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Sourcing and Availability of Cadavers for Anatomical Dissection Amid Covid-19 Pandemic: Safety Challenges and Possible Solutions

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The new coronavirus disease 2019 (COVID-19) pandemic has caused far-reaching impacts on medical education and training worldwide. The attendant disruptions in most medical schools led to the transition from classroom/in-person learning to online/virtual learning. A critical aspect of medical training needing urgent attention is the safety of cadavers from possible SARS-CoV-2 infection before using for anatomical or cadaveric dissection. This article explores the safety measures needed for cadaver handling and its consequences on sourcing and availability of cadavers for anatomy education amidst the COVID-19 pandemic.

Keywords: Anatomical dissection; COVID-19; Cadavers; Medical education; Pandemic

Introduction

The recent coronavirus disease 2019 (COVID-19) pandemic has led to an unparalleled effect on medical education and training worldwide. The impact of the outbreak on medical education cannot be over-emphasized, as most medical schools are closed and classroom learning had transited to online mode. This disruption has made millions of medical students either postpone learning or continue remotely (1). The resultant implication is that medical trainees had misplaced numerous months of professional experiences that are crucial to the training and career development. A dire facet of medical training requiring exigent consideration is the safety of cadavers from possible severe acute respiratory syndrome coronavirus 2(SARS-CoV-2) infection before using them for anatomical dissection, alongside the avoidance of the transmission of COVID-19 among medical students during cadaveric dissection.

As of 3 November 2020, about 46,909,107 confirmed cases of COVID-19 and 1,206,886 deaths have been recorded globally (2). This

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unique pandemic has had momentous impacts on global populations, economies, and health care systems (3-9). The ban of activities in numerous sectors, restriction of movements, and the prohibition of public gatherings among other stringent measures are the consequence of the daily surge in COVID-19 cases (10,11). This is to curtail its further spread and the tendency of the second wave of infections after the WHO recommendations and standards (6,12).

COVID-19, Availability of Cadavers and Anatomical Dissection

While the COVID-19 pandemic progresses, most published guidelines from the World Health Organization (WHO) in conjunction with various medical associations (MA) and centers for disease control and prevention (CDC) globally have stated that the bodies of suspected or confirmed COVID-19 patients were recommended to be burned after demise (13,14). This exercise is opined because of insufficient proof of the danger of the spread of the virus among the living and the dead (13).

Though this exercise appears not mandatory, individuals who refuse to burn their dead ones must comply with stringent measures on the care, management, and movement of the dead; such as strict compliance to the use of personal protective equipment (PPE) and exercising physical distancing from the cadaver (13,14). Furthermore, few health regulatory authorities and public health organizations have raised serious health, safety, and ethical concerns regarding body and organ donations to medical schools. This in turn may reduce the number of received donations, thereby negatively influence the sourcing and availability of bodies, and quality of anatomy teaching and learning via cadaver dissections. This article explores the safety measures needed for cadaver handling and its consequences on sourcing and availability of cadavers for anatomy education amidst the COVID-19 pandemic.

Challenges Regarding the Safety of Cadavers in a COVID-19 Pandemic Era

Though there exists no evidence of infection due to exposure to COVID-19 related cadavers, the suspected risk of COVID-19 infection from persons who died from the disease to health professionals and students handling such bodies cannot be overlooked. Also, there is the likelihood of a rise in the probabilities of disease transmission with direct contact to body fluids and invasive procedures on the cadaver, including autopsy and dissection or other procedures that produce droplets or aerosols (14). This emanating condition has positioned a critical burden on medical education in common, and predominantly cadaveric dissection.

The most troubling question is on those countries that depend chiefly on the use of unclaimed bodies for cadaveric dissection (15,16), as these bodies may not have any medical histories to determine their source of death. This may thus pose a danger for anatomy education and cadaveric dissection during the outbreak and after the coronavirus pandemic subsides. Hence, the safety in the use of cadavers by medical professionals and students for anatomical teaching and research is of great concern to medical training and practice worldwide. Furthermore, if the surge in COVID-19 deaths increases the availability of cadavers for training and research, questions like "what are the safety standard operating procedures to follow?" emanates to the forefront of medical students and educators.

In the light of the recent COVID-19 pandemic, it is important to ensure that COVID-19 safety protocols and standard operating procedures (SOP) recommended for anatomical and cadaveric dissections are stringently followed. Furthermore, the accessibility of adequate and necessary personal protective equipment (PPE) such as an impermeable disposable gown or overall, hand gloves, and face protectors (medical mask, shield, and goggles) should be provided for students and other personnel that will be handling both the unembalmed bodies and cadaver dissection in the gross anatomy laboratories (14,17).

Safety Measures for Anatomical Dissection in a COVID-19 Pandemic Era

To safeguard the students during cadaveric dissection, it is important to explore the safety measures needed for cadaver handling before its use for cadaveric dissections. Regarding the safety of students, while dissecting cadavers, proper hand hygiene must be encouraged by washing the hands with antiseptic soap and running water for at least 20 seconds after each contact with cadavers or using alcohol-based hand sanitizers containing at least 60% alcohol (17). To doubly protect the students, instructors and prosectors exposed to cadavers, there is need to decontaminate the bodies and surfaces where they are prepared before embalmment. The use of disinfectants such as standard bleach, 62-80% ethanol concentration or 75% 2-propanol, 0.5% sodium hypochlorite, 0.5% hydrogen peroxide have been recommended to be effective within 1 minute for suspected coronavirus contaminated surfaces (13,18).

Furthermore, the use of essential personal protective equipment (PPE) such as gowns, gloves, boots, masks, and googles is mandatory for all students in the dissection hall. The use of a long-sleeved water-resistant gown alongside an impermeable apron will prevent body fluid penetration. A double surgical examination (nitrile) gloves are most suitable for dissection, as they provide long-term protection, while the use of a filter mask or fluid-resistant medical mask and rubber or waterproof boots are highly recommended.

Also, all students are expected to comply with the standard operating procedures for dressing and undressing in the dissection halls during and after the COVID-19 pandemic (18). This is mandatory as it is safer to assume that all cadavers are possibly infectious. Thus, there is a need to ensure the integrity of PPE provided before their use. Besides, after each dissection, the recommended undressing procedures should be strictly practiced to prevent self-contamination (18). Students must avoid contacts between potentially contaminated PPE and the skin while discarding their PPE and carry out antiseptic handwashing alongside using alcohol-based hand sanitizers (19).

Recommended Solutions for Ensuring Public Health Safety during Cadaveric Dissection

The recommended measures for ensuring public health safety as required by medical students and educators at schools who employ cadaveric dissections for anatomy teaching are outlined as follows:

1. Since embalming cannot be completely eradicated in anatomy units, students and educators must be fully protected with essential personal protective equipment (PPE) before any cadaveric dissection.
2. Though embalming COVID-19 cadavers may not present any risk, procedures that can produce aerosols and smearing of contaminated fluids such as forced inflation

of the lungs during fixation should be avoided as the cadavers might still be contagious.

3. Educators must also certify that the appropriate medical records of cadavers donated to schools are available to ensure the handling staff and students has comprehensive access to detailed information before handling such bodies. Where medical histories are not obtainable, COVID-19 screening or tests should be performed on such cadavers.
4. All anatomy laboratory staffs and medical students should be properly trained on the transmission and prevention of COVID-19 infection, as negative results of laboratory examination may not eliminate the chance of COVID-19 infection.

Conclusion

As the COVID-19 pandemic may pose a potential impediment to anatomy education via cadaveric dissection by difficulty in sourcing and availability of bodies, medical schools must begin to consider employing other existing platforms and approaches to make up for these pitfalls. Though the eradication of cadaveric dissection due to the COVID-19 pandemic would be disheartening; the application of body art, prosections, plastic models, or virtual reality in anatomy teaching and the integration of technology and artificial intelligence in new medical curricula is long overdue (20).

Conflicts of Interest

The author has declared no conflict of interest for the present article.

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