Medical News

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Ventilator Circuit Changes Beyond 7 Days

According to the Guideline for the Prevention of Nosocomial Pneumonia, issued by the CDC's Hospital Infection Control Practices Advisory Committee (HICPAC) in 1994, breathing circuits of mechanical ventilators should not be changed routinely more often than every 48 hours. However, the maximum duration that breathing circuits can be left safely is categorized by CDC/HICPAC as an "unresolved issue."

In 1986, Donald Craven, MD, and colleagues of Boston City Hospital published the results of study showing increased risk of nosocomial pneumonia when circuits were changed every 24 hours compared to every 48 hours.[1] Since then, the results of 11 studies have been reported addressing the question of whether circuits for mechanical ventilation can be changed safely every 7 days.[2] The most recently published study, conducted by researchers at Edward Hines, Jr, Veterans' Affairs (VA) Hospital in Hines, Illinois, found that circuit-change intervals of 7 and 30 days have lower risks for ventilator-associated pneumonia (VAP), compared to changing at 2-day intervals, yielding substantial reductions in morbidity, as well labor and supply costs.[3]

A prospective 4-year review of mechanically ventilated patients was conducted in the respiratory and medical intensive-care units. All adult patients receiving mechanical ventilation from January 1991 through December 1994 were included in the study. Ventilator circuits with active, heated-water humidifiers were changed at 2-day intervals during a 2-year control period, followed by 7-day and 30-day intervals (for 1 year each). Heated-wire circuits were adopted with the 30-day interval. The rate of VAP per 1,000 ventilator days was calculated for each circuit-change interval group. Survival analysis was used to model VAP with ventilator circuit change to determine risk. During the study period, 637 patients received mechanical ventilation. During the 2 years with 2-day change intervals, the VAP per 1,000 ventilator days was 11.88 (n=343), compared with 3.34 (n=137) and 6.28 (n=157) for 7-day and 30-day change intervals, respectively. The risk of acquiring a VAP for those with a circuit change every 2 days was significantly greater (relative risk, 3.1; P=.0004; 95% confidence interval, 1.662-5.812) than those with the 7-day and 30-day circuit changes.

The researchers concluded that extending circuit-change intervals not only reduced morbidity but reduced supply and labor costs averaging $4,231 per year for each ventilator in use.

FROM: 1. Craven DE, Kunches LM, Kilinsky V, Lichtenberg DA, Make BJ, McCabe WE. Risk factors for pneumonia and fatality in patients receiving continuous mechanical ventilation. *Am Rev Respir Dis* 1986;133:792-796.

2. Stamm AM. Ventilator-associated pneumonia and frequency of circuit changes. *Am J Infect Control* 1998;26:71-73.

3. Fink JB, Krause SA, Barrett L, Schaaff D, Alex CG. Extending ventilator circuit change interval beyond 2 days reduces the likelihood of ventilator-associated pneumonia. *Chest* 1998;113:405-411.

TB Transmission From Medical Waste

The Washington State Department of Health in Olympia issued a news release dated March 4, 1998, regarding probable transmission of occupationally acquired tuberculosis at Stericyle Inc, a medical-waste processing facility in Morton, Washington. Transmission is believed to be related to aerosols being created during the processing of medical waste. According to the press release, three workers have been diagnosed with TB over the course of last year.

The first worker was diagnosed with TB in April 1997 and a second employee in June. Health officials initially believed TB was being spread person-to-person at the plant. They interviewed patients, family members, and coworkers, and reviewed medical records in an effort to track down a source.

When laboratory tests revealed that these two workers had different strains of TB, scientists began to suspect that the source could be the medical waste processed in the plant. A third worker was diagnosed with yet a different strain of TB last September. Scientists then began trying to find a match between a case in the plant and someone outside the plant who was treated in a facility that sends its waste to Stericycle. Laboratory tests confirmed that one of the workers has the same strain of TB as a person treated at a facility that sends waste to Stericycle.

Fifteen other workers have been found to have a positive tuberculin skin test; baseline data, however, apparently is not available for determination of timing of initial acquisition of TB infection. This is the first reported case of TB transmission from medical waste.

The medical-waste plant was inspected by the National Institute for Occupational Safety and Health, and preliminary findings identified lack of respiratory protection for workers. Short-term control measures will include respirators that have an independent clean-air source.

Stericycle is the second-largest provider of regulated

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medical-waste management services in the United States. The company's proprietary electro-thermal-deactivation process destroys human pathogens without producing harmful airborne emissions and permits resource recovery. Stericycle operates on a multiregional basis, providing medical-waste collection, transportation, treatment, disposal, reduction, and resource recovery.

FROM: Washington State Department of Health. Press Release: Probable transmission of occupationally acquired tuberculosis at Stericyle Inc, a medical waste processing facility in Morton, WA. Olympia, WA: Washington State Department of Health. March 4, 1998.

Vancomycin-Resistant Enterococci From Community Sources

Researchers from the Erasmus University Medical Center in Rotterdam, The Netherlands, reported the results of a study to determine the prevalence of vancomycin-resistant enterococci (VRE) in The Netherlands. Six hundred twenty-four hospitalized patients from intensive-care units or hemato-oncology wards in nine hospitals and 200 patients living in the community were screened for VRE colonization.

Enterococci were found in 49% of the hospitalized patients and in 80% of the patients living in the community. Of these strains, 43% and 32%, respectively, were *Enterococcus faecium*. VRE were isolated from 12 (2%) of 624 and 4 (2%) of 200 hospitalized patients and patients living in the community, respectively. Polymerase chain reaction (PCR) analysis of these 16 strains and 11 additional clinical VRE isolates from one of the participating hospitals revealed 24 *van*A gene-containing, 1 *van*B gene-containing, and 2 *van*C1 gene-containing strains. All strains were cross-resistant to avoparcin but were sensitive to the novel glycopeptide antibiotic LY333328. Genotyping of the strains by arbitrarily primed PCR and pulsed-field gel electrophoresis revealed a high degree of genetic heterogeneity. These findings underscore a lack of hospital-driven endemicity of VRE clones.

The authors believe that this data suggests that the VRE in hospitalized patients have originated from unknown sources in the community.

FROM: Endtz HP, van den Braak N, van Belkum A, Kluytmans JA, Koeleman JG, Spanjaard L, et al. Fecal carriage of vancomycin-resistant enterococci in hospitalized patients and those living in the community in The Netherlands. *J Clin Microbiol* 1997;35:3026-3031.

Influenza Virus A (H5N1) Risk Factors

The Department of Health in Hong Kong and the Centers for Disease Control and Prevention in Atlanta, Georgia, reported the results of a case-control study to determine risk factors associated with recent cases of avian influenza in Hong Kong.

The case-control study was aimed at comparing different exposure risk factors between patients and controls. It covered a number of areas including live-poultry exposure, exposure when preparing food, food eaten during the week before onset, and human-illness exposure during the week before onset. The results indicated that visiting a poultry stall in the week before becoming ill was the strongest risk factor. These results support earlier findings that human-to-human transmission of the virus is inefficient.

A total of 18 cases of influenza A(H5N1) was reported in Hong Kong. The day of onset of illness of the last case was December 28, 1998. A 24-year-old female patient is still under treatment and in stable condition, while 11 others have been discharged after recovery. Six people died of the disease.

FROM: Chin J (World Health Organization). Influenza virus A (H5N1) risk factors. ProMED-e-mail post; March 12, 1998.

Hospital Epidemic of *Malassezia pachydermatis*

Investigators from CDC's Hospital Infections Program recently reported an unusual outbreak involving the yeast *Malassezia pachydermatis*. *Malassezia* species are lipophilic yeasts that are emerging as nosocomial pathogens, particularly in low-birth-weight neonates who receive lipid emulsions.

A cluster of patients with *M pachydermatis* infection was identified in an intensive-care nursery, and an investigation was initiated. A case patient was defined as any infant in the intensive-care nursery who had a positive culture for *M pachydermatis* between October 17, 1993, and January 18, 1995. A cohort study was conducted to identify risk factors for colonization and infection with *M pachydermatis*. Cultures were collected from the infants and the healthcare workers and from the healthcare workers' pets, because this organism has been associated with otitis external in dogs.

Fifteen infants met the case definition: eight with bloodstream infections, two with urinary tract infections, one with meningitis, and four with asymptomatic colonization. The case patients were significantly more likely than the other infants to weigh 1,300 g or less (15/65 vs 0/419; $P<.001$). In a multivariate analysis of infants weighing 1,300 g or less, the independent risk factors for colonization or infection with *M pachydermatis* were a greater severity of concomitant illness, arterial catheterization for 9 or more days, and exposure to nurse A.

In a point-prevalence survey, 9 additional infants, 1 healthcare worker, and 12 of the healthcare workers' pet dogs had positive cultures for *M pachydermatis*. The isolates from all 15 case patients, the 9 additional colonized infants, 1 healthcare worker, and 3 of the 12 dogs had identical patterns of restriction fragment-length polymorphisms.

It was concluded that it is likely that *M pachydermatis* was introduced into the intensive-care nursery on healthcare workers' hands after being colonized from pet dogs at home. The organism persisted in the nursery through patient-to-patient transmission.

FROM: Chang HJ, Miller HL, Watkins N, Arduino MJ, Ashford DA, Midgley G, et al. An epidemic of *Malassezia*