

Medico-Legal Autopsies in Cases of Corona Virus Infection

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ABSTRACT

This article will aid mortuary staff and pathologists in deciding if a post-mortem examination is appropriate on a possible corona virus infection death and to advise them on the possible risks associated with such a case and how to reduce these risks and diagnosis of corona virus infection at post-mortem examination. In general, if a death is believed to be due to confirmed COVID-19 infection, there is unlikely to be any need for a post-mortem examination to be conducted and the Medical Certificate of Cause of Death should be issued. Hazard groups (HG) of infectious biological agents can cause severe human disease and may be a serious hazard to employees; the agent may spread to the community, but there is usually effective prophylaxis or treatment available. People who have died from COVID-19 can be buried or cremated. Any person (e.g. family member, religious leader) preparing the deceased (e.g. washing, cleaning or dressing body, tidying hair, trimming nails or shaving) in a community setting should wear gloves for any contact with the body. For any activity that may involve splashing of bodily fluids, eye and mouth protection (face shield or goggles and medical mask) should be worn. Clothing worn to prepare the body should be immediately removed and washed after the procedure or an apron or gown should be worn; Store specimens at 2-8°C for up to 72 h after collection and ship overnight to CDC on ice pack. If a delay in testing or shipping is expected, store specimens at -70°C or below and ship overnight to CDC on dry ice. Label each specimen container with the patient's ID number (e.g., medical record number), unique specimen ID (e.g., laboratory requisition number), specimen type (e.g., serum) and the date the sample was collected.

Keywords: Medico-legal autopsy, Corona virus infection

INTRODUCTION

This article will aid mortuary staff and pathologists in deciding if a post-mortem examination is appropriate on a possible Corona Virus Infection death and to advise them on the possible risks associated with such a case and how to reduce these risks and diagnosis of Corona Virus Infection at post-mortem examination. In general, if a death is believed to be due to confirmed COVID-19 infection, there is unlikely to be any need for a post-mortem examination to be conducted and the Medical Certificate of Cause of Death should be issued.

Hazard groups (HG) of infectious biological agents can cause severe human disease and may be a serious hazard to employees; the agent may spread to the community, but there is usually effective prophylaxis or treatment available. Example: COVID-19 (from China 2020) [1].

SPECIFIC HEALTH AND SAFETY ASPECTS

The critical issues in managing HG infections in the mortuary revolve around:

- Preparation for the possible presence of an infection in the deceased
- drafting of appropriate and agreed protocols on what to do

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- The state of the mortuary and its equipment
- PPE
- Preventive prophylaxis through vaccination of staff.

In the mortuary, infections may be acquired via:

- Percutaneous inoculation
- Skin contamination without inoculation
- Ingestion
- Inhalation
- Contamination of mucosal surfaces (eye, mouth, nose).

To perform autopsies safely and satisfactorily, it is essential that the following are in place:

- Universal standard precautions
- Routine risk assessment
- Knowledge of the diseases one may encounter
- SOPs for managing specific high-risk infectious autopsies.

RISK ASSESSMENT

Pre-autopsy risk assessment may include:

- The clinical history on a consent form
- The history as provided by a coroner
- Direct information from the treating clinicians
- Pathological information from a laboratory database, e.g. positive infection serologies, etc.
- Information from hospital infection control
- Information on an infection notice performa that should accompany each cadaver to the mortuary
- External examination of the body.

The autopsy suite and its facilities

1. The safe working guidance [2] indicates that having a separate high-risk suite is ideal but not mandatory for HG autopsies.
2. Good ventilation is required in the working areas (autopsy table and dissection bench), as well as adequate space away from other activities.
3. Whole room ventilation with the draught passing from ceiling height down and across the tables, exiting at floor level, is suitable. Alternatively, down-draft tables work well.³
4. Electric skull saws all now come with vacuum evacuation into a separate chamber.
5. It is essential to have all the necessary equipment to hand to avoid the need to leave the area to find additional items. For example, containers for all anticipated samples must be available, including sterile plastic bottles for fresh tissues and fluid, and blood culture bottles (aerobic and anaerobic).

THE AUTOPSY PROCEDURE AND PPE

For most HG3 infections (known or suspected), a standard systematic external and internal organ examination procedure is appropriate. In cases of blood-borne infections, the presence of multiple hands within the cadaver should be avoided to prevent accident.

Behaviour and technique [3]

The following are part of universal precautions in autopsy dissection practice:

- Round-ended scissors should be used.
- PM40 blades with blunted points reduce prick injuries.
- Sharps in the working area should be kept to a minimum and their whereabouts known at all times.
- Practitioners should operate within the body cavity one at a time.
- Unfixed organs must be held firm on the table and sliced with a sponge - care should be taken to protect the hand.
- An oscillator saw with suction extraction of the bone aerosol into a removable chamber should be used for sawing the skull; alternatively, a hand saw with a chain-mail glove may be used.
- Needles should not be re-sheathed after fluid sampling - needle and syringe should be placed in a sharps bucket.

Universal precautions and PPE

- Surgical scrub suit
- Hat to protect hair
- Clear visor to protect the face, eyes and mouth
- Respiratory protection, either as a standard surgical mask or a FFP3 mask, which more effectively excludes small particles of infective material
- A waterproof gown that covers the entire body, including the forearms
- A plastic apron over a waterproof gown
- Rubber boots with metal-protected toecaps and dorsal reinforcement or other equivalent material gloves
- Under single use disposable non-latex gloves, protective gloves made of kevlar or neoprene, which are cut-resistant in case of potential blood-borne infection.

DIAGNOSIS OF COVID-19 INFECTION [4]

Samples for diagnosing cases of COVID-19 at post-mortem examination are identical to those used to make the diagnosis in life and consist of upper respiratory tract swabs (viral nose swab, viral throat swab), lower respiratory tract (sputum, BAL) and a plain tube of blood for serology.

The guidance includes all the necessary specific information on organizing such testing including how to package samples, where to send them and how to contact the laboratory involved with testing by email with the relevant

proforma, etc. There is a specific request form that should be used; there is a box to tick for post-mortem samples.

Specific post-mortem guidance obtained from Public Health England states that 'it would be helpful if you were able to swab the upper respiratory tract with one swab and conduct a swabbing of the internal lungs on another swab. Lung tissue could be taken at the time of swabbing, but if the swabs are negative then the tissue would not be tested. Please note that each sample requires its own form.

In addition to the specific samples taken for COVID-19 testing, other standard samples, including swabs and tissue samples from the respiratory tract, be sent locally for microbiology/virology to assess for other infectious agents and a full set of tissue samples are taken for histology together with other samples for other investigations taken as appropriate and defined on the merits of the case.

How to take these samples

Urine, blood and cerebrospinal fluid (CSF) need to be taken as clean as possible, and before opening any cavity of the body, to reduce contamination of skin. The skin sample site can be cleaned with alcohol-containing swabs. Blood for bacterial culture must be taken from above the umbilicus to reduce fecal contamination. Thus, take it from subclavian or jugular veins, or from the heart left ventricle through the sternum. Pre-prepared sample sticks can be used for nasal swabs and submitted immediately for PCR influenza virus identification.

Burial

People who have died from COVID-19 can be buried or cremated.

- Confirm national and local requirements that may dictate the handling and disposition of the remains.
- Family and friends may view the body after it has been prepared for burial, in accordance with customs. They should not touch or kiss the body and should wash hands thoroughly with soap and water after the viewing;
- Those tasked with placing the body in the grave, on the funeral pyre, etc., should wear gloves and wash hands with soap and water after removal of the gloves once the burial is complete.

Burial by family members or for deaths at home

- Any person (e.g. family member, religious leader) preparing the deceased (e.g. washing, cleaning or dressing body, tidying hair, trimming nails or shaving) in a community setting should wear gloves for any contact with the body. For any activity that may involve splashing of bodily fluids, eye and mouth protection (face shield or goggles and medical mask) should be

worn. Clothing worn to prepare the body should be immediately removed and washed after the procedure or an apron or gown should be worn.

- The person preparing the body should not kiss the deceased. Anyone who has assisted in preparing the body should thoroughly wash their hands with soap and water when finished;
- Apply principles of cultural sensitivity and ensure that family members reduce their exposure as much as possible. Children, older people (>60 years old), and anyone with underlying illnesses (such as respiratory illness, heart disease, diabetes, or compromised immune systems) should not be involved in preparing the body. A minimum number of people should be involved in preparations. Others may observe without touching the body at a minimum distance of 1 m.

Submission of postmortem NP swab and lung swabs for COVID-19 Testing

- Store specimens at 2-8°C for up to 72 hours after collection and ship overnight to CDC on ice pack. If a delay in testing or shipping is expected, store specimens at -70°C or below and ship overnight to CDC on dry ice.
- Label each specimen container with the patient's ID number (e.g., medical record number), unique specimen ID (e.g., laboratory requisition number), specimen type (e.g., serum) and the date the sample was collected.
- Complete a CDC Form for each specimen submitted.

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