

Dead Body Management in Times of Covid-19 and its Potential Impact on the Availability of Cadavers for Medical Education in India

To the Editor of *Anatomical Sciences Education*:

Technology integration in teaching is an evolving concept in modern medical education like other study disciplines in India. The domain of medical science education is presently deficient of deploying technology-based practices. Currently, the majority of medical schools and colleges continue to choose traditional wet laboratory dissections over new virtual dissections which are being followed in institutions such as All India Institute of Medical Sciences (AIIMS Rishikesh) and handful of other governmental as well as private medical schools of India like AIIMS Jodhpur, Government Medical College Vimsar, Burla, Odisha, GSL Medical College Rajahmundry, Andhra Pradesh, Yennapoya University Mangalore, Dutta Megha Medical College, GMC Chhindwara, Madhya Pradesh, Symbiosis Institute Pune, and Apollo Medical College Chittoor. Not to mention, as the current push for technology integration increases, it is likely that a large number of Indian academic scholars will begin seeing virtual dissections as beneficial to their classroom. Obviously, it is difficult to reach any consensus and conclusion as of now and only time will tell whether this new wave of change will be incorporated within our anatomy teaching and replace the traditional methods. In times of Covid-19, to maintain social distancing when the whole country is locked down, the Ministry of Health and Family Welfare, Government of India, and Board of Governors of Medical Council of India have issued directives to all the medical institutions to suspend classes for courses such as M.B.B.S., B.Sc., Nursing, and other paramedical and allied health sciences to maintain social distancing (Government of India, 2020). Keeping this in view, most of the medical institutions are conducting online classes for various undergraduate courses. Theory classes of several subjects can easily be conducted by using video software like Zoom, Google Classroom, Google Hangouts, Google Meet, and Moodle to name a few. However, anatomy dissection classes remain challenging to conduct online. Anatomy lays the foundation of surgical disciplines and a logical understanding of various surgical equipment and techniques can be successfully attained through cadaveric dissection classes (Sugand et al., 2010).

Cadaveric dissection is one of the methods of training hands and fingers for future surgical procedures on living human

beings (Ajita and Singh, 2007). Understanding the significance of dead body, Government of India, Ministry of Health and Family Welfare, Directorate General of Health Services (EMR Division) have issued guidelines of dead body management in view of Covid-19 pandemic. The guidelines 2020 for dead body management have been released by Central Government on 15 March 2020 (Government of India, 2020). Guidelines were issued with regard to precautions, infection prevention and control measures, handling of the human body, and environmental disinfection. It is based on the current epidemiological knowledge about the Covid-19 as there was some delay in the cremation of the second disease-related casualty of a 68-year-old woman in Delhi (India Today, 2020). The first Covid-19 casualty in India was a 76-year-old man in Karnataka who died on March 10, 2020. He had recently returned from Saudi Arabia (India Today, 2020).

Considering the fact that novel Coronavirus is a new disease and there is a knowledge gap on best practices such as how to dispose the dead body of a suspect or confirmed case of Covid-19, the necessary guidelines were issued. The main mode of transmission of Covid-19 is through droplets, fomites, and close contact with possible spread through feces (WHO, 2020). Hence, the augmented risk of Covid-19 contamination from a dead body to healthcare professionals or relatives who follow standard precautions while handling the body is quite unlikely (Government of India, 2020). Till date there is no evidence of individuals getting infected from exposure to the bodies of people who died from Covid-19 (WHO, 2020). It is advised that healthcare workers identified to handle dead bodies in the isolation area, mortuary, ambulance, and in the crematorium/burial ground should be trained with respect to best infection prevention and control practices. The healthcare worker attending to the dead body should practice hand hygiene and ensure proper use of personal protective equipment such as coveralls, head covers, shoe covers, N95 respirators, surgical masks, goggles/face shields, etc. If the exterior of the body is visibly contaminated with body fluids, excretions or secretions, it has to be ensured that the gown is waterproof. They should remove all tubes, drains and catheters from the dead body. All puncture holes or wounds should be properly disinfected with 1% hypochlorite solution and dressed with impermeable material. It is advisable to properly dispose and take precaution while handling intravenous catheter or any sharp devices. To avoid leakage of body fluids, all the orifices of dead body should be plugged. Viewing of the dead body for the relatives to see the body for one last time may be allowed by unzipping the face end of the body bag by using standard precautions. Guidelines also advise to keep the dead body in a leak-proof plastic body bag. The exterior of the bag can be decontaminated with 1% sodium hypochlorite (NaOCl) solution. Mortuary personnel managing the dead body of Covid-19

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Received 30 March 2020; Revised 31 March 2020; Accepted 31 March 2020.

Published online 28 April 2020 in Wiley Online Library (wileyonlinelibrary.com). DOI 10.1002/ase.1962

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patients are advised to observe standard precautions like storing the dead body in coolers maintained at approximately 4 degrees Celsius (4°C), disinfecting environmental surfaces, instruments, transport trolleys and cleaning the doors, handles, and floor with sodium hypochlorite 1% solution after removing the body. As per the guidelines, embalming of such dead bodies should not be allowed (Government of India, 2020). Similarly, autopsy may be avoided and in case if it is to be performed for special reasons, the recommended infection prevention and control practices should be followed.

The Government of India has directed to avoid huge congregation either at the crematorium or burial ground as a social distancing measure due to an obvious reason that close family members or relatives may be symptomatic of corona virus disease (Government of India, 2020). According to voluntary body donation program, the general population can will their bodies to serve the purpose of medical education and scientific research. A beautiful quote by famous Indian academician, author, and psychologist Dr. Amit Abraham makes sense here: “*After I die if I am buried, I will rot. If I am burnt I will become ash but if my body is donated I will live to give life and happiness to many*” (Abraham, 2020).

Body donation in India is followed as per the Bombay Anatomy Act (1949): An Act to provide for the supply of unclaimed bodies of deceased persons (or donated bodies or any part thereof of deceased persons) to hospitals and medical and teaching institutions for the purpose of anatomical examination and dissection and other similar purposes (Mohan Foundation, 2020). Body donation not only is useful for understanding human body and for advancing medical science but also helps medical students in learning relations of human anatomic structures and development of psychomotor skills by cadaveric dissection (Ajita and Singh, 2007). Each human body is a new source of knowledge with anatomical variations and a medium for gaining medical knowledge, more effective than any textbook or computer. Nowadays, cadaveric dissection is not only limited to medical graduates and post graduates but it also helps various surgical disciplines such as surgical oncologists, neurosurgeons, burns and plastic surgeons, radiotherapists, head and neck and orthopedic surgeons to experiment innovative surgical skills and procedures in the form of cadaver laboratories and cadaveric workshops, to explore human body in a realistic manner before performing any major and complex surgery on living patients (Ajita and Singh, 2007). Apart from these, there are other uses of body donations such as cadaver banks for brain, skin, vessel and bones for molecular research and cadaver grafting.

With the growing concerns regarding the corona virus (Covid-19) pandemic, many anatomists have questions about the impact on body donation. We should maximize all donation opportunities, while keeping our healthcare professionals, medical students, and community safe. The risk of a Covid-19 infection from an infected donor is unknown at this time. Factors that could impact the risk of similar coronavirus such as SARS-CoV-2 transmission include epidemiological risk factors, incubation period, degree of viremia, and viability of the virus within the blood and specific organ compartments (Lai et al., 2020).

We should follow infection prevention guidelines which address Covid-19. These include the screening and testing of body donors or potential donors that could have contracted

Covid-19. Donors should be screened for potential Covid-19 infection (AST, 2020). Screening for Covid-19 includes three different methods such as (1) Epidemiologic screening for travel and potential exposures, (2) History for symptoms suggestive of Covid-19, and (3) Laboratory screening like nasopharyngeal and oropharyngeal or bronchoalveolar lavage sample for testing Covid-19. Recent studies indicate that negative results of laboratory screening may not rule out Covid-19 infection (Winichakoon et al., 2020).

The optimal approach to donor screening may change over time as more data accumulate. In the present scenario, medical professionals including anatomists need to be vigilant about evolving Covid-19 guidelines and adopt their standard operating procedures accordingly. The Covid-19 pandemic is unpredictable; still we are hopeful for the success of social distancing as the country is locked down else it might have a severe impact not only on medical education but on healthcare infrastructure and capacity crisis as well.

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LITERATURE CITED

- Abraham A. 2020. Amit Abraham > Quotes > Quotable Quote. Goodreads, Inc., San Francisco, CA. URL: <https://www.goodreads.com/quotes/7625795-after-i-die-if-i-am-buried-i-will-rot> [accessed 30 March 2020].
- Ajita R, Singh YI. 2007. Body donation and its relevance in anatomy learning – A review. *J Anat Soc India* 56:44–47.
- AST. 2020. American Society of Transplantation. COVID-19 (Coronavirus): FAQs for Organ Donation and Transplantation. 11 March 2020 Ed. Mr. Laurel, NJ: American Society of Transplantation. 8 p. URL: https://www.myast.org/sites/default/files/COVID19%20FAQ%20Tx%20Centers%202020.03.11_FINAL.pdf [accessed 30 March 2020].
- Bombay Anatomy Act. 1949. Bombay Act No. XI of 1949 [The Bombay Anatomy Act, 1949]. Bombay Government, Bombay, India. 9 p. URL: <http://bombayhighcourt.nic.in/libweb/acts/1949.11.pdf> [accessed 30 March 2020].
- Government of India. 2020. Covid-19: Guidelines on Dead Body Management. 1st Ed. New Delhi, India: Government of India, Ministry of Health and Family Welfare, Directorate General of Health Services (EMR Division). 7 p. URL: https://www.mohfw.gov.in/1584423700568_COVID19GuidelinesonDeadbodymanagement.pdf [accessed 30 March 2020].
- India Today. 2020. 68-year-old coronavirus victim cremated under medical supervision in Delhi. *India Today*, 14 March 2020. T.V. Today Network Ltd., New Delhi, India. URL: <https://www.indiatoday.in/india/story/68-year-old-coronavirus-victim-cremated-under-medical-supervision-in-delhi-1655539-2020-03-14> [accessed 30 March 2020].
- Lai CC, Shih TP, Ko WC, Tang HJ, Hsueh PR. 2020. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and corona virus disease-2019 (COVID-19): The epidemic and the challenges. *Int J Antimicrob Agents* 55:105924.
- MohanFoundation.2020.BodyDonation.MohanFoundation,Chennai,India.URL: https://www.mohanfoundation.org/body-donation.asp?gclid=Cj0KCQjw6_vzBRCIARIsAOs54z5tFfowO5tZpz7d3qZEWTLn1M5wz3EBoPJ-r8ECKWwU3wFCCB2iHQaAo7SEALw_wcB [accessed 30 March 2020].
- Sugand K, Abrahams P, Khurana A. 2010. The anatomy of anatomy: A review for its modernization. *Anat Sci Educ* 3:83–93.
- WHO. 2020. World Health Organization. Infection Prevention and Control for the Safe Management of a Dead Body in the Context of COVID-19: Interim Guidance 24 March 2020. 1st Ed. Geneva, Switzerland: World Health Organization. 6 p. URL: https://apps.who.int/iris/bitstream/handle/10665/331538/WHO-COVID-19-IPC_DBMgmt-2020.1-eng.pdf [accessed 30 March 2020].
- Winichakoon P, Chaiwarith R, Liwsrisakun C, Salee P, Goonna A, Limsukon A, Kaewpoowat Q. 2020. Negative nasopharyngeal and oropharyngeal swab does not rule out COVID-19. *J Clin Microbiol* 58:e00297–20.