STANDARD GUIDELINES FOR MEDICO-LEGAL AUTOPSY IN COVID-19 DEATHS IN INDIA

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ICMR, New Delhi

Standard guidelines for Medico-legal autopsy in COVID-19 deaths in India

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SCOPE

This brief guidance document has been drafted by Indian Council of Medical Research in consultation with stakeholders in healthcare who are following the outbreak of the COVID-19 infection in the country. It has been specifically produced to aid Forensic experts, Pathologists, Microbiologist, Doctors who are conducting legal autopsy, Mortuary staff, Forensic Laboratory scientist/officers, Social workers investigating Police officers, Morgue van transporters, and Crematoriums dealing with a confirmed or suspected COVID-19 death deceased body. It is an advisory for all of them on the possible health risks associated with such a case and the reduction of these risks health hazards, further spread of disease and Dignified cremation of deceased Body.

The objectives of the document are to:

1. To provide Standard operating procedure for Medico-legal autopsy in COVID-19 cases.
2. To recommend standard Bio-safety precautions for Forensic Pathologists, Health care workers, Mortuary technicians/staffs, relatives, crematorium/burial staff handling COVID-19 dead bodies.
3. To provide guidelines for Safe and Dignified management of COVID-19 dead bodies encompassing preservation, transportation and disposal.
5. To provide further deliberations on Bio-safety guidelines/required resources for Safe medical autopsy and research in COVID-19 death cases.

These guidelines have been specifically prepared from the viewpoint of conducting safe Medico-legal Autopsy with no invasive surgery in COVID-19 deaths. The facilities and resources differ between different Healthcare institutes, Hospital and Autopsy centre and between different clinical departments of same Institute. Hence, each Healthcare institute and each clinical department must customize their respective guideline accordingly, using Indian Council of Medical Research guideline as rational format.

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STANDARD GUIDELINES FOR MEDICO-LEGAL AUTOPSY IN COVID-19 DEATHS IN INDIA
Section I: Introduction

The Corona virus Disease-2019\textsuperscript{1} caused by the novel corona virus, COVID-19 was first reported in late 2019 at Wuhan city, China. World Health Organization on 30\textsuperscript{th} January 2020 declared the outbreak of COVID-19 as a Public Health Emergency of International concern. There are currently over four million cases reported worldwide and three lakh deaths. On 30\textsuperscript{th} January 2020 India reported its first case of COVID-19 in Kerala and since then over 90,000 laboratory confirmed cases and over 2900 deaths due to COVID-19 in India have been reported. The Doctors, Mortuary Technicians and other Mortuary Staffs in mortuary performing autopsy are exposed to potentially high and dangerous health risks due to coming in direct contact with infected organs, fluids and secretions, even after taking the highest precautions. Hence, Non Invasive Autopsy Technique should be adopted for Forensic Autopsy. Death in hospital or under medical care due to COVID-19 is a Non-Medicolegal case and doesn’t require a medico-legal autopsy and the required certification of death has to be done by treating doctors. During this pandemic, many of the dead bodies will be of COVID-19 suspected people, which can be alleged suicides, accidents, homicides or brought dead cases to hospitals. These cases will be labeled by emergency doctors as medicolegal case and subsequently police will be informed, which may necessitate a Forensic Autopsy.

As per 174 (3)(IV) CrPC “\textit{there is any doubt regarding the cause of death}”; or As per 174 (3)(V) CrPC “\textit{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.”\textit{After the inquest procedure, if any crime is not suspected or in cases where there is no doubt regarding the cause of death, police have the authority (as per section 174 CrPC) to waive off conduction of autopsy, even though it has been labeled as medicolegal case. The investigating Police officer must proactively take steps to waive off unnecessary autopsies during this 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.

Section II: Case categorization of COVID-19 dead bodies

Categorization according to case risk assessment and dealing with cases accordingly is the key to minimize possibility of spread of infection. According to COVID-19 infective status, dead bodies brought for medico-legal autopsy can be categorized as below:

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 two clinical features OR three 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 cases.
- Exposure to patients with fever or respiratory symptoms in COVID-19 hotspots.
- Evidence of clustering.

**Clinical features**:

- Fever with or without respiratory symptoms
- Initially, total WBC count can be 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 people and patients in incubation period may not meet the diagnostic criteria for suspected cases but if they have possible epidemiological history, all dead bodies without reliable clinical/ epidemiological history and all unidentified dead bodies should be treated as suspected COVID 19 deaths. Cases with negative swab results also should be treated as suspected COVID-19 deaths as false negative result is not uncommon.
Section III: Safety and Precautions in packing of dead body in Hospital ward/ICU/ Emergency Ward and transport of the dead body to Mortuary

All Designated COVID-19 Hospitals 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 cases before moving the body to mortuary for preservation if the same was not sent in due hospital course.

- Death report mentioning the Cause of death along with body handover slip should be prepared by treating doctor.

- The body should be shifted after making proper entry in the nursing log books.

- The Nursing Officer with assistance from hospital attendant will pack the dead body in double packing in a leak proof zipped body bag.

- A transparent body bag is preferable, so that the body can be identified by relatives/police/administration. If transparent bag is not available, the packing should be done in such a manner that the face can be shown to the relatives/police/administration with minimum movement of the bag and body.

- All dead bodies should be properly labeled indicating: Name, Registration Number, date, time and place of packing. The label should be preferably water resistant.

- All tubes, drains and catheters on the dead body should be removed.

- Any puncture holes or wounds (resulting from removal of catheters, drains, tubes, or otherwise) should be disinfected with 1% Sodium hypochlorite and dressed with adhesive 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, nasal orifices of the dead body to prevent leakage of body fluids.

- The exterior of the body bag should be decontaminated with 1% Sodium hypochlorite.

- The dead body shall be kept inside leak-proof plastic body bag wrapped in a plastic bag or sheet.
B) Transport of Dead Body to Mortuary:

- The status of COVID-19 infection should be clearly mentioned on the exterior of Body packing.
- The trolley, on which the body is to be shifted, must be disinfected before it is taken out from the ICU/ward/emergency.
- If death occurs in ICU/hospital ward/emergency, the Health Care Worker (HCW) working in the respective areas should hand over the trolley carrying the dead body to the designated staff outside of the respective area. **Under no circumstances should the HCW working in the COVID ward/area carry the dead body to the mortuary or any other place.**
- The HCW who shifts the body to the mortuary should be wearing mask, coverall and gloves at all times. Complete PPE kit is not required for transport of dead bodies, if they are packed properly.
- The body should be shifted to Mortuary earmarked for preservation.
- All mortuary staffs involved in transfer of the dead body from trolley to cold chamber and vice versa, as well as shifting of the dead body to the autopsy hall need to wear prescribed PPE for handling these dead bodies’ i.e. N95 masks, coverall, goggles, head cover and shoe cover. This is because shifting in mortuary requires direct handling and lifting of the body by the staff.
- To minimize the number of people involved in handling of the dead body, the mortuary staff who is entrusted with the duty of shifting the dead body to the autopsy hall should be the one who assists during the autopsy.
- 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 area for COVID-19 bodies and area for Non COVID-19 bodies and should be labeled.
- A proper log book should be maintained for receiving and preserving the body in Mortuary, clearly recording the COVID-19 infection status.
- If feasible, separate cold chamber/cabinets shall be allotted collectively for COVID-19 positive and suspected cases.
• At places where allotting separate cold chamber is not possible due to lack of adequate facilities, the existing cold storage should have dedicated storage chambers/bays/trays for COVID-19 bodies.

• The COVID-19 positive bodies should preferably be preserved in lower chambers, to prevent spillage of body fluids or other material while lifting and tilting the body.

• Dead bodies should be stored in dedicated cold chambers/cabinets maintained at approximately 4-8°C.

• The cold chamber must be kept clean. All surfaces, instruments, door knobs and transport trolleys should be properly disinfected with 1% Sodium hypochlorite solution after handling each body.

D) Precautions at Mortuary before handing over the body:

• Handling staff or morgue attendant should take standard precautions including wearing gloves, water resistant gown/ plastic apron over water repellent gown, and surgical mask.

• Any COVID-19 confirmed or suspected body that is received in the mortuary should be properly packed and sealed as mentioned before. In case the body is received directly to the mortuary, it should be packed and sealed as mentioned earlier. The procedure for packing and sealing is same, whether it is done in ICU/ward/ emergency or at the mortuary.
**Section IV: Forensic autopsy in confirmed & suspected COVID-19 deaths in India**

- **Death due to COVID-19 is a non-medicolegal case.** The death in hospital or under medical care due to COVID-19 is a non-medicolegal case and no medicolegal Autopsy shall be conducted. The certification of death and issuance of Medical Certificate of Cause of Death (MCCD) shall be done by the treating doctor.

- **Dead bodies of suspected COVID-19 patients** which are brought dead to hospital may be labeled as medico legal cases by the Doctor in Emergency/ Casualty duty. In this situation the body will be sent to Mortuary as a medicolegal case and police will be informed, which may necessitate a Medicolegal Autopsy for clarity in the cause of death. The Forensic Autopsy in these cases may be waived off.

- In some homicidal, accidental or suicidal death cases, the deceased may be COVID-19 confirmed or suspected. If the patient dies in the hospital, the clinical records and all other relevant documents may be sent along with the body for Forensic Autopsy.

- **The procedure of conducting Forensic Autopsy:** Medicolegal Autopsy is an inquest based medical examination vide sec 174 CrPC and 176 CrPC and inquest itself contains panchnama, statements from witnesses and all other allied circumstantial evidence details. On the basis of same, along with examination of clothing, external examination, multiple photographs, utilizing the concept of verbal autopsy (as described by WHO) and criteria of elimination and exclusion, the medicolegal autopsy shall be conducted strictly avoiding any invasive surgical procedures and avoiding contact with body fluids for mortuary staffs, body handlers and doctors conducting post mortem examination.

  **Photography:**

  - While performing autopsy, photography must be done in every case. The following views must be taken
  - Full body front and back with clothes (the back view can be taken by merely tilting the body, or can be completely avoided unless mandated by the presence of injuries on the back)
  - Full body front and back without clothes
  - Close up of face, clearly depicting the facial features (used for identification)
• Panoramic and close up view of all injuries present on the body
• Any other photograph that might be useful in a particular case.
• The photographs later on can be submitted with the autopsy report or can be preserved as part of Medicolegal records, to be produced whenever required by the Court of Law or the Investigating Officer.
• If available, X-ray imaging may be performed of the entire body in case of suspected bony injuries/any other relevant cases in concept of Virtual Autopsy.

Examination of clothing:
• Clothes are an important part of examination and can many times provide important evidence regarding the case. However, it must be remembered that the clothes can have the deceased’s body fluids and secretions attached to them. In every case, handling of clothes should be done assuming that they have the deceased’s secretions and are highly infectious.
• The clothes should be removed by cutting them, taking care not to damage any part which may be having any cuts, marks or any biological fluid on them, which could be important evidences.
• The clothes should be examined after air drying them and then carefully laying them on the ground.
• The packing and handing over of the clothes should be done after ensuring that there are no wet patches or fresh stains of any kind on the clothes.
• The packing should be done in a paper envelope, which should be then sealed in a thick plastic envelope which needs to be sanitised by 1% sodium hypochlorite solution from outside before despatching.

External examination of body: A detailed external examination should be done after examination of the clothing. During this procedure, the autopsy surgeon has to look for all possible external injuries and manifestations which could be present over the body in circumstances as alleged. Following should be mandatorily examined: Any abnormal discolouration, icterus/pallor/pigmentation, condition of all natural orifices, all visible injuries of any age all over the body, hidden injuries in concealed parts of the body like injuries inside oral cavity, behind ears, axilla, scrotum, digital webs etc., any deformity or disfiguration of any part of body, other external manifestations of clinical conditions like ascites/oedema/surgical emphysema etc.

Sample preservation:
• Biological samples are highly contagious and dangerous to be sampled and preserved. In India till date, no Forensic Science Laboratory or Virology laboratory has been earmarked for biosafety level for examination of such contagious samples. Hence, it advisable that no tissue or biological samples to be preserved in such cases.

• In case of unidentified and unknown dead bodies, the facial and multiple body photographs, finger prints of both hands, bunch of scalp hair with the root by extraction by forceps including the hair bulb for DNA analysis; should be preserved for later identification.

• In case of post mortem which are conducted in small post mortem centers by non-forensic doctors, where he has confusion, he should consult the forensic doctors posted in dedicated nearby COVID-19 hospital mortuary and if needed, police officials can be directed to shift the body to the COVID-19- hospital mortuary.

• An appropriate log book of who is entering the autopsy room (HCW or any other staff) should be maintained as it is easier for tracing in case if required later.

• Ethical Aspect for Medicolegal Autopsy: Medicolegal Autopsy 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 conducting autopsy. All the ethical, legal and confidentiality aspects are already in place while conducting 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.
Though these guidelines do not cover the aspect of Pathological Autopsy, the ethical concerns involved in Pathological Autopsy for research with COVID-19 samples that may be involved are as follows:

- Any research study should be conducted after the proper ethical clearance from respective Institute and as per the established Research guidelines of ICMR and other Health Authorities. The informed consent and other ethical aspects like confidentiality, religious sentiments etc. should be addressed as per the specific objectives and methodology of the study.
- The Doctors, Mortuary Technician and other Mortuary Staff in Mortuary performing autopsy are exposed to potentially high and dangerous health risks to organs fluid and secretions, even after taking the highest precautions. Hence, the pathological Autopsy requires a detailed deliberation, since in literature some special techniques have been devised for doing this autopsy.
- Institutional Research and Ethical Committee clearance should be obtained for the research work as per current National Ethical Guidelines for Biomedical and Health Research involving Human Participant (2017).
- Proper informed written consent should be obtained from the next of kin or the legal guardian of the decedent as per current National Ethical Guidelines for Biomedical and Health Research involving Human Participant (2017).
- 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 with 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 dissection procedure should be strictly limited to the scope of consent obtained and which is absolutely necessary for the research work concerned.
• 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 anonymized or linked to identified information.

Limited studies have been conducted on postmortem samples of patients who 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 membrane. 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 to organs like heart, liver, kidney, brain, blood vessels and other organs. 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 resources, feasibility, infrastructure assessment, identifying the research objectives, establishing the Biosafety laboratories and Ethical aspect.

Section VI: Embalming

Embalming of all the COVID-19 confirmed or suspected bodies should not be performed to avoid the risk of infections and relatives should be counseled to cremate/bury the body at the place of death itself. If embalming has to be done for unavoidable reasons, it should be done with minimal invasive techniques.
The human Corona virus can remain on various surfaces for varying period of time, which can be as high as nine days. In experimental conditions, this virus has been found on various surfaces even beyond 72 hours. The following methods should be employed for the cleaning of the mortuary:

- The mortuary must be kept clean and properly ventilated at all times.
- Perform autopsies in an adequately ventilated room.
- Lighting must be adequate.
- Surfaces and instruments should be made of materials that can be easily disinfected and maintained between autopsies.
- Autopsy table, instruments, equipment and other materials used during autopsy must be disinfected using 1% Sodium Hypochlorite or 70% ethanol. Wherever possible, the surfaces should be washed first with soap and water before being cleaned with bleach or ethanol.
- The mortuary floor and surroundings should be disinfected by using 1% Sodium Hypochlorite solution; allow a contact time of 30 minutes, and then allow it to air dry. The solution should be freshly prepared and discarded after every four hours.
- Personnel who are doing the cleaning must be in complete PPE kit, without which the cleaning should not be undertaken.
- All the waste that is generated during autopsy, both biological as well as other (e.g. PPE kits) must be disposed of as per the hospital’s waste disposal policy.

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

- **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.
Section VIII: Safe transportation of dead body of COVID-19 death

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. The duration of transport without embalming is safe up 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 burial ground/crematorium.
- The body handlers should wear complete PPE like coverall, N95 masks, gloves, shoe cover and head cover while loading and unloading the dead body.

B. Air transport of COVID-19 dead body:

In unavoidable circumstances, the Government may ask for safe embalming by higher Medical Centre.

C. Importation of COVID-19 dead body:

For transportation of dead body by air or 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.
COVID-19 is a highly infectious disease. Its high infectivity and absence of any cure at present makes it a deadly disease. When all the legal formalities have been completed, the question that comes is whom and how to hand over the dead body. Due to its highly infective nature, it has been observed that many times the relatives of the deceased are in isolation/quarantine. So, getting them to receive the dead body and to perform the last rites can put them and other people at risk of acquiring the infection.

Death is a highly emotional event. The loss of near and dear ones is a highly stressful event for the family members. In such times, it becomes difficult to manage how the deceased’s relatives will behave on receiving the dead body. At most of the places, there is legal limit to the number of people who can be present either in the mortuary or in the burial/cremation grounds. Keeping these situations in mind, the following guidelines have been prepared to ensure proper and dignified disposal of the dead.

- **If the COVID-19 test report is awaited, the dead body must not be released from the mortuary until the final report is received.**
- The dead body must be handed over to the district administration.
- The Medical Superintendent of the hospital must coordinate with CMO/District Collector for formation of task force that can oversee the whole process without causing undue delay.
- As soon as a patient is sick in the ward/ICU/emergency, or the autopsy is going to be started, the local administration should actively involve, so that if and when the need arises, the administration is ready with vehicles to transport the body, as well as having relatives of the deceased available nearby.
- At no time, more than two relatives must be present near the body and they must maintain a distance of at least 1 meter from the body.
- The dead body must be identified by the relatives through the plastic bag, without opening the bag, and it must be done in the presence of law enforcing agencies.
- The dead body must be taken to the burial/cremation ground in presence of law enforcing agencies, where not more than five relatives of the deceased should be allowed.
Section X: Legal responsibility of Unclaimed/Unknown dead bodies or if family members are not in position to collect the dead bodies of COVID-19 confirmed or suspected Deaths

Due to social stigma related to COVID-19 death, ill health or quarantining, the relatives may not able to 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 off by the hospital authority in consultation with Police/ local administrative authorities after informing and taking consent from the relatives of the deceased. In case of unclaimed/ unknown dead bodies this can be done by the hospital authority in consultation with Police/ local administrative authorities.

Section XI: Precautions to be taken at crematorium / burial ground

- 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 the best interest of public health at large.
- In case of burial upper surface should be cemented and earmarked.
- The body must be cremated in an electric crematorium, wherever possible, so that the movement and handling of the body are minimized.
- While handing over the body, relatives should be sensitized that the deceased was COVID-19 Confirmed 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 through the body bag itself. If the body bag is opaque, then the viewing can be done by unzipping the face end, ensuring that a minimum of one-meter distance is maintained between the deceased and the viewer.
- 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 including acts such as bathing, kissing and hugging of the dead bodies.
- Religious rituals such as reading from religious scripts, sprinkling holy water and any other last rites that do 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.

**Section XII: Psychosocial support to family members in dealing with the COVID-19 death**

Death is almost always associated with emotional turmoil, whether it is expected or sudden. Those who are bereaved, goes through a series of grief reactions, which according to Kubler-Ross (1969), follows five stages: denial, grief, anger, depression, and acceptance. Although these reactions are natural and help in the mourning process, it must be sensitively handled. Doctors managing patients with COVID-19 battling for life, are one of the most immediate witnesses of deaths. Especially, those from Forensic Medicine, are closely involved in management of dead bodies and the bereaving family members. Informing the family members or relatives about death of patient with COVID-19 and the management of their emotional reactions throughout the process, is often the prime responsibilities of the doctors and is often perceived to be a stressful experience. An understanding of the appropriate ways of handling the situation sensitively helps in performing the task effectively.

For simplification, the role and responsibilities performed by doctors in Forensic Medicine can be subdivided into two major categories where first is to be practiced while interacting with the family member of deceased COVID-19 patient and the second one is for the doctor himself.

1. **Facilitating Grief Reactions:**

It is essential to understand that many traumatic stress reactions are expressed through bodily gestures and emotions. For any doctor, witnessing a bereaving family member is the most
critical part of the management. It demands a need for a sensitized approach for which many professionals may feel unprepared or challenging. Some of the important ways of facilitating adaptive grief reactions are as follows:

a. **Allow free flow of emotions:** It is crucial for the doctor to know that it is normal to experience emotional turmoil (example- feeling of sadness, anger, abandonment, anxiety, stress) in response to losing anyone, especially compounded due to the complications associated with COVID-19. Though witnessing a bereaved human can naturally incline an individual towards providing any form of support within reach. However, it is professionally advisable to refrain from doing so (without appropriately knowing the family context, their ways of responding to trauma or the severity of trauma). Maintain the psychological presence with the family. Allowing the uninterrupted expression of emotion is in itself an intervention, or a part of the human process to adjust to the new reality in life. Encourage them to talk about the patient's illness, and if they open up, try to explain the efforts taken to save him/her and the inevitable outcome. Moreover, the doctor can further reduce the need for initiating active intervention by explaining themselves that mourning to the grief is a gradual process and may take a lot of time and efforts for the family members. Letting an individual to actively engage in expression of trauma marks, the beginning of the mourning process and they must go on till a person gathers strength and courage to engage in the cremation process.

As a cautionary note, it may happen many times, that during an emotional upsurge, the family member can argue or blame the doctor or the treatment team. It is important to understand that it is a manifestation of the acute emotional turmoil they are going through currently and there is absolutely no need to provide any explanation for the same or engage in any further argumentation.

b. **Facilitating acceptance of the reality:** As discussed in the previous point, its significant to process trauma, and denial or disbelief can block this process of adjustment. Thus, to facilitate acceptance of the death, doctor can arrange for viewing the body bag till face and let family members spend some time with it to sink in reality. Spending time with the body of a loved one who has died helps mourners truly and fully acknowledges the reality of death with all necessary and prescribed safety and precautions. It also provides a precious last chance to say goodbye “in person.”
The doctor should explain to family members about all the safety precautions while maintaining the full dignity of the deceased. The doctors need to emphasize that all religious rituals which requires touching of the dead bodies should be avoided including acts such as bathing, kissing and hugging.

c. **Appoint a supportive family member to facilitate the recovery:** To facilitate recovery, doctor can designate a support person of the family (the one who appears to be most composed during the crisis) to provide necessary help and assistance to the family members throughout grief process. Further, grieving process usually involves holding funerals which is one of the most culturally acceptable ways of coping with grief. Since COVID-19 pandemic may deprive bereaved of this critical step, support person, or anyone more familiar with the technology can be suggested to hold tele-funerals such that family members feels a sense of comfort in virtual social connections.

As an immediate next step, the appropriate hospital staff should assist the relatives in completing the formalities like filling the forms or other details of deceased to obtain a death certificate. Precautionary steps which must be followed throughout the cremation process may be re-explained clearly. Furthermore, ensure smooth and timely handing over the body of deceased along with valuables and personal belongings.

2. **Practicing Self-Care:**

It is crucial for the clinician or staff especially in the event of COVID-19 related death, to be aware of the concept of vicarious trauma in professionals. Vicarious trauma refers to the experience of a clinician who develops a traumatic reaction, secondary to the client’s traumatic experience. It can be manifested in multiple ways such as feelings of helplessness, lack of trust in others, social withdrawal, becoming easily emotionally upset, vague feelings towards people and events, loss of connectedness to others and the self, hyper vigilance and difficulty to experience joy and happiness. Also called as spillover effect, the experiences often build within the context of compassion fatigue created by the trauma of helping others in distress, which leads to a reduced capacity for empathy toward suffering in the future. Since, it has deleterious impact on the mental health of the doctor as well as their clinical practice, it is essential to deal with it by regularly engaging in self-care which includes:

a. **Nourishing physical health:** engaging in activities which helps doctors to remain healthy and fuels them with enough energy to get through the day. This includes eating healthy at regular intervals, maintain sleep hygiene and going for walk.
b. Nourishing emotional health: As it is significant to maintain physical hygiene, so it is crucial to nourishing one’s emotional health. This can be done by engaging in frequent ventilation of emotions with loved one/trusted support person which includes addressing emotional pain and receiving support for the same. Engaging frequently in pleasurable activities which add richness and meaning to life further helps in ensuring emotional well-being.

c. Nourishing social health: Everyone has a need for connectedness and building meaningful social relationships. Finding some quality time for loved ones and people who are significant in one’s life, nourishes the need for nurturance and belongingness.

d. Enhancing coping mechanisms: Doctors can actively invest in employing adaptive coping to stressful situations in their lives. Adaptive coping mechanisms involve confronting problems directly. For example, making reasonably realistic appraisals of problems, recognizing and changing unhealthy emotional reactions, employing problem-solving and positive reinterpretation strategies.

Section XIII: Conclusion

The Doctors, Mortuary Technicians and other Mortuary Staff in Mortuary performing autopsy are exposed to potentially high and dangerous health risks to organs fluid and secretions, even after taking the highest precautions. Hence the postmortem examination of Medicolegal cases should be conducted using Non invasive technique as described above which meet all the legal requirements for investigation of the case. It will prevent the spread of infection to Doctors, Mortuary staff, Police persons and all the people in chain of dead body disposal. Further, all the personnel associated with the care of the dead, from doctors to mortuary staff, to hearse van drivers and crematorium/burial ground staff should follow the precautions so that everyone can do their duty in good health.
Section XIV: Frequently Asked Questions

The draft of the Guidelines was put up for comments and suggestion on ICMR website for a period of one week. The suggestions received are included in main draft under the relevant heading. Some of the doubts are being clarified in the form of frequently asked questions as under:

1. **What is to be done if zipped body bag is not available?**
   - **Ans:** If zipped body bags as described are not available, the dead body can be wrapped in minimum of two layers of thick, leak-proof plastic sheets, secured with adhesive tapes.

2. **What to be done when there is shortage of man power in shifting the dead body from ward to mortuary?**
   - **Ans:** This is more of an administrative issue to be handled locally at the hospital administration level. There should be dedicated hospital staff (Multipurpose worker, Nursing Orderly etc.) for transfer of such bodies. In shortage of staff in Mortuary additional staff should be deputed for transportation of the body by hospital authorities. The help of NGO’s and Social welfare department may also be taken to address such kind of manpower issue.

3. **Is there any risk of infection to body handlers if COVID-19 and non-COVID bodies are kept in separate racks of same cold chamber having the same compressor?**
   - **Ans:** The chances of contacting the infection is negligible if the proper precautions are taken like double bagging of body, handling the body with proper PPE, disinfection of the exterior of the bag and personal hygiene measures are properly followed.

4. **How many days is the infectivity period of COVID-19 from a dead body?**
   - **Ans:** The COVID-19 infection is a respiratory infection and mainly spread through aerosols. As per the available scientific literature till now, the survival of virus gradually decreases with time in a dead body but there is no specific time limit after to declare the body non infective. So, it is advisable to adopt the necessary precautions while handling the body and non-invasive autopsy technique.
5. What is waving-off of a medicolegal autopsy?

Ans: The waving-off of medicolegal autopsy is more of a term which is used in day to day practice when the police hand over the body of a medicolegal case without autopsy to the relatives. Section 174 CrPC clearly states that the autopsy needs to be conducted if there is doubt after inquest regarding the cause of death. In cases where there is no such doubt, autopsy is not required. However, this discretion lies with the investigating officer, depending on his inquest findings. This provision of law can be used and it can be discussed with the investigating officer regarding the requirement of autopsy in a particular case. In case it is not essential and all the requirements of the autopsy are already fulfilled (e.g. patient of road traffic accident who was admitted in hospital and died during treatment, with complete hospital records), the investigating officer can hand over the body to relatives/administration (as the case may be) without getting the autopsy done.

6. What is the procedure of waving-off of a Medicolegal Autopsy and who is the competent authority?

Ans: The investigating officer can decide whether a medicolegal Medicolegal Autopsy has to be done or not on a dead body and is himself empowered to take a decision in this regard. But Law and order is state subject in Indian federal system. The exact procedure in practice and competent authority may be variable in different States and UTs. The concerned autopsy surgeon should be aware of the practice followed at state/district level and in case of any doubt may coordinate with senior police officers. The autopsy surgeon should take a proactive role in guiding and coordinating with police officers to reach a decision regarding handing over the body without autopsy.

7. If a COVID 19 confirmed/suspected case dies to any unnatural cause like poisoning, accident, burns, drowning etc., what procedure should be adopted? Whether internal dissection is required or not?

Ans: In such cases, the certification of death and issuance of Medical Certificate of Cause of Death (MCCD) should be done in coordination with police personnel and the body should be handed to relatives without internal dissection. In treated cases, hospital case records like lab investigation reports, report of other diagnostic tests...
including imaging studies, treatment given etc. will give an additional documentary background for correlating with the investigation and to reach a reasonable conclusion about the cause of death and other related queries. Non-invasive autopsy technique as described in guidelines should be used, if at all required to prevent the risk of spreading the infection to Mortuary Staff, Police personnel and contamination of Mortuary surfaces.

If Autopsy surgeon feels that he will not be able to conclude cause of death or any other related issue without dissection, then he can proceed with minimal invasive / limited internal dissection. However, the dissection has to be performed keeping in mind that the conduction of autopsy is a high risk procedure which is potentially as hazardous as any other procedure performed on the body of a COVID-19 patient. Therefore, the following precautions must be taken while conducting the autopsy by adopting proper infection control measures as described below:

- All the staff who enters the autopsy hall, including the doctor and other mortuary staff, should be wearing the complete PPE set, including the N-95 mask, face shield, goggles, overall etc. Under no circumstances should autopsy be performed in the absence of proper and complete PPE
- The mortuary must have a separate donning and doffing area for the PPE.
- Sharp, pointed scissors should be avoided. Instead, round tipped scissors should be used.
- The organ dissection should be carried out in situ. Only those organs or organ systems should be removed from the bodies which need to be examined in detail to determine the cause of death.
- The respiratory tract (upper as well as lower) must not be removed from the body unless necessary. If they need to be removed, all efforts must be made to use minimum force for their removal and spillage of body fluid must be tried to be minimized.
- Skull should be opened using hand-saw/ chisel and hammer/ any other such equipment that is not going to generate aerosols. The oscillating bone saw should not be used.
- After the procedure, all wounds should be stitched and orifices must be plugged with cotton dipped in 1% Sodium Hypochlorite to prevent and discharges.
• Viscera or any other sample that are removed at the time of autopsy should be considered as infectious as the body from which they are removed. Hence, minimum amount of sample should be removed from the body.

8. How can cause of death be opined in suspected poisoning cases which are brought dead without preserving viscera?

**Ans:** The cause of death can be opined based on circumstantial evidences like scene of crime photos, presence of suspicious containers/packets, statements of witnesses and police officials along with external examination of the body showing suggestive features of poisoning. The Autopsy surgeons, Investigating Officers and the supervising senior police officers must have a very clear concept that investigation and legal course of death due to poisoning is not solely based in a positive viscera report. A negative viscera report also does not rule out death due to poisoning as the viscera tests has a lot of limitations and restricted to very few common poisons. As per judgments of Honorable Supreme court and the cause of death can be concluded as due to poisoning depending Medical records, circumstantial evidences and after ruling out other cause/manner of death.

9. Is there any dedicated Forensic Science Laboratory for handling samples from COVID-19 cases?

**Ans:** No CFSL/FSL at National or State level has been specifically designated to handle samples from COVID-19 cases. Few State FSLs have issued SOP’s at regional level to handling and submission of theses samples.

10. If the Investigating Officer insists on preservation of viscera for Chemical analysis, what is to be done?

**Ans:** If Chemical analysis is mandatory for the fulfillment of investigation, the autopsy surgeon can go for percutaneous collection of femoral blood, urine and Vitreous samples (if indicated). COVID 19 infective status should be labeled over the Specimen. Still if viscera preservation is still required it may be conducted using the precautions mentioned at point no 7.

11. What precautions should be taken while handling/packing/handing over the biological samples?
Ans: The primary container containing sample should be placed into a larger secondary container. Both containers should be having leak proof, air tight caps. The secondary container should then be placed into a re-sealable plastic bag. The plastic bag should then be placed into a biological specimen bag with absorbent material, after which it can be transferred outside of the autopsy room for handing over to the IO. During the entire procedure, the doctor and helping staff should wear PPE.

12. In a Non Invasive Autopsy, how to opine about time since death?
Ans: Estimation of Postmortem Interval (PI) or Time since Death (TSD) is mostly given on the basis of various external post-mortem changes along with circumstantial evidences like hospital records, time of last seen alive, CCTV footages and statement of eye witness after confirming their reliability. The same procedure can still be followed.

13. How to determine and opine the cause of death in sudden death/brought dead cases by Non Invasive Autopsy?
Ans: With a detailed external examination, considering all circumstantial evidences furnished by Police after their preliminary investigation, statements of relatives, perusal of available medical records, the doctor can rule out involvement of any unnatural elements like suicide, homicide or accident in vast majority of cases. Instead of opining the exact cause of death which may not be possible in every case, the concept of exclusion diagnosis should be applied.

A suggested model opinion in cases:

“Considering the Autopsy findings, police investigation findings, statements of relatives, other circumstantial evidences and ruling out of external injuries, I am of the considered opinion that death in this case could be due to a natural cause. A subsequent opinion may be obtained by the IO if needed in view of further investigative/circumstantial findings.”

14. What is the protocol to do autopsy in a COVID-19 suspected dead body with Negative RT-PCR result?
Ans: Considering the relatively high rate of false negative results of COVID-19 RT-PCR, every case still has to be considered as a possible COVID-19 case. Thus, it is advisable to follow Non-Invasive Autopsy in these cases throughout the duration of pandemic.

15. Can Invasive autopsy be performed after disinfecting the body surface using 1% hypochlorite or 70% alcohol solution?
Ans: Source of infection from a COVID-19 Confirmed case is mainly from aerosol generating procedure from internal body fluids and visceral organs. Even mucosal surfaces, such as those in nasal and oral cavities, gases or fluids expelled through natural orifices as a result of compression of cavities which can occur during transport, can be sources of disease transmission. Hence, surface disinfection does not provide protection against COVID-19 during autopsy.

16. What is the advisable procedure for conducting an autopsy in which foreign body is suspected to be inside the body (like a firearm bullet)?
Ans: Pre-autopsy radiological evaluation of the body should be conducted in these cases to locate the foreign body. After discussion with the IO if actual extraction is not needed for investigation, the extraction may be avoided and the same should be recorded in the Autopsy report. If the legal issue behind the case strongly warrants extraction, the foreign body should be retrieved with minimum possible exposure by using limited dissection techniques confined to affected body region/cavity and with all prescribed personal protection measures mentioned at point no 7.

17. Is Non Invasive approach and limited dissection justifiable where the medico-legal issues related to the case require a mandatory internal examination?
Ans: Yes. In Indian legal scenario, there is no pre-defined legal description/notion on the extent of dissection required for a medicolegal autopsy. It is up to the discretion of the autopsy surgeon for satisfying the fulfillment of investigation. All infection control measures should be strictly followed during and after the procedure.

18. What procedure should be adopted regarding identity of an Unidentified/Unknown dead body in non-invasive Autopsy technique?
Details of clothing and other belongings should be properly recorded and article may be handed over to IO for identification purpose. The facial and multiple body photographs and finger prints of both hands may be taken. A bunch of scalp hairs including hair bulb by combing or by extraction by forceps should be taken and preserved for DNA analysis. If X-ray facility is available, whole body X-ray can be taken and looked for characteristics of age, sex and stature and specific unique individual characteristics.

19. What additional precautions can be taken in the Mortuary during COVID-19 pandemic?

Ans:

A) For Police Personnel

- All the police persons coming to the mortuary should be advised to wear mask strictly follow social distancing
- No more than one relative should accompany them inside the mortuary.
- The IOs of different cases should avoid clustering while doing the paperwork inside the mortuary premises.
- As far as possible only one Police person should remain inside the mortuary at a time.

B) For General Public

- All General public coming to the mortuary should be allowed only after wearing the masks and strictly follow social distancing (to maintain 1 meter distance between each other) while inside the mortuary premises.
- Entry of large groups while accompanying the dead body of a relative and clustering inside the mortuary premises to be prevented.
- Only one person should enter for any enquiry or accompany the police personnel.

C) For Departmental Staff

- All the Staff members working in Mortuary are strictly directed to wear masks and strictly follow social distancing.
- They should not cluster in their free times and maintain the basic hygiene for prevention of spread of infection.
Any Staff member not feeling well and having the symptoms of COVID-19 should not attend the duty and report to concerned screening area in Hospital.

D) Infrastructure

- The exhaust from these autopsy rooms should be directed outdoors, away from windows, doors, areas of human interaction or gathering spaces, and from other building’s air intake systems.
- PPE should be available for the doctor and mortuary attendants.
- Multiple portable air recirculation unit/ air purifiers may be placed for reduction in aerosols.
- Minimum staff should enter the autopsy hall.

20. How to utilize the concept of verbal autopsy in a medico-legal case?
   **Ans:** The detailed questionnaire furnished by WHO for verbal autopsy can be utilized for taking history from relatives or friends as a check list for evaluating history related to the most probable causes of death. The questionnaire can be modified as per the requirement of the case concerned.

21. How the concept of virtual autopsy can be incorporated with medicolegal autopsies in the current pandemic?
   **Ans:** Virtual autopsy concept is based on utilization of postmortem cross sectional imaging like Computed Tomography to evaluate the internal findings in a dead body to avoid unnecessary dissections. The non-invasive technique as described in guidelines is part of virtual autopsy procedure adopted in International Scenario. Postmortem X ray examination can be done if possible cases to obtain further evidentiary internal findings which may help in formulating a more focused opinion as to the cause of death. The virtual autopsy concept is the need of the hour in current scenario.

22. How to dispose biological waste generated at mortuaries?
   **Ans:** The waste disposal can be done in adherence with the standards prescribed for COVID-19 isolation wards in guidelines for handling, treatment and disposal of biomedical waste generated during treatment, diagnosis or quarantine for COVID-19
patients published by Central Pollution Control Board. The waste disposal should be coordinated with sanitation department of Hospital.

23. **What is the ideal depth of burial of dead body?**
   
   **Ans:** As per available literature and reports, the burial is being done at a depth of Six to Eight feet.

24. **If a Medical Officer/Forensic Medicine specialist at a remote or peripheral setup is in doubt regarding handling /Autopsy of COVID-19 Confirmed/ Suspected body?**
   
   **Ans:** One nearby District Hospital/Medical College/ higher center having the Department of Forensic Medicine should be designated for all medicolegal consultations regarding handling/Autopsy/Transportation/disposal of COVID-19 Confirmed/ Suspected bodies. These issues can be discussed online or by telephonic conversation and the body shifting should be avoided.

25. **How to comment on pattern and age of injuries during Non-invasive autopsy?**
   
   **Ans:** In most of the case, pattern and age of injuries can be determined by external examination itself. Treatment records and other ancillary investigations/ imaging reports can also be utilized. Postmortem X ray examination can be conducted if useful. If the merit of the case warrants further exploration of injury, the same may be done strictly following the measures mentioned in point.7.

26. **Regarding preservation of dead bodies due to COVID 19 which changes can be implemented in the current practices with no separate storage facility?**
   
   **Ans:** Using separate cold chambers/ cabinets for COVID 19 confirmed or suspected cases are advisable. At places where this is not possible due to lack of adequate facilities, the existing cold storage should be demarcated with separate storage chambers/bays/trays for COVID-19 bodies. Immediate procurement of cold chambers or cabinets on emergency basis should be tried.
27. During autopsy or while handling the dead body, what should be done if anyone get accidental occupational exposure with body fluids/ tissues of a COVID 19 patient?

Ans: Immediately after coming in contact with any such potential infective material, the entire exposed area should be washed with soap and water with minimum contact time of 20 seconds. This should be followed by application of 70% alcohol based disinfectant. The exposed clothes/ articles should be disposed off according to the established practices. The matter should be reported to the hospital administration to evaluate the necessary steps accordingly.
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