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# **STANDARD GUIDELINES FOR DIGNIFIED AUTOPSY IN COVID-19 DEATHS**

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## **STANDARD GUIDELINES FOR DIGNIFIED AUTOPSY IN COVID-19 DEATHS**

### **1. Introduction:**

The Coronavirus Disease-2019<sup>1</sup> (COVID-19) caused by the novel coronavirus SARS CoV-2 was first reported in late 2019 at Wuhan city, China. World Health Organization on 30<sup>th</sup> January 2020 declared the outbreak of COVID-19 as a Public Health emergency of International concern. There are currently over three million cases reported worldwide and a quarter million deaths. On 30<sup>th</sup> January India reported its first case of COVID-19 in Kerala and since then over 49000 laboratory confirmed cases and over 1600 deaths due to COVID-19 in India have been reported. The Doctors, Mortuary Technicians and other Mortuary Staff in Mortuary performing Autopsy are exposed to potentially high risk fluid and secretions, even after taking the highest precautions. Hence, No Invasive Autopsy Technique should be adopted for Forensic Autopsy<sup>2</sup>. **The death in hospital and under medical care due to COVID-19 is a Non-MLC case and doesn't require postmortem examination and the required certification of death is being done by treating doctors.** Some of the cases of suspected COVID-19 death which are brought dead to hospitals are labeled by emergency doctors as MLC and body is sent to the mortuary and Police are informed which may need postmortem examination. Some of the cases are suicide, homicide or accident and maybe COVID-19 positive or suspected case of COVID-19. *As per 174 (3)(V)CrPC "the police officer for any other reason considers it expedient so to do, he shall. subject to such rules as the State Government may prescribe in this behalf, forward the body, with a view to its being examined, to the nearest Civil Surgeon, or other qualified medical man appointed in this behalf by the State Government, if the state of the weather and the distance admit of its being so forwarded without risk of such putrefaction on the road as would render such examination useless."* According to this after the inquest procedure, if any crime is not suspected, police have the authority (as per section 174 CrPC) to waive off conduction of medico-legal autopsy, even though labeled as Medico-legal case. The investigating Police officer must proactively take steps to waive off unnecessary autopsies during such pandemic situation. This provision needs to be used prudently based on Police officer's investigation findings and Forensic Doctor's advice. These guidelines are based on the current understanding about modes of transmission of COVID-19, sensitivity of the diagnostic tests, international autopsy guidelines and knowledge about infrastructure and logistic strength of common mortuaries in India.

## 2. Case categorization of dead bodies:

Categorization according to case risk assessment and dealing the cases accordingly is the key in minimizing the possibility of spread of infection. According to COVID-19 infective status, dead bodies brought for medico-legal autopsy can be categorized as below<sup>3,4</sup>:

- a) **Confirmed Case:** Cases with Nucleic acid positive by RT-PCR technique for COVID-19 infection (OR) High homology for COVID-19 infection by viral gene sequencing.
- b) **Suspected Case:** Cases having at least one of the epidemiological history features and 2 clinical features (OR) 3 clinical features of COVID-19.

**Epidemiological history:** 14 days prior to the onset of symptoms:

- Travel history or residence in areas declared COVID-19 hotspots.
- Contact with COVID-19 infected cases.
- Exposure to patients with fever or respiratory symptoms in COVID-19 hotspots.
- Evidence of clustering.

**Clinical features:**

- Fever and/or respiratory symptoms
- In early onset, total WBC count normal or decreased, or lymphocyte count decreased
- Imaging characteristics of COVID-19 as small patchy shadows and interstitial changes, especially in lateral lung
- Ground glass opacities and infiltrates were seen subsequently in bilateral lungs
- Lung consolidation in severe cases.

**Asymptomatic infected persons, Patients in incubation period, unidentified dead bodies and Cases with negative result may not meet the diagnostic criteria for suspected cases, but should be treated as suspected COVID-19 death cases as false negative result is not uncommon.**

### **3. Safety and Precautions in Dead body packing in Hospital ward/ICU/ Emergency Ward and transport of the dead body to mortuary<sup>12-14</sup>:**

All the Designated COVID-19 Hospital should have dedicated Mortuary Services or an earmarked Mortuary with dedicated Transport Facility.

#### **A) Packaging of Dead Body in Hospital ward/ICU/ Emergency Ward:**

- It is advisable to collect Nasopharyngeal swab at the emergency department/casualty/ward/ICU and should be sent for COVID-19 RT-PCR test in all Suspected/ Latent/ Unascertainable cases before moving the body to mortuary for preservation if the same was not sent in due hospital course.
- Treating Doctor should be informed by Death of the patient by Nursing Staff.
- Cause of Death along with body handover slip and Death report should be prepared by treating Doctor.
- The body should be shifted after making proper entry in the nursing log books and the handing over should be done taking proper receiving from Mortuary Staff.
- The Nursing Officer with assistance from Hospital Attendant will pack the Dead Body in Double packing in a leak proof zipped body bag.
- All tubes, drains and catheters on the dead body should be removed.
- Any puncture holes or wounds (resulting from removal of catheter, drains, tubes, or otherwise) should be disinfected with 1% hypochlorite and dressed with impermeable material.
- Apply caution while removing and handling sharp devices attached to the body. They should be disposed into designated containers for sharp hospital wastes.
- Plug oral and nasal orifices of the dead body to prevent leakage of body fluids.
- The exterior of the body bag can be decontaminated with 1% hypochlorite.

#### **B) Transport of Dead Body to Mortuary:**

- The status of COVID-19 infection should be clearly mentioned on the exterior of Body packing.
- The body should be shifted to Mortuary earmarked for preservation.
- All health care workers including mortuary staffs handling dead body with a confirmed or suspected COVID-19 status should observe standard precautions with

minimum prescribed PPE for handling these dead bodies' i.e. N95 masks, coverall, goggles, head cover and shoe cover.

- The vehicle/Trolley after the transfer of the body to mortuary shall be decontaminated with 1% Sodium Hypochlorite.

C) Preservation in cold chamber:

- The existing mortuary facility for body storage should be strictly divided into COVID-19 bodies and Non COVID-19 bodies.
- A proper log book should be maintained for receiving and preserving the body in Mortuary also recording the COVID-19 infection status.
- If feasible, a separate cold chamber/ cabinets shall be allotted collectively for COVID-19 positive and suspected cases.
- Positive cases: In cases if preservation is needed, dead body can be transferred in the sealed, disinfected, leak-proof body bag with proper tag depicting COVID-19 test status (COVID-19 POSITIVE) along with other details of the deceased.
- Suspected Cases: In cases where preservation is needed, dead body can be transferred in a sealed, disinfected, leak-proof body bag with proper tag depicting COVID-19 test status (COVID-19 RESULT AWAITED) along with other Identification details of the deceased like Name, Age, Sex etc.
- Dead bodies should be stored in cold chambers maintained at approximately 4-8°C.
- The cold chamber must be kept clean. Environmental surfaces, instruments and transport trolleys should be properly disinfected with 1% Hypochlorite solution after handling each body.

D) Precautions at Mortuary before handing over the body to relatives:

- Handling staff or morgue attendant should take standard precautions including wearing gloves, water resistant gown/ plastic apron over water repellent gown, and surgical mask. Use goggles or face shield to protect eyes, if there may be splashes.
- Before packing the dead body, it should be cleaned and disinfected using sterilizing agent based on 70% Alcohol or 1% Sodium Hypochlorite.
- The body should be handed over preferably in a robust, leak proof zipped transparent plastic body bag which is locked properly using nylon cable zip ties to avoid spillage of any fluids. The plastic body bag should not be less than 150 µm thick.

- The bagged body should be preferably either wrapped with a plastic sheet or placed in an opaque body bag.
- The body bag packing should again be disinfected using sterilizing agent.

#### 4. Forensic autopsy in suspected & Positive COVID-19 deaths in India<sup>5</sup>:

- **Death due to COVID-19 is a non medico legal case.** The death in hospital or under medical care due to COVID-19 is a non medico legal case and no Forensic Autopsy will be conducted. The certification of death and issuance of death certificate will be done by the treating doctor of the hospital.
- Some of the cases of suspected death due to COVID-19 infection are brought dead to hospital and are labeled as medico legal case by the emergency doctor on duty and the body is sent to mortuary as MLC case and police is informed, which may need post mortem examination for clarity in the cause of death and differentiating between MLC and Non MLC case. The Forensic Autopsy of these cases may be waived off.
- Some cases which are homicidal/accidental/suicidal and may be COVID-19 Positive or Suspected COVID-19 cases. If the deceased dies in the hospital, the clinical records and all the history may be sent along with the body for Forensic Autopsy.
- **The procedure of Conducting Forensic Autopsy:** Forensic Post Mortem Examination is an inquest based medical examination vide sec 174 CrPC and 176 CrPC and inquest itself contains panchnama, statements from witness and all other allied circumstantial evidence details. On the basis of same along with general examination, external examination, examination of clothing, multiple photographs and verbal autopsy (as depicted by WHO) and criteria of elimination and exclusion, the Post mortem should be conducted strictly avoiding any invasive surgical procedures and avoiding splashing of body fluids for staff, body handlers and doctors conducting post mortem.
- **External Examination of deceased body:** A thorough external examination is done after thorough examination of the clothing. During this procedure the autopsy surgeon has to look for all the possible signs and symptoms present over the body apart from rigor mortis and post mortem lividity. Following should be mandatorily examined: Any abnormal discoloration, icterus/anaemia/pigmentation, visible injuries, visible injury which may cause death like ligature mark etc, all natural orifices, visible injury

inside oral cavity, any deformity or disfiguration which is fresh, signs of ascites/effusion/edema etc.

- **Clothing examination of deceased body:**

The clothing should be examined for any suspicious cuts or stains. Detail description of the clothing, both external wear and internal wear, should be photographed and documented including mention of colour/type/any accessories like ring or nose pin or allied articles. Any suspicious stains or cuts should be marked over the cloth and photographed. Clothing should be photographed and if need be should be preserved

- **Still Photographs of dead body:**

Full body photograph from top with clothes intact, full body photograph both back and front after removal of the clothes, close up view of face, neck, anterior and posterior abdomen, lateral part of chest and abdomen, both limbs (anterior and posterior), posterior part of trunk after removal of clothes.

Close up view of any injury/disfiguration or any significant findings, close up view of nail beds, eyes, inner aspect of lips, natural orifices (in case of any significant findings). Photograph of any significant finding contributing to the cause of death.

The photographs later on can be submitted with the Post Mortem report or can be preserved as part of Medico legal reports, to be produced whenever required by the Court of Law or the IO.

- If available digital X-ray may be taken of the full body in case of suspected bony injuries in concept of Virtual and Verbal Autopsy.
- The biological samples are highly contagious and to be sampled and preserved. In India, no Forensic Laboratory or Virology laboratory has been earmarked for examination of such contagious samples. Hence, it is strictly prohibited for any tissue or biological samples to be preserved in such cases. No viscera will be preserved in any suspected COVID-19 positive case.
- In case of unidentified and unknown dead bodies, the facial and multiple body photographs, finger prints of both hands, bunch scalp hairs by combing or by extraction by forceps should be preserved.
- In case of post mortem which are conducted in small post mortem centers by non forensic doctors, where he/she has confusion, he/she should consult the forensic doctors posted in dedicated nearby COVID-19 hospital mortuary, or the police officials should be insisted to shift the body to the COVID-19 hospital mortuary.

## 5. Medical autopsy for research:

- **Ethical aspect for Forensic Autopsy;** It is a Legal Procedure conducted on request of police officers for the Justice delivery system. The body is in the custody of Police and no consent is required from relatives for conduction of Autopsy. All the Ethical, Legal and Confidentiality aspects are already in place while conducting an Autopsy and same should be followed. While handing over the body the relatives may be counseled by the doctor regarding any apprehensions about the Cremation/Burial of body.
- **Ethical aspect for Medical Autopsy for research:** Any research study should be conducted after an approval from the institutional ethics committee and follow the ICMR National Ethical Guidelines for Biomedical and Health Research Involving Human Participants, 2017 and other Health Authorities.

For collection and storage of any biological material for research, adequate safeguards related to informed consent from Legally Authorized representatives, ensuring protection of privacy and confidentiality, other cultural or religious sentiments should be taken care off. There should be clarity on the purpose and duration of sample storage and if the sample would be anonymised or linked to identified information.

- The Doctors, Mortuary Technician and other Mortuary Staff performing Autopsy are exposed to potentially high risk fluid and secretions, even after taking the highest precautions. Hence, the pathological Autopsy requires a detail deliberation, since in literature some special techniques have been devised for doing this autopsy<sup>11</sup>.
- Institutional Research and Ethical committee clearance should be obtained for the research work as per current ICMR guidelines.
- Proper informed written consent should be obtained from the next of kin or the legal guardian of the decedent as per current ICMR guidelines.
- The autopsy proceedings under such circumstances should be done by Pathologists in collaboration with treating doctor.
- Facilities of Department of Forensic Medicine/ Hospital Mortuary can be utilized for obtaining specimens of internal organs as per the interdepartmental working protocols in practice at the institute.
- All the prescribed infection control measures for dealing a dead body with COVID-19 infection should be followed.
- Tissue processing and storage facilities of different departments should be identified which can strictly adhere with safety guidelines for preventing the spread of COVID-



19 infection control practices and as per the interdepartmental working protocols in practice at the Institute.

- Autopsy procedure should be strictly limited to the scope of consent obtained and which is absolutely necessary for the research work concerned.

Limited studies have been conducted on postmortem samples of patients which died due to COVID-19. The studies have indicated that lung tissue manifest significant pathology which includes alveolar exudative and interstitial inflammation, proliferation of alveolar epithelium and formation of hyaline membranes. Most of the pathological studies are in consensus with the clinical features and clinical course of the disease in general. But the disease also gives pathological damages at organs like heart, liver, kidney, Brain, vessels and other organs. So, further Studies are needed in properly understanding pathophysiology of the disease in detail to improve the treatment methodology accordingly. For the same a dedicated core research group should be created comprising of specialists from Pathology, Microbiology, Biomedical research, Anatomy, Forensic Medicine and other interested clinical departments to assess the requirement of resources, feasibility, infrastructure assessment, identifying the research objectives, establishing the Biosafe laboratories and Ethical aspect as per discussion of the above mentioned group members .

## **6. Embalming:**

Embalming of all the COVID-19 confirmed or suspected deceased bodies should not be preferably performed to avoid risk of infections and relatives should be counseled to cremate/bury the body at place of death. If Embalming has to be done for unavoidable reasons, it should be done with minimal invasive technique

## **7. Disinfection & sterilization of mortuary:**

The various equipment and instruments should be disinfected by using 4% Sodium hypochlorite solution after autopsy. The mortuary floor and surroundings should be disinfected by using 10% sodium hypochlorite solution. The solution should be freshly prepared and discarded after every four hours.

- I. Procedure with 10% Sod. Hypochlorite solution:
  - a. Take 1 part Sodium hypochlorite (10%) solution
  - b. Take 19 parts of tap water

- II. Procedure with 4% Sod. Hypochlorite solution:
  - a. Take 1 part Sodium hypochlorite (4%) solution
  - b. Take 7 parts of tap water

Ultraviolet ray disinfection lamps can further be used if available for 1 hour for irradiation disinfection after vacating the room.

## **8. Safe transportation of Dead body of COVID-19 death from one place to another place:**

### **A. Transportation by Road:**

By road transportation is done through hearse vans having portable cold chamber where the temperature of the chamber is maintained at 4 to 8 degree Celsius and the duration without embalming is safe within 24 to 72 hours.

Body packing during transportation:

- The body should be tightly wrapped in plastic sheet and then packed in leak proof double body bag.
- The body bag should not be opened and no religious rituals should be performed in between or at the venue.
- The body handlers should wear minimum PPE like coverall, N95 masks, nitrile gloves, shoe cover and head cover while loading and unloading.

B. Air transport of Covid-19 Death Patient: In unavoidable circumstances, the government may ask for safe embalming by higher Medical Centre.

### **C. Importation of Covid-19 death patients<sup>10</sup>:**

For transportation of dead body by air on in case of death of a person on-board, the standard operating protocol as described in the Standard Operating Protocol for Airport Health Officer can be followed.

## **9. Handing over of Positive or Suspected COVID-19 Dead Bodies to the relatives<sup>6-9</sup>:**

The by burial/cremation process is very sensitive for the family and community and can be the source of trouble or even open conflict. Once the COVID-19 or suspected COVID-19 patient succumbs to death, the medical professionals should hand over the body of the deceased to the relatives/friends for last rites after counseling them that there is no risk of spread of the infection from the dead body if standard precautions of hand hygiene, use of

masks and gloves are followed. The COVID-19 Positive dead body should be accompanied by local authority/ Police personnel for ensuring safety and security. Before starting any procedure, the family must be fully informed about the dignified burial/cremation process and their religious and personal rights to show respect for the deceased. When the numbers of deaths are high the authority may decide for mass burial/cremation after informing the relatives regarding the safe disposal of the dead body.

#### **10. Legal responsibility of Unclaimed/Unknown or the family members are not in position to collect the dead bodies of COVID-19 positive or suspected deaths:**

Due to social stigma related to COVID-19 death, ill health or Medical Quarantine, the relatives may not come forward to claim the body and receive the same for cremation. In many cases relatives may not be able to be present in person at the hospital due to their health condition, geographical or transportation barrier. Under such circumstances, dead body could be disposed by the hospital authority in consultation with Police/ local administrative authorities after informing and taking consent from the relatives of the deceased.

#### **11. Precautions to be taken at crematorium / burial ground<sup>6-9</sup>:**

- In case of large number of deaths, both incineration and burial are recommended methods for safe disposal of dead bodies however the Government's decision of incineration or burial may be taken in best interest of Public health at large.
- In case of burial upper surface should be cemented and earmarked.
- While handing over the body, relatives should be sensitized that the deceased was COVID-19 Positive or Suspected so that they can adhere to the safety precautions like wearing gloves, masks, gowns and cremate/ bury the body along with the zipped body bag, perform hand hygiene before and after handling the dead body.
- Viewing of the dead body may be done by unzipping the face end of the body bag.
- The relatives should also be counseled regarding avoidance of large gatherings at the crematorium / burial ground as the number of people coming in contact with an infected body should be limited in order to decrease more people getting direct contact.

- Religious rituals which requires touching the bodies should be avoided like bathing, kissing and hugging etc. of the dead bodies.
- Religious rituals such as reading from religious scripts, sprinkling holy water and any other last rites that does not require touching of the body can be allowed.
- The ash does not pose any risk and can be collected to perform the last rites.
- The crematorium/burial staff should adhere to the safety precautions like wearing gloves, masks, gowns and health precautions like hand washing.

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