scalpels, BP Handle with blades- 10 sets with disposable blades
- i) Bistoury, probe pointed solid forged -1
- j) Scissors (Stainless steel)
 - Scissors; blunt /sharp 8" - 1
 - Scissors; blunt /sharp 6" -1
 - Scissors; dissection 5" with one probe point for coronary artery -1
 - Scissors; bowel, Bernard 1
- k) Forceps (stainless steel)
 - a) Bone cutting forceps 10" straight -1
 - b) Bone cutting forceps 10" angled -1
 - c) Rib-shear 9-1/2"-1
 - d) Dissecting forceps 6" - 1
 - e) Dissecting forceps 8" - 1
 - f) Dissecting forceps 10" - 1
 - g) Toothed and blunt forceps - 6

Equipment should be made available as per the number of post-mortem tables functioning. Two instruments sets per table should be assigned and two set should be kept as reserve.

Conclusion

Since hospital crater to healthcare needs of people and have an associated Mortuary setup, they should have minimum standardized infrastructure so as to display utmost respect for human being even after death. Effective work output will not be achieved till the doctors and staff will have basic facilities. The policy makers should feel the need of the hour to upgrade all existing mortuaries and build new mortuaries in required places to match with the advancement of Medical and Criminology fields.

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References

1. Hafeez S. Handling of Dead in Delhi Mortuary, the ugly truth. The Indian express. 2015 Sep 21. [Internet]. [Cited 2019 Jan 3]. Available from: <https://indianexpress.com/article/cities/delhi/handling-of-the-dead-the-ugly-truth/>
2. Iqbal M. Amicus curiae to see condition of Mortuaries. The Hindu. 2014 Aug 18. [Internet]. [Cited 2019 Jan 3]. Available from: <https://www.thehindu.com/todays-paper/tp-national/tp-newdelhi/amicus-curiae-to-oversee-condition-of-mortuaries/article6327265.ece>
3. Gupta SK, Yadav A. Mortuary Manual. Department of Forensic Medicine, AIIMS, New Delhi; 2018.
4. Management of Mortuaries. Ministry of Health and Family welfare. Government of India. 2014 March 27.
5. Facilities for Mortuary and Post-Mortem Room Services; Design and briefing guidance. Scottish Health Planning Note 20. National Health Service Scotland. Property & environment forum. January 2002.
6. Modular Postmortem Dissection/Autopsy Hall Picture. [image on the Internet]. MTX Contracts; UK [Cited 2018 Jan 03]. Available from: <https://www.mtxcontracts.co.uk/health/mortuary-buildings/>