

ICU, 14% [before patient contact] and 25% [after patient contact]; cardiac surgery ICU, 6% [before] and 13% [after]). Observations in the medical ICU after introduction of the new, increasingly accessible, alcohol-based, waterless hand antiseptic revealed significantly higher handwashing rates ( $P < .05$ ). Handwashing compliance improved as accessibility was enhanced: before patient contact, 19%, and after contact, 41%, with one dispenser per four beds; and before contact, 23%, and after contact, 48%, with one dispenser for each bed.

The authors concluded that the education and feedback intervention and the patient awareness program failed to improve handwashing compliance. However, introduction of easily accessible dispensers with an alcohol-based waterless handwashing antiseptic led to significantly higher handwashing rates among healthcare workers.

FROM: 1. Maury E, Alzieu M, Baudel JL, Haram N, Barbut F, Guidet B, et al. Availability of an alcohol solution can improve hand disinfection compliance in an intensive care unit. *Am J Respir Crit Care Med* 2000;162:324-327.

2. Bischoff WE, Reynolds TM, Sessler CN, Edmond MB, Wenzel RP. Handwashing compliance by health care workers: the impact of introducing an accessible, alcohol-based hand antiseptic. *Arch Intern Med* 2000;160:1017-1021.

## Heat-Moisture Exchangers and Risk of Nosocomial Pneumonia

Davis and colleagues, at the University of Cincinnati, studied the effect of using a single heat-and-moisture exchanger (HME) for  $\leq 120$  hours on the efficiency, resistance, level of bacterial colonization, frequency rate of nosocomial pneumonia, and cost compared with changing the HME every 24 hours. In a prospective, randomized, controlled study in a surgical ICU, the study population included 220 consecutive patients requiring mechanical ventilation for 48 hours. Patients were randomized to one of three groups: (1) hygroscopic HME (Aqua+) changed every 24 hours (HHME-24); (2) hydrophobic HME (duration HME) changed every 120 hours (HME-120); and (3) hygroscopic HME (Aqua+) changed every 120 hours (HHME-120). Devices in all groups could be changed at the discretion of the staff when signs of occlusion or increased resistance were identified.

Daily measurements of inspired gas temperature, inspired relative humidity, and device resistance were made. Additionally, daily cultures of the patient side of the device were accomplished. The frequency rate of nosocomial pneumonia was made by using clinical criteria. Ventilatory support variables, airway care, device costs, and clinical indicators of humidification efficiency (sputum volume, sputum efficiency) also were recorded.

Prolonged use of both hygroscopic and hydrophobic devices did not diminish efficiency or increase resistance. There was no difference in the number of colony-forming units (CFUs) from device cultures over the 5-day period and no difference between CFUs in devices changed every 24 hours compared with devices changed after 120 hours. The average duration of use was  $23 \pm 4$  hours in the HHME-24 group,  $73 \pm 13$  hours in the HME-120 group, and  $74 \pm 9$  hours

in the HHME-120 group. Mean absolute humidity was greater for the hygroscopic devices ( $30.4 \pm 1.1$  mg of  $H_2O/L$ ) compared with the hydrophobic devices ( $27.8 \pm 1.3$  mg of  $H_2O/L$ ).

The frequency rate of nosocomial pneumonia was 8% (8:100) in the HHME-24 group, 8.3% (5:60) in the HME-120 group, and 6.6% (4:60) in the HHME-120 group. Pneumonia rates per 1,000 ventilatory-support-days were 20:1,000 in the HHME-24 group, 20.8:1,000 in the HME-120 group, and 16.6:1,000 in the HHME-120 group. Costs per day were \$3.24 for the HHME-24 group, \$2.98 for the HME-120 group, and \$1.65 for the HHME-120 group.

The authors concluded that changing the hydrophobic or hygroscopic HME after 3 days does not diminish efficiency, increase resistance, alter bacterial colonization, or increase the rate of nosocomial pneumonia. Thus, use of HMEs for  $>24$  hours, up to 72 hours, is safe and cost-effective.

FROM: Davis K Jr, Evans SL, Campbell RS, Johannigman JA, Luchette FA, Porembka DT, et al. Prolonged use of heat and moisture exchangers does not affect device efficiency or frequency rate of nosocomial pneumonia. *Crit Care Med* 2000;28:1412-1418.

## Semiquantitative Culture of IV Catheter Without Removal

Sensitivity and negative predictive values of combined surface cultures (skin and hub) are high in the presumptive diagnosis of catheter-related infection, but specificity and positive predictive values (PPVs) are poor. Fortun and coinvestigators from Madrid, Spain, conducted a prospective study to evaluate the yield of the semiquantitative culture of the subcutaneous segment in the diagnosis of colonization of the catheter tip without removal of the catheter.

One hundred twenty-four nontunneled central venous catheters were removed because of suspected infection or the end of therapy. Colonization was considered if  $>15$  colony-forming units (CFUs) in the roll procedure or  $>1,000$  CFUs in the quantitative Cleri procedure were recovered from the tip cultures (gold standard). Before removing the catheter, a semiquantitative culture of skin surrounding the point of insertion, a semiquantitative culture of the subcutaneous segment (after removing the catheter only 2 cm), a semiquantitative culture of the hub, and a quantitative blood culture were performed. Receiver operating characteristic curves were calculated to estimate the cutoff points. A culture was considered positive when CFUs were  $\geq 15$ ,  $\geq 15$ , and  $\geq 5$  for skin, hub, and subcutaneous segment cultures, respectively.

Colonization was detected in 51 catheters. The mean duration of catheterization was  $14 \pm 8$  days; the rates of incidence of tip colonization and bacteremia were 2.9 per 100 catheter days and 1.2 per 100 catheter days, respectively. Sensitivity of skin, subcutaneous, and hub cultures analyzed individually were  $\leq 61\%$ ; however, specificity and PPVs of subcutaneous segment cultures were significantly higher than skin cultures (94% and 88.5% vs 71.6% [ $P = .001$ ] and 62% [ $P = .014$ ], respectively). Sensitivity of the combined skin and hub cultures and of the combined subcutaneous segment and hub cultures were similar: 86.2% and 84.3%, respectively; how-