

When to Remove a Patient from Isolation Precautions: a guidance document for Acute Care Hospitals including Intensive Care Units.

Background:

Scientific data on viral shedding in immuno-competent hosts comes from human challenge studies and observational studies. In the challenge studies volunteers (mean age 21.0 yr) were intranasally inoculated with a strain of influenza virus and nasal washings were collected for a number of days afterwards and viral titres determined. Viral shedding peaked on day 2 and declined thereafter lasting for 6-7 days (J Clin Invest 1998; 101:643-9). Similar results are seen with animal (ferret and pig) model studies. In the human challenge studies where antiviral treatment (oseltamivir) was used the period of viral shedding was reduced from a mean of 107 hours to 58 hours (2 ½ days) after the onset of symptoms (JAMA 1999; 282 (13): 1240-6).

Hospitalised patients are usually older and are more likely to be immuno-suppressed or have chronic illness. Two recent studies have looked at the duration of viral shedding in hospitalised patients.

The first study looked at influenza A virus shedding in a group (n=50) of hospitalised patients (Infect Control Hosp Epid 2007; 28: 1071-6). The mean age was 72 years, 48 (96%) had 1 or more underlying diseases, 17 (34%) had respiratory failure, 9 (18%) were admitted to intensive care, and 1 (2%) died. The mean length of stay was 5 days. The mean duration of viral shedding for those treated with antiviral treatment was 5.7 days compared with the mean of 7.5 days for those not treated with antiviral treatment. The longest duration of viral shedding observed after starting antiviral treatment was 4 days (range 0-4 days).

The second study from Hong Kong (JID 2009; 200: 492-500) was a one year prospective study involving consecutive patients admitted to hospital with influenza. 147 adult patients with influenza A were included; the mean age \pm SD was 71.8 \pm 15.8 years, two thirds (64%) had co-morbidities. Two patients died. Three quarters (75%) received oseltamivir treatment (50 started day 1-2 after symptom onset, 51 started on symptom day 3-4 and 9 after symptom day 4). Viral load before starting antiviral treatment was significantly increased in those with major co-morbidity. Factors affecting decline in viral load included days from symptom onset and receiving antiviral treatment. Duration of viral shedding was determined by sequential testing of nasal and throat swabs by PCR and viral culture. Just under one third, 32.7%, of the patients had viral RNA detected at symptom day \geq 7 but only 2.1% had virus cultured. Only 10% of patients started on antiviral treatment had virus cultured by day 4 after symptom onset.

In a group of hospitalised children with influenza A viral isolation was reported to occur for 6.8 \pm 1.7 days after onset of symptoms; there was no significance in the duration of shedding when treated with antiviral treatment (Ped ID J 2005; 24 (10): 931-2).

CDC infection control guidelines for the prevention and control of influenza in acute care facilities (MMWR Recomm Rep 2005; 54 (RR-8): 1-40) advocate that patients hospitalised with suspected or confirmed influenza be placed under Standard Precautions and Droplet Precautions for 5 days after symptom onset. This

recommendation does not distinguish on age, the presence of chronic disease nor immuno-suppression. The detection of virus does not automatically equate with infectiousness. PCR methods may amplify inactive viral RNA.

Conclusions:

1. Immuno-competent adults shed virus for an average of 107 hours (5 days) following the onset of symptoms. Treatment with antiviral treatment reduces shedding to a mean of 58 hours.
2. The elderly patient and adult patients with chronic underlying illnesses shed virus for a mean 7.5 days and shedding is reduced to a mean of 5.7 days with antiviral treatment.
3. Shedding may persist for longer periods in immuno-suppressed patients. The effect of antiviral treatment on reducing viral shedding in this group has not been well studied.
4. In general, children shed virus longer than adults, usually about 7 days.

Recommendations:

1. All hospitalised patients should receive oseltamivir unless contraindicated.
2. Hospitalised patients who are immuno-competent and have received oseltamivir should be placed under Standard Precautions and Droplet Precautions for a minimum of 3 days and then Standard Precautions apply.
3. Hospitalised patients who are immuno-compromised (HIV infection, receiving cytotoxic therapy, on immuno-modulatory therapies including steroids etc) and have received oseltamivir should be placed under Standard Precautions and Droplet Precautions for 7 days and then Standard Precautions apply.
4. Hospitalised patients admitted to intensive care units with viral pneumonitis and respiratory failure should be placed under Standard Precautions and Droplet Precautions for a minimum of 7 days. De-escalation of precautions should be made on a clinical basis. Once the person is removed from Droplet Precautions then Standard Precautions apply.
5. The utility of additional laboratory testing to establish the absence of viral shedding is unclear.

References:

http://www.cdc.gov/ncidod/dhqp/gl_isolation.html