

Dignified management of dead during COVID -19 pandemic - A commentary review

Senthil Kumaran¹, Venkatesh Janarthanan^{2*}, Karthi Vignesh Raj K³, Sathish K⁴, Vijay Balaji R⁵, Manivel S⁶

¹Associate Professor, All India Institute of Medical Sciences, Mangalagiri, Andhra Pradesh, India.

²Senior Resident, Department of Forensic Medicine and Toxicology All India Institute of Medical Sciences, New Delhi, India.

³Senior Resident, All India Institute of Medical Sciences, New Delhi, India.

⁴Senior Resident, Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry, India.

⁵Assistant Professor, Stanley Medical College and Hospital, Chennai, Tamil Nadu, India.

⁶Junior Resident, Department of forensic medicine and Toxicology.

***Corresponding Author:** Venkatesh Janarthanan, M.D.D.N.B (Forensic Medicine) Senior Resident, Department of Forensic Medicine and Toxicology All India Institute of Medical Sciences, New Delhi, India

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When will we say death is due to COVID-19?

As per WHO guidelines, death due to COVID-19 can result from a clinically compatible illness in a probable or confirmed COVID-19 case unless an alternative cause of death that cannot be related to COVID (e.g., trauma). It also emphasized that there should be no period of complete recovery from COVID-19 between illness and death. Death caused due to COVID-19 may not be attributed to another disease (e.g. cancer) and should be counted independently of pre-existing conditions suspected of triggering a severe course of COVID-19.

Whenever a death occurs of COVID-19, it will be categorized based on the infectivity status of that individual during life. It is classified as a confirmed case or suspected case.

- a) **Confirmed case:** Cases with nucleic acid positive by RT-PCR technique for COVID-19 infection (or) high homology for COVID-19infection by viral gene sequencing.

- b) **Suspected case:** Cases with at least one epidemiological history (travel, contact with confirmed cases, and exposure to clusters or hotspot areas) and two clinical features consistent with COVID-19.

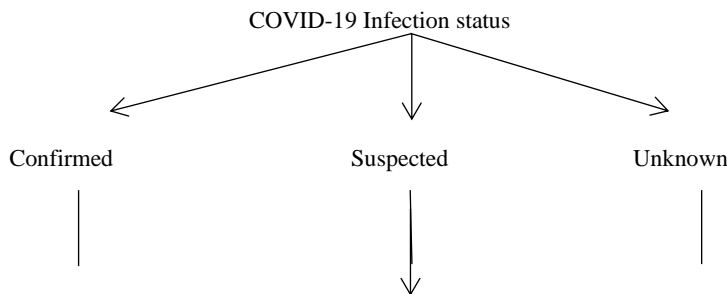
The suspected cases also include asymptomatic infected persons, patients in the incubation period, unidentified and brought dead bodies, and cases with negative results as false-negative results are expected.

COVID-19 death considered as a natural and a non-medicolegal case? Whether an autopsy is required?

The death occurred exclusively due to COVID, and its complications are natural death and turn out to be a non-medico-legal case. Hence autopsy is not needed routinely.

How do we categorize the COVID-19 death medicolegal cases?

When it comes to a medicolegal case, the death during COVID-19 will fall into either category.



Homicide
 Suicide
 Accident
 Brought dead
 Unidentified or Unknown
 Others (E.g., Custodial deaths, Medical negligence etc.)

Autopsy in COVID-19 positive suicidal, homicidal, or accidental cases

In suicidal cases, if no foul play is found during the investigation waiving an autopsy could be beneficial in minimizing the risk of spread of infection. In any situation of suicidal cases, if it warrants an autopsy, it can be done with proper protective equipment.

In homicidal and accidental cases, if the patient has been treated and if proper treatment records are available based on the Medical Certificate of Cause of Death, waiving an autopsy is considered. If the legal situation and investigation officer demand an autopsy, they should do a virtual autopsy or minimally invasive techniques to minimize the risk of spread.

COVID-19 unidentified abandoned dead body?

In these types of cases, identification of the deceased and the cause of death will play a vital role in the investigation. The police should be emphasized on fastening the investigations as piling up dead bodies for an extended period will pose hazards in the storage of the other dead bodies of COVID-19.

How to avoid mishandling the COVID-19 dead bodies?

After death, all the dead bodies should be appropriately tagged with identity after complete packing. A proper entry and exit register should be maintained. The in-charge person in the morgue should get the receipt of the dead body signed by the government officials or relatives to whom it is being handed over. Appropriate standard operating procedures should be made for the proper storage and safe disposal of the dead bodies. The necessary guidelines and information should be made available in the local language.

When are the bodies to be preserved in the mortuary?

In COVID-19 suspect cases where the test status is awaited, the body is preserved in the mortuary with a proper tag (result awaited) and in COVID 19 confirmed cases for disinfection purposes.

How to pack COVID-19 dead bodies?

COVID-19 dead bodies should be packed with double bagging with an identity tag to prevent leakage of fluid and infection spread. All tubes, drain, and catheters should be removed. Wound disinfected, oral and nasal orifices to be plugged. The body is disinfected with 1% sodium hypochlorite; the exterior is again decontaminated with 1% sodium hypochlorite.

How to collect sample for testing in COVID-19 medico-legal cases?

A combined nose & throat swab or nose swab sample should be collected.

Is there an alternate solution other than medico-legal autopsy in COVID-19?

There is no alternative for a proper medico-legal autopsy. Still, considering the rapid spread of COVID-19 through the generated

aerosols, even though the viruses are dead once the individual dies, as per expert views, it is wise to think about alternatives to combat the psychological belief of the persons involved. Even though numerous modifications to a complete autopsy examination have been recommended for minimizing the risk of infection during autopsies, which include a reduced number of people performing the autopsy, limited handling of the corpse by sticking to the rokitansky procedure (in situ examinations), avoiding other methodologies, reduced aerosol generation during autopsy using appropriate techniques, especially while handling lung tissue and, strictly curtailing embalming procedures. The use of a combination of minimal invasive modalities like Post Mortem Computed Tomography (PMCT), Postmortem Ultra-Sonography (PUS), and Laparoscopic autopsy (LA) can be considered as an alternative solution.

However, these modalities are practised abroad; in India, the PMCT is in the initial trial and run in AIIMS, New Delhi, and the implications of LA are being considered in the field of Forensic Medicine. On the other hand, the use of PUS is limited to validating the findings from medical records, thereby minimizing the need for exploratory autopsy in COVID 19 cases. The procedures mentioned above can assist in giving the cause of death medically and can be a piece of evidence both legally and for insurance purposes.

Guidelines for transporting cremated remains?

Cremated remains contained in a funeral urn depend on personal, cultural, and religious beliefs of the bereaved as well as laws pertaining to the land of death.

Enumerate about government standard regarding embalming a COVID-19 dead body?

In certain unavoidable circumstances, the government may ask for safe embalming by a higher Medical Centre. Embalmed body should be enclosed in a tightly sealed coffin. But the option of embalming may be challenging; for instance, the law in the departure country may not allow embalming, while the destined country may require embalming to repatriate the remains. In addition to this, some aircraft operators will only accept embalmed human remains. At the start of pandemic, WHO not recommend the practice of embalming for COVID-19 remains in order to avoid excessive manipulation of the body?

How is the importation of COVID-19 death patients done?

For transportation of a dead body by air 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. The corpse must be secured in a body bag; the exterior is decontaminated, no additional risk to the staff transporting the dead body. Standard precautions recommended should be followed at each and every step by the person handling the dead body.

Requirement for conducting autopsy in COVID-19 positive dead body

Standard precautions had to be followed by mortuary staff handling COVID dead bodies. Should store dead bodies in cold chambers maintained approximately at 4°C. The mortuary must be kept clean with

exhaust if the facility is there or must ensure a continuous flow of air. Environmental surfaces, instruments, and transport trolleys should be disinfected appropriately with a 1% sodium hypochlorite solution. After removing the body, the chamber door handles and floor should be cleaned with sodium hypochlorite 1% solution.

The autopsy surgeon should assess the risk and apply standard operating procedures recommended by authorities while handling COVID-19 cases. It is significant to have proper personal protective equipment, and adequate ventilation in a separate negative pressure autopsy room is vital besides a suitable infrastructure of the autopsy room. However, a non-invasive autopsy is recommended for retrieving necessary fluid and tissue samples in widespread infections, but it is not enough for local and regional infections. So, it should be combined with post-mortem imaging, such as a CT scan for post-mortem diagnosis. The required diagnostic post-mortem samples of COVID-19 infection are 5 ml of plain blood without additive for serology, nose & throat swabs, and broncho-alveolar lavage or sputum, besides other routine samples under the sterile conditions.

How to manage the dead bodies after autopsy in a case of COVID-19 positive?

After the autopsy, bodies of suspected/confirmed COVID -19 cases are packed in a leak proof plastic body bag, which is zipped to prevent any fluid spillage. Identification of the body is done without opening the body bag and by seeing through the transparent plastic sheet at the body bag near the face area. The dead body is handed to the district administration. Relatives should be instructed regarding the transmission of COVID-19 infection and about the proper protective measures during transportation and burial/cremation of the body. Only two relatives are allowed to be present at the time for identification, and they should maintain at least a 1-metre social distance. At the cremation /burial site, a limited number of relatives are allowed (5 or less) because mass gatherings can cause further spread of infection. Police personnel should be present while body handing over and at cremation/burial.

Viscera preservation in an unavoidable situation?

Studies indicate that SARS-CoV2 viral particles can be isolated from many-body fluids, including faeces, saliva, semen, and tears, suggesting transmission could occur through some of these routes. Hence, healthcare workers and other persons handling the body fluids and specimens should keep in mind the possible spread of infection. Viscera for chemical

analysis is to be avoided from suspected/confirmed cases of COVID-19 as per ICMR guidelines. If the situation necessitates preserving viscera, like if the investigating officer suspects any foul play or allegation of poisoning/intoxication is there, then viscera need to be held in such situations. The autopsy surgeon can suggest that the Forensic Science Laboratory (FSL) treat the samples with heat or chemicals to inactivate the viruses after receiving them. Occupational safety and health administration regulations can be carried out in FSL while handling samples of COVID-19 cases. A certificate can be issued to the FSL by the autopsy surgeon mentioning the COVID-19 status of the deceased, tested antemortem/ postmortem nasopharyngeal swabs.

Why should internal inspection of an organ be avoided in a medicolegal autopsy in a case of COVID positive?

SARS CoV2 can be present in the body after death and can cause further spread of infection in body handlers like autopsy surgeons, mortuary workers and crematorium/burial ground staff. The reported case of the SARS-CoV-2 genome in the corpse of an exhumed infected person, one month after her death, is present. Though the virus is inactive in the dead, the possible risk of spread should be considered. In a conventional autopsy, one has to open all body cavities and do a complete dissection of organs, including the heart, liver, brain and lungs. This can cause exposure to body fluids, accidental sharp instrument injuries, and may generate an aerosol, which poses a risk to the person involved in the autopsy procedure. To prevent this, one has to reduce the exposure as much as possible by doing the minimal opening of body cavities. Sawing of skull and bones should be avoided; instead, a hammer and chisel can be used to open the cranial cavity. If the cause of death is identified and sufficient to go for further legal proceedings, one can avoid additional exposure as much as possible by doing a minimal invasive autopsy.

Is cremation or burial advisable?

In case of burial, the body fluids may present inside for three-four days before it is decomposed. So spread of infection is possible if the body is buried. Different populations worldwide prefer their religious method to dispose-off their dead ones. Funeral rites of the deceased should also be considered. In the case of cremation, ashes won't pose that risk of transmission. In burial, the body should be placed in a leak proof plastic bag to prevent leakage of body fluids. The upper surface of the burial site should be cemented.



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