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AT A GLANCE

Infection Prevention and Control Management of Viral Hemorrhagic Fever in Pre-Hospital Care and Ground Transport

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Introduction

This document is for Emergency Medical Services (EMS) staff caring for patients with a suspect or confirmed Viral Hemorrhagic Fever (VHF) such as Ebola, Marburg and Lassa during pre-hospital care and ground transport.

This document summarizes key infection prevention and control (IPAC) elements from Public Health Ontario's (PHO) Infection Prevention and Control Management of Viral Hemorrhagic Fever in Acute Care and Public Health Agency of Canada's (PHAC) Infection Prevention and Control Measures for pre-hospital Care and Ground Transportation of Persons Under Investigation of Ebola Disease or with Confirmed Ebola Disease[1] documents that can be applied during the care and transport of patients by EMS.

The Ministry of Health may establish standards through policy or directives that go beyond the recommendations contained in this document. Refer to the Ministry of Health's Public Health Management of Viral Hemorrhagic Fevers[2] and Infectious Disease Protocol Appendix 1: Case Definitions and Disease Specific Information Disease: Hemorrhagic fevers caused by: i) Ebola virus and ii) Marburg virus, iii) Lassa Fever and (iv) Other viral causes including bunyaviruses, arenaviruses and flaviviruses[3] for additional information.

For additional information, consult PHO's Viral Hemorrhagic Fevers webpage or email Communicable.DiseaseControl@oahpp.ca.

Background

Viral Hemorrhagic Fever (VHF) is a serious disease caused by viruses (e.g., Ebola, Marburg and Lassa) that can damage blood vessels, leading to unexplained bruising and bleeding and, in some instances, severe life-threatening illness due to internal hemorrhage, organ failure and death.

Viruses that cause VHFs are primarily transmitted through direct contact with blood, body fluids or waste (e.g., saliva, vomit, urine or feces) of an infected person. They can also spread through contact with contaminated objects (e.g., medical equipment) or direct or indirect exposure to infected animals (e.g., rodents, primates).

Ebola, Marburg and Lassa viruses circulate in defined endemic regions in West and Central Africa.

Determining the Status of the Patient

The clinical presentation of the patient with a suspected or confirmed VHF will evolve over time and risk of exposure to the infectious agent will also change depending on the patient's clinical status and the nature of the care or procedure being provided. The presence of large amounts of fluid loss in a clinically unstable patient puts the EMS staff at a higher risk for body fluid exposure or the environment at higher risk for contamination[4].

A point-of-care risk assessment (PCRA) is a dynamic risk assessment that should be completed by the EMS staff before each patient interaction or task where there is a potential risk of being exposed to an infection and for the selection of correct personal protective equipment required in their interaction with the patient and the patient environment.

This document summarizes key aspects of the elements of Additional Precautions that can be applied based on clinical status and risk of exposure categorized as stable suspect case, unstable suspect case or confirmed case of VHF. Decision making will also need to consider the anticipated clinical trajectory and care procedures.

Suspect Case

A suspect case is an individual who has met established jurisdictional EMS screening criteria for VHF

Stable Suspect Case of VHF (e.g., stable vital signs, contained fluids)

- patient is in early stage of illness (e.g., fever with fatigue and myalgia)
- patient is in convalescent stage of illness with diarrhea and vomiting resolved
- patient's body fluids are contained (e.g., formed stool, no vomiting, no bleeding)
- patient is continent of stool and urine
- patient is capable of self-care and hygiene

Unstable Suspect Case of VHF (e.g., abnormal vital signs, uncontained fluids):

- other clinical findings suggesting that the patient is likely to contaminate their environment with
- blood and bodily fluids (e.g., non-compliance, delirium, etc.)
- patient's body fluids are uncontained (e.g., vomiting, diarrhea or bleeding)
- patient is incontinent of stool or urine
- patient is unable to perform self-care and hygiene
- patient requires invasive procedure or aerosol-generating medical procedure (AGMP) (e.g., intubation, suctioning, active resuscitation)
- patient has signs and symptoms of shock

All confirmed cases of VHF should be managed as per the unstable suspect case, given the potential for deterioration, including high-volume fluid loss or the need for AGMPs. If a confirmed case is convalescing and the acute, high-volume fluid loss phase has resolved, you may consider de-escalation of recommendations, to those of a stable patient.

Summary of Recommendations

Patient Placement

- A designated patient care/isolation area should be established in the back of the transport vehicle and patient movement and patient care is to be restricted to this area. Personnel wearing PPE should remain in this area.
- Only essential personnel with appropriate PPE should enter the patient care/isolation area.
- Extra supplies and clean PPE should be stored in a designated area outside the patient care/isolation area, when possible or covered with an impermeable barrier in a manner that prevents contamination. Plastic-lined biohazard waste receptacle should be placed inside the isolation area.
- Where available, consider the use of a medical equipment pod (a secure, climate-controlled unit designed to store and protect patients, responders and medical gear) as the designated patient care/isolation area.
- If monitoring is not possible from a separate space (i.e., through barrier or video), space in the patient care/isolation area should be provided to allow monitoring of personnel for breaches in PPE or protocols by a trained monitor[1].

Equipment and Instruments

- Use disposable equipment whenever possible (i.e., bedpan/urinal with the use of a solidifier) and discard used items into a plastic-lined biohazard waste container.
- If reusable items are required, dedicate non-critical reusable patient-care equipment for single-patient use. Immediately after use, place used items into biohazard bags and label for cleaning and disinfection following manufacturer's instructions by trained staff wearing correct PPE (see Cleaning and Disinfection of Transport Vehicle).

Personal Protective Equipment

For Stable Suspect Cases of VHF

- Well-fitting fluid-resistant medical mask (Medical Masks of ASTM level 2 and level 3).
- Disposable full-face shield.
- Disposable fluid-resistant cuffed sleeve gown that covers to mid-calf (Fluid resistant gowns meet CSA or AAMI level 2 or 3 standards).
- Gloves with extended cuffs to pull over gown cuffs.

Additional Considerations for Unstable Suspect or Confirmed Cases of VHF

- A fit-tested, seal-checked N95 respirator. A PAPR is an alternative and may be used based on considerations such as length of time in transport vehicle room, availability of equipment, user training and PPE assistance/observers.
- Fluid resistant/impermeable hair/head/neck covering.

- Impermeable long-sleeved, cuffed gown that covers to mid-calf and fluid resistant/impermeable shoe cover with/plus gaiters that come up to the knee (Impermeable gowns meet CSA or AAMI level 4 standard).

  OR

  Impermeable coverall and fluid resistant/ impermeable shoe covers/integrated sock. Apron can be worn if coverall has zipper on the front.

- **Double gloves** should be considered, depending on activity (e.g., venipuncture), to allow for changing of glove if required between activities during the care and transport of patients by EMS. In this case the outer pair of gloves should have extended cuffs. Ensure cuffs of the inner gloves are tucked under the sleeves of gown or coverall.

Comments

- Those involved with moving the patient into and out of the transport vehicles are required to wear PPE. Those who do not wear PPE must not have contact with the patient or the patient environment.
- PPE should remain on and be worn correctly for the duration of pre-hospital patient care, transport and when in contact with the patient's potentially contaminated care environment.
- Recommend using a PPE coach/monitor, if required (see also Staffing).
- When removing the outer pair of gloves, use alcohol based hand rub (ABHR) to disinfect the inner gloves prior to putting on a new pair of outer gloves.
- Fit-tested and seal-checked N95 respirator required for all AGMPs. Performance of AGMPs can increase the creation and mobilization of in particular very small, respiratory particles which may result in a risk of transmission to EMS staff.
- A powered-air purifying respirator (PAPR) is an alternative and may be used based on considerations such as length of time in attendance with patient and appropriate training and availability.
- Care should be taken to avoid contamination of the driver/passenger (front cab) area of the vehicle. The pass-through from driver cab to the back of the transport vehicle should remain closed.
- PPE should only be worn when in contact with the patient or the patient's potentially contaminated care environment. PPE should be removed (as outlined above) prior to entering the front cab, in order to prevent contamination. The driver does not need to wear PPE to operate the vehicle.

Staffing

For Stable Suspect Cases of VHF

- Only essential/dedicated staff members who have been trained and have demonstrated competency in putting on and taking off recommended PPE are to be assigned to provide care for the patient.
- If sufficient staff available, use an observer to coach and observe putting on, taking off and disposal of PPE.

Additional Considerations for Unstable Suspect or Confirmed Cases of VHF

- Ensure observer availability to coach and observe putting on, taking off and disposal of PPE.

Comments

- If unfamiliar PPE is being worn, training is to be provided prior to use (just-in-time training may be needed).
- Maintain a log of all EMS staff entering the designated patient care/isolation area established in the back of the transport vehicle (see Additional Considerations).
- Observers can be used to ensure that EMS staff follow the appropriate procedure for putting on, taking off and disposal of PPE. This can be supported through the use of a visual aid and checklist that is read aloud to the EMS staff while they put on and take off PPE[5].
- There is some evidence that having an additional individual observing and coaching putting on, taking off and disposal of PPE can further reduce the risk of contamination[6].
- Limit the number of pre-hospital and transport personnel to the minimum required to safely provide care and transport. Monitoring and maintaining a log of all personnel involved in pre-hospital care and transport is recommended.

Additional Considerations

- The transport vehicle should be dedicated to a single patient. The stretcher should be covered with impervious material. Where available, consider the use of a medical equipment pod (a secure, climate-controlled unit designed to store and protect patients, responders and medical gear) as the designated patient care/isolation area.
- The patient should perform hand hygiene and wear a medical mask, if tolerated, to contain droplets.
- If PCRA indicates the potential for blood and body fluid exposure during transport (i.e., patient is bleeding, vomiting, and/or has diarrhea) methods should be used to contain fluids (i.e., use continence products and place absorbent pads under the patient) to prevent exposure of personnel and contamination of vehicle.

EMS Transport: Patient Movement to/from Transport Vehicle

- Staff assisting with loading/unloading patient should wear PPE as outlined above.
- Handle transfers carefully to prevent damage/contamination of PPE during stretcher-to-stretcher movement.
- Emergency team meets the transport vehicle with a prepared stretcher to reduce EMS movement inside the hospital.
- Transfer the patient directly to the receiving area using the most direct secured route to minimize exposure[1].

Cleaning and Disinfection of Transport Vehicle

- Staff responsible for environmental cleaning should receive training, practice and supervision on proper cleaning procedures and PPE use.
- At a minimum, staff responsible for cleaning and disinfection should wear the same level of protection as personnel providing care to a suspect or confirmed patient.
- Use Health Canada approved hospital-grade disinfectant with an eight-digit identification number preceeded by the designation “DIN” and claim sufficient to inactivate enveloped viruses.

- After patient transfer, clean and disinfect:
  - All surfaces or equipment the patient or their bodily fluids have contacted
  - All exposed surfaces in the transport vehicle
  - All non-contaminated areas of the transport vehicle as per regular protocol.
  - All equipment and reusable containers prior to their return to transport vehicle.
- Blood or body fluid contaminated seat cushions, webbed seats or straps should be removed and discarded in a plastic-lined biohazard waste container.
- Do not use compressed air or spray cleaners for vehicle cleaning[1].

Linen and Waste Management

- Preparedness is key to help with linen and waste management, such as a designated plastic-lined biohazard waste containers inside the transport vehicle for contaminated tissues, linens, PPE etc.
- All VHF patient waste is to be treated as Category A infectious waste and requires appropriate containment and handling
- For more information please refer to PHAC's Ebola Virus Disease: Management of Waste and Environmental Cleaning for Pre-hospital Care and Ground Transport[7] for recommendations on the safe handling, containment, transport and disposal of waste (including linen and sharps) generated during pre-hospital care and transport of suspect or confirmed cases of VHF.

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