Medicolegal responsibilities of physicians during dealing with wounded victims during covid19 pandemic

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Introduction:

The current COVID-19 pandemic underlines the importance of a mindful utilization of financial and human resources. Preserving resources and manpower is paramount in healthcare. It is important to ensure the ability of surgeons and specialized professionals to function through the pandemic. A conscious effort should be made to minimize infection in this sector. A high mortality rate within this group would be detrimental.

So we have to :

- All known or suspected COVID-19-positive patients requiring surgical intervention must be treated as positive until proven otherwise to minimize infection spread.
- Allocating dedicated senior staff to key management roles is crucial to minimize COVID-19 spread. All staff must be specifically trained to don, doff, and dispose of personal protection equipment (PPE) including masks, eye protection, double non-sterile gloves, gowns, suites, caps, and socks.
- In-transit surgical patients proceeding through the theater block must not stop in the anesthetic bay, recovery room, or any place other than the COVID-dedicated operating room (OR). They must be taken directly to a designated OR that must be adequately marked with clearly visible door signs. In the event that the scheduled surgical procedure does not require a general anesthetic and if the clinical situation allows, patients should continue to wear a protective mask for the entire duration of the procedure
- It is important to underline how all non-COVID patients must be protected. Established separate pathways must exist to keep suspected/infected patients apart from non-COVID ones. PPEs or at least masks must be enforced for all non-COVID patients during all inhospital transfers in order to minimize infection risk in the event that they cross the path or come in proximity of a COVID patient.

Table 1 Necessary personal protection equipment

Personal protection equipment
FFP2 facial mask
FFP3 facial mask (in case of maneuvers at high risk of generating aerosolized particles)
Disposable long sleeve waterproof coats, gowns, or Tyvek suits
Disposable double pair of nitrile gloves
Protective goggles or visors
Disposable head caps
Disposable long shoe covers
Alcoholic hand hygiene solution

FFP filtering face piece

Some instructions must be taken to deal with trauma during covoid 19 pandemic like:

Location

- Designated COVID operating areas (COA) must be allocated to COVID patients' urgent/emergent operating.
- The OR closest to the entrance of the theater block entrance should be the first one designated to COVID patients. Also operating rooms must be utilized in order of proximity to the theater block entrance

Patient transport

- Patient transit to and from the COA must be as quick as possible. A pre-defined direct path must be kept as short as possible and away from other patients and people in general within the hospital in order to minimize the chances of infection. If inter-hospital patient transfer or transfer from other buildings within the hospital is required, a dedicated vehicle should be used. Transfer personnel should be specifically trained and equipped with PPEs. The patient's compartment in the transport vehicle is ideally kept separate from the driver.
- If any unexpected contamination occurs during transport (i.e., patient vomiting or else), adequate dedicated sanitization should take place. A dedicated specifically trained 24/7 cleaning team from the local contracted cleaning service might prove a valuable resource.
- Any non-intubated patient must wear a surgical mask, disposable waterproof gloves, disposable cap, and shoe covers during transport. When possible, the patient's hands should be sanitized before transport. Transport operators must sanitize hands and wear PPEs before transfer and should minimize contact with patients.
- Coded routes should be followed and hospital public areas avoided. Anyone crossing the path of an infected patient should be preemptively alerted in order to minimize contact. Well-organized logistics will contribute to minimizing disposables wastage. Dedicated wellidentifiable containers for infectious-risk health waste (IRHW) should be used for potentially infected disposables.
- Lastly, COVID patients should be transported in the most professional and confidential way possible inorder to minimize unjustified alarmism.

  Dedicated areas allocated to infected patients awaiting transfer to the COA must be preemptively identified in the emergency department. The patient's transfer from the emergency department to the COA should be streamlined

in order to avoid all unnecessary contacts. Each hospital should provide a step by step, well-defined path pre-allocating some corridors and elevators to COVID patients.

COVID operating area

- It is important to minimize the total number of operators working in the designated COA. Whenever possible, it is important to minimize to number of people working on a single infected case.
- PPEs and stock required for hand hygiene must be constantly replenished within the COA. A specifically allocated filter area designed for COVID patients to enter the COA must be equipped with PPEs, hand hygiene station, and a dedicated IRHW bins. Handling of potentially infected linen should be adequately managed too.

Taking charge of the patient in COVID operating area

- Special attention should be given to what, in non- COVID times, is routine practice. Staff taking responsibility for positive or suspected infected patients must be limited to those who need to be primarily involved in each operation. A record must be kept of all operators involved in procedures on potentially infected patients.
- Personnel equipped with full PPEs must receive the patient in the COA, transfer the patient to the operating room minimizing environmental contamination and, after time-out, proceed to move the patient on the operating table in the allocated OR.
- All non-intubated patients must wear a surgical mask. Medical records must remain outside the OR and must be consulted and updated there after adequate doffing. Intraoperativedocument consultation is discouraged and should beminimized.

Operating room preparation

- Negative pressure ORs would be ideal to minimize infection risk. However, ORs are normally designed to have positive pressure air circulation. A high air exchange cycle rate ($\geq$ 25 cycles/h) contributes to effectively reduce the viral load within ORs.
- Equipment kept in each OR must be minimized to what is strictly necessary on a case to case basis.
- Once the operation starts, all efforts must be made to use what is available in the room and minimize staff transiting in and out the OR, in order to minimize infection risk.

- Standard anesthetic trolleys should be replaced with dedicated pre-prepared ones with minimal but adequate stock.
- All required surgical material (i.e., stitches, scalpel blades) must be preemptively prepared in a sterilizable steel wire basket.
- Dedicated IRHW containers must be used for infected and sharp disposable instruments.
- Alcoholic solution for hand hygiene must always be available.
- Avoiding non-strictly necessary commonly used non-disposable devices is recommended. Disposable material in general should be preferred, including linen. All operators (i.e., surgeon, anesthetist, nurses, technicians) should enter the OR timely, aiming to minimize time spent within the OR itself. Once in the OR, they should not leave until the operation is completed, and once out they should not re-enter.

Personnel dressing

- All operators must wear the required PPE before meeting the infected patient. The patient's receiving personnel inside the COA filter area must perform hand hygiene and wear full PPE.
- While taking care of infected patients, gloves should be changed immediately after contact with infected material (objects, surfaces, etc.) or if any damage occurs.
- Operator with a beard should exert special attention to the fit of the mask ensuring adequate protection.
- Some procedures likely to generate aerosolized particles have been associated with increased coronavirus transmission: tracheal intubation, non-invasive ventilation, tracheostomy, cardiopulmonary resuscitation, and manual ventilation before intubation and bronchoscopy. An FFP3 mask should be therefore worn by operators working closer to the patient during these procedures.
- Given the conjunctiva's susceptibility to viral transmission, it is important to wear visors or goggles to protect the eyes from potential exposure of viral particles.

Anesthesiologic consideration

- Careful anesthesiologic planning is recommended to minimize any infection potentially associated with unexpected complex endotracheal intubation procedures.
- A more liberal use of intubation might be justified in patients with acute respiratory failure, bypassing noninvasive ventilation techniques (e.g., CPAP or biPAP) in order to minimize the transmission risks.

- Disposable airway equipment should be preferred. Medical and nursing staff must be equipped with FFP3 filters during laryngoscopy and intubation.
- Awake intubation techniques should be avoided. At the end of these procedures, all staff directly performing the procedure must immediately replace the first pair of gloves and other PPEs in case heavy contamination risk exists (i.e., in the event that vomiting, coughing, or else has occurred).
- Fiberscope intubation, unless specifically indicated, should be avoided as it may generate aerosolization.
- If a patient is transferred directly from the intensive care unit, a dedicated transport ventilator should be utilized. In order to reduce aerosolization risks, the gas flow should be turned off and the endotracheal tube clamped with forceps when switching from the portable device to the OR ventilator.
- When possible, a dedicated ventilator should be used in the OR for general anesthesia in positive or suspected positive COVID-19 patients. Invasive procedures like for example the placement of intercostal catheters, central venous catheters, or similar should be performed at the patient's bedside, rather than in the OR.
- When a general anesthetic is required, a HEPA (high-efficiency particulate air) filter should be connected to the patient end of the breathing circuit and another one between the expiratory limb and the anesthetic machine. Alternatively, for pediatric patients or other patients in whom additional dead space or the weight of the filter may be problematic, the HEPA filter must be placed at the expiratory end of the circuit (before the exhalation re-enters the ventilator).

Intraoperative management

- The surgical team will drape the patient according to the surgical procedure, replacing the surgical mask with FFP2 filter and wearing long shoe covers before doing so.
- All personnel in direct contact with the patient must wear a double pair of gloves at all times, even while operating. After the patient left the OR, logistics should allow as much time as possible before the next procedure takes place, to reduce possible air contamination.
- This time depends on the number of air exchanges/hour of the specific room. Air exchange cycles should be increased whenever possible to $\geq$ 25 exchanges/h. After the case, all areas at risk of contamination must be cleaned and disinfected.
- Efforts should be made to minimize the contamination risk associated with specimens sent to the pathology department. No data currently exist on COVID-19 viral load in bodily fluids or tissue samples.

Table 2 Sanitization sequence

Surface and electromedical sanitization sequence
1. Clean with chloro-derivate solution
2. Rinse and dry
3. Disinfect with chloro-derivate solution in a concentration ≥ 0.1% or 1000 ppm; time of contact must be superior to 1 min

ppm parts per million

PPE undressing/removal

- Staff not directly involved in the patient's care should leave the OR at the end of the operation and remove all PPEs in a dedicated doffing area.
- A clean area should be accessed only after the doffing procedure is complete. All used PPEs must be disposed of through IRHW containers.
- Scrubs must be replaced after each procedure following showering, whenever possible.

Instructions for PPE removal

- The healthcare professional must take all care not to become infected while removing PPE; this must be done through an adequate procedure preventing recontamination of the operator's clothing and hands. The first pair of gloves is likely to be heavily contaminated and must be removed first.
- All other PPEs must be considered infected as well and removed with care during the doffing procedure, especially if the patient had a cough.
- Protective suite, shoe cover, and head cap must be subsequently removed.
- Face mask and glasses must be then removed, taking care to handle the face mask by the ear laces and without touching its external side.
- The second pair of gloves must be removed as the very last PPE and hands disinfection with hydro-alcoholic solution must be accurately performed immediately after.

Environmental sanitization

- The OR and surrounding exchange areas must be sanitized as soon as possible after each procedure, with particular attention to all objects used when caring for infected patients.
- Similarly, all areas where COVID patients have transited must be carefully sanitized too.
- All personnel must contribute to maintain a clean environment including floors and surfaces in general.

- All potentially infected single-use materials should be disposed of through IRHW containers. Reusable materials should be decontaminated, washed, dried, and or disinfected/ sterilized, based on the likelihood of infection.
- Electromedical equipment (i.e., ventilator, radiological equipment) must be cleaned with chloro-derivate solution, rinsed and dried, and then disinfected with chloroderivate solution in a concentration ≥ 0.1% or 1000 ppm (parts per million) with contact time superior to 1 min.
- Full PPE must be worn during the sanitizing procedure. Disposable materials only (i.e., double gloves, paper towel) should be used for cleaning.
- Anything disposable kept inside the OR during the operation must be disposed of through IRHW containers, even if not used.

Waste disposal

- It is advisable to set up a dedicated container for hazardous medical waste immediately outside the OR, to immediately dispose of all contaminated disposable material and PPEs.
- Containers should be closed and sealed before being transferred to the collection point.
- All sharps should be disposed of in a dedicated rigid plastic container.
- PPE should be worn when closing and transporting containers and removed immediately after.
- Any visibly damaged or contaminated container must be promptly replaced.

Linen management

- Linen can be contaminated and must therefore be handled and transported with care, aiming to prevent infection spread.
- Disposable laundry should be preferred, when possible.
- All linen (sheets, pillowcases, crossbars, etc.) should be handled wearing PPE during collection, not placed on surfaces or floors, but directly inside dedicated containers.

These must be sealed and immediately sent for cleaning and sterilization, limiting them being left outside the OR.

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