

HPS - Hantavirus Pulmonary Syndrome

HPS-C COMPLICATIONS

OUTCOME: The patient/family will understand the potential consequences of exposure to and/or infection caused by the hantavirus.

STANDARDS:

1. Discuss the common or significant complications that may occur after infection with the hantavirus, such as cardiorespiratory failure and death.
2. Discuss if treatment is obtained before the disease progresses to acute respiratory distress, the chances of surviving are greatly increased.

HPS-DP DISEASE PROCESS

OUTCOME: The patient/family will have a basic understanding of the pathophysiology, symptoms, and prognosis of infection with the hantavirus.

STANDARDS:

1. Explain that deer mice (along with cotton rats in the southeastern states and the white-footed mouse in the northeast) carry “hantaviruses” that cause hantavirus pulmonary syndrome (HPS). Explain rodents shed the virus in their urine, droppings, and saliva and the virus is mainly transmitted by people when they breathe in air contaminated by the virus.
2. Explain that following aerosol exposure and deposition of the virus deep in the lung, infection may be initiated. The virus attacks the lungs and infects the walls of the capillaries, making them leak, flooding the lungs with fluid.
3. Incubation time is not positively known, but it appears that symptoms may develop between one and five weeks after exposure.
4. Explain that symptoms include:
 - a. Early universal symptoms: fatigue, fever, and muscle aches, especially in the large muscle groups – thighs, hips, back, and sometimes shoulders.
 - b. Other early symptoms: headaches, dizziness, chills, and abdominal problems, such as nausea, vomiting, diarrhea, and abdominal pain (about half of all HPS patients experience these symptoms).
 - c. Late symptoms (4 to 10 days): coughing and shortness of breath, with the sensation of a “tight band around the chest and a pillow over the face” as the lungs fill with fluid.
5. Discuss that the sooner an infected person gets medical treatment, the better the chance of recovery. Explain the need to see the doctor immediately for exposure to rodents and development of symptoms of fever, deep muscle aches and severe

shortness of breath. Emphasize the need to tell your physician that you have been around rodents.

HPS-EQ EQUIPMENT

OUTCOME: The patient/family will understand and demonstrate (when appropriate) the proper use and care of equipment.

STANDARDS:

1. Explain the use of equipment utilized to monitor the patient.
2. Explain that the various alarms are to alert the medical personnel of the patient's status and/or the function of the equipment.
3. Emphasize, as necessary, that electrodes and sensors must be left in place in order for the equipment to function properly.
4. Encourage the patient/family to ask questions if they have concerns regarding equipment readings.
5. Emphasize the importance of not tampering with any medical equipment.

HPS-FU FOLLOW-UP

OUTCOME: The patient and/or family will understand the importance of follow-up in the treatment of hantavirus.

STANDARDS:

1. Discuss the importance of follow-up care.
2. Discuss the procedure for obtaining follow-up appointments and that follow-up appointments should be kept.
3. Emphasize that full participation of the treatment plan is the responsibility of the patient/family.
4. Discuss signs/symptoms that should prompt immediate follow-up.
5. Discuss the availability of community resources and support services and refer as appropriate.

HPS-HPDP HEALTH PROMOTION, DISEASE PREVENTION

OUTCOME: The patient will understand lifestyle changes necessary to promote and sustain healthy living.

STANDARDS:

1. Explain that health and wellness refers to whole person (mind, body, and spirit) and is a positive state which results from healthy choices.

2. Explain healthy lifestyle choices (e.g., spirituality, social connections, exercise, nutrition) and avoidance of high-risk behaviors (e.g., smoking, alcohol and substance abuse, sex with multiple partners). Discuss the benefits of a healthy lifestyle.
3. Review lifestyle aspects/changes and avoidance of high-risk situations where the hantavirus might lurk. (e.g., caution when cleaning, entering buildings that have been unused for long periods of time, awareness of the need to wear protective gloves, masks, etc. during cleaning).
4. Discuss wellness as an individual responsibility to:
 - a. Learn how to be healthy.
 - b. Be willing to change.
 - c. Practice new knowledge.
 - d. Get help when necessary.
5. Review the community resources available for help in achieving behavior changes.

HPS-INT INTUBATION

OUTCOME: The patient/family will have a basic understanding of endotracheal intubation, as well as, the risks, benefits, alternatives to endotracheal intubation and associated factors affecting the patient.

STANDARDS:

1. Explain the basic procedure for endotracheal intubation, including the risks and benefits of endotracheal intubation and the adverse events that might result from refusal.
2. Discuss alternatives to endotracheal intubation, including expectant management, as appropriate.
3. Explain that the patient will be unable to speak or eat while intubated.

HPS-L LITERATURE

OUTCOME: The patient/family will receive literature about HPS.

STANDARDS:

1. Provide the patient/family with literature on HPS.
2. Discuss the content of the literature.

HPS-MNT MEDICAL NUTRITION THERAPY

OUTCOME: The patient/family will understand the specific nutritional intervention(s) needed for treatment or management of HPS.

STANDARDS:

1. Explain that Medical Nutrition Therapy (MNT) is a systematic nutrition care process provided by a Registered Dietitian (RD) that consists of the following:
 - a. Assessment of the nutrition related condition.
 - b. Identification of the patient's nutritional problem.
 - c. Identification of a specific nutrition intervention therapy plan.
 - d. Evaluation of the patient's nutritional care outcomes.
 - e. Reassessment as needed.
2. Review the basic nutrition recommendations for the treatment plan.
3. Discuss the benefits of nutrition and exercise to health and well-being.
4. Assist the patient/family in developing an appropriate nutrition care plan.
5. Refer to other providers or community resources as needed.

HPS-P PREVENTION

OUTCOME: The patient/family will understand that HPS can be prevented by eliminating or minimizing contact with rodents.

STANDARDS:

1. Explain that rodents tend to be found in the home, cabin, workplace, orchards, out buildings, hay fields, or open fields; therefore, it is important to keep a clean and healthy home and yard to eliminate sources of nesting materials and sites. This might include:
 - a. The need to seal up the house to keep rodents out of the home.
 - b. The need to examine for any gaps around roofing, attic spaces, vents, windows, and doors as well as for gaps under the sink and locations where water pipes come into the home.
2. Discuss the common signs that point to a rodent problem (e.g., rodent droppings, rodent nests, food containers that have been "chewed on," gnawing sound, or an unusual musky odor).
3. Discuss the mode of transmission of HPS is inhalation of infected rodent feces, so it is important to not stir-up dust by sweeping-up or vacuuming-up droppings, urine, or nesting material. If rodents or rodent droppings are suspected, use precautions, including wearing rubber or plastic gloves and spraying dead rodents, urine, or droppings with a disinfectant or a mixture of bleach water. Explain that contaminated gloves must be disinfected with a disinfectant or soap and warm water before taking them off.
4. If contamination is suspected, thoroughly wet the contaminated areas with a disinfectant to deactivate the virus. The most general purpose disinfectants and household detergents are effective. A solution prepared by mixing 1½ cups of

household bleach in 1 gallon of water may be used in place of commercial disinfectant. Take up contaminated materials with a damp towel, then mop or sponge the area with disinfectant.

5. Discuss that when going into outbuildings that have been closed up for awhile, they should be opened and aired before cleaning due to the high probability of rodent infestation and the possibility of droppings and/or urine.

HPS-TE TESTS

OUTCOME: The patient/family will understand the test(s) to be performed, the potential risks, the expected benefits, and the risks of non-testing.

STANDARDS:

1. Explain test(s) that have been ordered (explain as appropriate):
 - a. method of testing
 - b. necessity, benefits, and risks of test(s) to be performed
 - c. any potential risk of refusal of recommended test(s)
 - d. any advance preparation and instructions required for the test(s)
 - e. how the results will be used for future medical decision-making
 - f. how to obtain the results of the test
2. Explain test results:
 - a. meaning of the test results
 - b. follow-up tests may be ordered based on the results
 - c. how results will impact or effect the treatment plan
 - d. recommendations based on the test results

HPS-TX TREATMENT

OUTCOME: The patient/family will understand the possible treatments that may be available for HPS.

STANDARDS:

1. Explain to patient/family that there is currently no virus-killing drug that is effective against HPS.
2. Explain that there is no specific treatment or “cure” for hantavirus infection. If the infected individuals are recognized early and admitted to intensive care, the chance for recovery is better.
3. Emphasize that treatment is supportive care.

HPS-VENT MECHANICAL VENTILATION

OUTCOME: The patient/family will understand mechanical ventilation, as well as, the risks, benefits, alternatives to mechanical ventilation and associated factors affecting the patient.

STANDARDS:

1. Explain that the patient must be intubated with an endotracheal tube or tracheostomy tube in order to receive mechanical ventilation.
2. Explain the basic mechanics of mechanical ventilation, including the risks and benefits of receiving mechanical ventilation and the adverse events which might result from refusal.
3. Discuss alternatives to mechanical ventilation, including expectant management, as appropriate.
4. Explain that the patient will be unable to speak or eat while intubated and receiving mechanical ventilation.
5. Explain that the patient will be sedated during intubation and the initiation of mechanical ventilation.
6. Discuss the possibility that the patient may require restraints to prevent accidental extubation.