

# Inexplicable COVID-19! Would pathological autopsy be the panacea?

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**Abstract.** SARS-CoV-2 has swamped the entire world, unfolding into a COVID-19 pandemic. Efforts are on to develop an understanding of the various aspects related to SARS-CoV-2 and COVID-19. A pathological autopsy can play a vital role in understanding the pathophysiology of the disease, which may be vital in evolving effective management strategies. Despite its significance in the present circumstances, only a limited number of pathological autopsies are being conducted worldwide. The paper stresses on the need for taking up pathological autopsies globally and discusses its present status and the way forward, along with international perspectives and recommendations for consideration of pathological autopsy. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Keywords:** Post-mortem examination; clinical autopsy; COVID-19; pathological autopsy; SARS-CoV-2

## Introduction

Following the first case of coronavirus disease 2019 in Wuhan, the capital of Hubei, China, COVID-19 outbreak has expeditiously spread across China and swamped the entire world, unfolding into a pandemic (1). Relentless attempt is being made by the researchers to develop an understanding of the various aspects related to SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus-2) and COVID-19, be it about the virus and origin of the disease, the possible modes of transmission, ways towards effective diagnosis and management of the patients or the preventive strategies to be adopted. Knowledge of the pathophysiology of the disease is vital to develop an understanding of the mechanism of disease and disease process. Pathophysiology of the COVID-19 is yet to be completely understood.

## Pathological autopsy, a 'Panacea'

Conventionally, the autopsies carried out can be either medico-legal or pathological. Prime objectives

of the medicolegal autopsy are to provide answers to questions about the cause of death and other medicolegal parameters. While the pathological autopsies are carried out to study the disease process and diagnoses contributing mainly to the death when efforts have been failed antemortem (2,3). In most of the cases, despite the establishment of the cause of death, pathological autopsy, also commonly referred to as medical or clinical autopsy is done to study the disease process, hence, enhancing the existing knowledge about the disease. Significance of pathological autopsy as a diagnostic tool to bring clarity in underlying mechanisms behind death is paramount (4,5). Lack of postmortem investigations in COVID-19 has limited the understanding of the exact pathways of this infection, and hence, the urgent need of autopsy has been emphasized in the current times (6). A team of pathologists in Italy shifted their attention to autopsies in confirmed cases of COVID-19 to determine its pathophysiology and recommended, autopsies in large numbers in such cases. Ledford goes on to state that "In the instance of a newly emerging disease, an autopsy is critical to all of humanity" (7).

## COVID-19 autopsies, what has been reported

The first report of complete autopsy findings in the disease in the English literature from Oklahoma reflected virus-related pathology (8). Later on, the authors from the same report pointed out that the diagnosis of COVID-19 would have been missed without an autopsy and these complete autopsies were therefore critical for confirming viral infection as well as for distinguishing true virus-related pathology from potential confounders (9). A research from Switzerland has reported respiratory failure with exudative diffuse alveolar damage and massive capillary congestion often accompanied by microthrombi despite anticoagulation therapy (10). Core biopsy of lung, liver and heart in four patients who died of COVID-19 suggested their immunocompromised comorbid status, fibrin forming clusters in airspaces, centrilobular sinusoidal dilatation in the liver and mild myocardial hypertrophy (11). It has been reemphasized that postmortem examination offers insights into disease processes, enables greater accuracy in the cause of death reporting and enables collection of tissue for more sophisticated analyses. Renal histopathological analysis has found direct evidence of the invasion of the coronavirus into kidney tissue (12). Apart from typical findings, absence of multinucleated syncytial cells, fibroblastic plugs, or hyaline thrombi in microvessels have also been noted (13). Such findings have not been explored during the management of living patients, and can only be accessed during the autopsy.

## Pathological autopsy, the way forward

Though a complete autopsy is desired to provide the best possible understanding of the disease process, its variants such as core biopsies, and echopsies can be taken up as safer alternatives, especially in resource-limited centres. The board of the Italian Society of Surgical Pathology and Cytology (Società Italiana di Anatomia Patologica e Citologia - SIAPEC) (14) has suggested that tissue sampling on corpses can be done using core biopsies considering the biosafety issues associated with conventional autopsies in COVID-19 deaths. Besides, SIAPEC has created a repository of images illustrating the organ damage induced by SARS-CoV-2 (15). Likewise, The Royal College of Pathologists has developed

COVID-19 post-mortem portal as a means to build a database of information to help the treatment and research about the disease (15). Chair of the Royal College's death investigation committee conceded that lack of postmortems might hamper the fight against COVID-19, and emphasized to increase more and more number of consented postmortems to investigate the disease (16). Ledford states that so far, researchers from almost twenty-five countries have shown interest in creating an international COVID-19 pathology repository (7). Considering the potential infectivity, a roadmap to the safe practice for the autopsy in this pandemic has been suggested meticulously to be helpful while performing a pathological autopsy (5).

## Scenario from India

Realizing the significance of pathological autopsies, Gujarat, a state of India, has issued directions for conducting pathological autopsies in COVID-19 deaths for the purpose of research into pathology and disease progression (17). The leading medical institution of India, the All India Institute of Medical Sciences (AIIMS), New Delhi is also contemplating on setting up of a core research group to assess the feasibility of carrying out pathological autopsies (18). Meanwhile, at AIIMS, Jodhpur, another premier medical institution of India, a core group comprising of experts from Departments of Pathology, Medicine, Pulmonary Medicine, Anesthesiology, and Forensic Medicine under its Director, Professor Sanjeev Misra has started to conduct pathological autopsies in COVID-19 confirmed and suspect deaths. Thus, becoming the first institution in India to do so. It appears that a beginning is already made, and we hope many more institutions will follow this quest of using pathological autopsies to enhance our knowledge about COVID-19.

## Conclusion

In consideration of the need to conduct pathological autopsies in these trying times, it is suggested that medical institutions should be directed and encouraged to conduct pathological autopsies. The institutions, in turn, should develop guidelines and standard operating procedures for smooth conduction of pathological

autopsies. Core biopsies may prove to be a useful and safer technique in this regard. Modalities for autopsies may vary from place to place but the quest for the path remains the same. After all, this small step may show the way forward to the entire mankind! As rightly stated by Paul. H. Brussal, “A surgical operation is attended with pain and is for the benefit of the Individual, an autopsy is free from pain is for the benefit of humanity”.

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