Viral respiratory diseases pose a threat to global health as new outbreaks continue to occur each year. Middle East Respiratory Syndrome coronavirus (MERS-CoV) is one of the latest to develop and causes a severe acute respiratory illness with symptoms of cough, fever, and shortness of breath. The first reported case of MERS-CoV in humans was identified in Saudi Arabia in 2012 and details regarding how the virus spreads are unclear. Anti-MERS-CoV antibodies have been detected in dromedary camels in the Arabian Peninsula, and although few patients with the confirmed disease have reported direct exposure to camels, the consumption of camel-derived products, such as unpasteurized camel milk, may be one route of transmission to humans.

The spread of the disease occurs primarily from human-to-human transmission, with a high degree of health care–associated transmission. A review of 191 confirmed MERS-CoV cases in Saudi Arabia revealed that 20.9 percent of symptomatic patients were health care workers and of those who were not, the majority had contact with a health care facility, another person with confirmed MERS-CoV infection, or both. Globally, there have been 1,413 confirmed cases and 502 deaths. Recently, an outbreak in the Republic of Korea and China affected 186 people and had 36 confirmed deaths as of August 20, 2015. Although two cases were reported in the United States in May 2015, the infection did not spread beyond these patients, both of whom recovered. Both were health care workers who lived and worked in the Middle East and traveled to the United States, demonstrating the importance of taking proper precautions at health care facilities across the globe.

Because this disease is caused by a virus, there are no available effective preventive measures such as a vaccine or specific medications. The mortality rate is 40 percent overall and 60 percent in patients with comorbidities. The lack of knowledge regarding transmission, lack of medications to treat the disease, high mortality rate, and prevalence of hospital-centered outbreaks all highlight the need for health care facilities and workers to take proper precautions to limit the spread of MERS-CoV. In recognition of National Preparedness Month in September, *Periop Briefing* spoke with Terri Link, MPH, RN, BSN, CNOR, CIC, a certified infection preventionist at AORN, about how facilities and perioperative team members can prepare for the potential care of patients with highly contagious respiratory infections like MERS-CoV.

**Surveillance and symptom recognition**

Identifying patients with MERS-CoV is a crucial step to mitigating a potential outbreak. The incubation period is estimated to be five to 14 days and the early clinical features of the disease include fever, cough, chills, myalgia, arthralgia, and sore throat. Within the first week, the patient may experience difficulty breathing and develop pneumonia, which may progress to multiorgan failure and death. The early symptoms are common to several diseases, making it difficult to make a diagnosis without laboratory confirmation of the exact pathogen. “Before a patient with respiratory symptoms is admitted to a hospital or to an ambulatory surgery center or even a clinic, we need to screen and find out their travel history, just like we do with Ebola,” said Link. As an airborne virus that causes respiratory disease, MERS-CoV differs greatly from Ebola, which is a hemorrhagic fever spread through bodily fluids; however, some of the precautionary measures put in place to limit the spread of Ebola also apply to a potential outbreak of MERS-CoV. Laboratory tests should be performed to confirm the presence or absence of MERS-CoV if a patient with fever and respiratory symptoms has

- traveled to the Arabian Peninsula within 14 days of symptom onset,
- had close contact with a traveler to the Arabian Peninsula who developed symptoms within 14 days after traveling, or
- been in a health care facility in the Republic of Korea within 14 days before symptom onset.

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Patients with signs of a respiratory infection that may be caused by MERS-CoV should be instructed on proper hand hygiene, respiratory hygiene, and cough etiquette. “This is somebody that you want to put a mask on until you determine exactly what it is they have,” said Link. “Make sure that their family members who are with them do those very same things and isolate them.” The Centers for Disease Control and Prevention recommend that patients with suspected MERS-CoV infection be isolated in an airborne infection isolation room.

Implementing perioperative precautions

Patients with confirmed MERS-CoV infection are unlikely to undergo surgery as part of the infection treatment or elective surgeries while infected; however, procedures such as intubations and bronchoscopies may still be performed by perioperative team members. “Those are the types of procedures that might emit pathogens into the air, so you would want to make sure that those extra precautions are taken while you’re doing those procedures,” said Link. These precautions include limiting the number of perioperative team members present, wearing the appropriate personal protective equipment (PPE) for standard, contact, and airborne precautions, and isolating the patient.

Personal protective equipment

When treating patients with MERS-CoV infection, perioperative team members should wear gloves, a clean disposable gown, and eye protection. An N95 respirator is an important measure to keep health care workers from contracting the virus. These respirators are distinct from surgical masks in that they provide a greater degree of respiratory protection and must be fit tested for each health care worker to ensure that the respirator is sealed around the face for improved protection. Respirators should be discarded after each patient encounter, especially when used during aerosol-generating procedures; putting on a used respirator increases the risk of contact transmission of the respiratory pathogen if the respirator is contaminated.

Perioperative team members need to be trained on the Centers for Disease Control and Prevention’s recommended protocols for donning and removing PPE. “One of the things we’ve found with Ebola is that it’s important for people to be competent in how they put on PPE and how they take it off so that they don’t expose themselves,” said Link. A small observational study of 30 health care workers at a tertiary hospital recently found that only 17 percent of workers properly removed and disposed of their PPE. When donning PPE for protection from respiratory pathogens like MERS-CoV, the individual should put the gown on first, followed by the respirator, goggles or face shield, then gloves. When removing PPE, gloves should be removed first, followed by goggles or face shield, and gown; used PPE should be disposed of inside the patient’s room. Respirators should be removed outside the room after the door is closed, and hand hygiene should then be performed.

Patient placement

Patients with suspected or confirmed MERS-CoV infection can be placed in airborne infection isolation rooms kept at a negative pressure to reduce airflow and spread of airborne pathogens out of the room. Special considerations for these rooms include limiting the number of health care workers who enter the room and keeping a log of all workers who care for the patient or enter the room for any reason. If an airborne infection isolation room is not available, patients should be isolated in a room with high-efficiency particulate air filtration until they can be transferred to a facility with an airborne infection isolation room.

Conclusion

The spread of contagious diseases is a global health concern in our modern world of international travel. Perioperative team members need to be alert to the possibility of a MERS-CoV infection in patients presenting with a fever and respiratory symptoms and question these patients regarding their travel history. Standard, contact, and airborne precautions should be followed when caring for patients with suspected or confirmed MERS-CoV infection, with an emphasis on performing proper hand hygiene and wearing PPE. Viral respiratory disease outbreaks are a concern for all health care workers, especially given the number of outbreaks that have occurred in health care facilities.
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