

Medical News

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Chlorhexidine Versus Povidone-Iodine for Catheter-Site Care: A Meta-Analysis

Bloodstream infections related to the use of catheters, particularly central-line catheters, are an important cause of patient morbidity, mortality, and increased healthcare costs. Researchers from Naresuan University in Pitsanulok, Thailand, conducted a meta-analysis to evaluate the efficacy of skin disinfection with chlorhexidine gluconate compared with povidone-iodine solution in preventing catheter-related bloodstream infection.

Multiple computerized databases (1966 to 2001) were used, in addition to reference lists of identified articles and queries of principal investigators and antiseptic manufacturers. Randomized, controlled trials comparing chlorhexidine gluconate with povidone-iodine solutions for catheter-site care were reviewed. Using a standardized form, two reviewers abstracted data on study design, patient population, intervention, and incidence of catheter-related bloodstream infection from all included studies. Eight studies involving a total of 4,143 catheters met the inclusion criteria. All studies were conducted in a hospital setting, and various catheter types were used. The summary risk ratio for catheter-related bloodstream infection was 0.49 (95% confidence interval, 0.28 to 0.88) in patients whose catheter sites were disinfected with chlorhexidine gluconate instead of povidone-iodine. Among patients with a central vascular catheter, chlorhexidine gluconate reduced the risk for catheter-related bloodstream infection by 49% (risk ratio, 0.51; 95% confidence interval, 0.27 to 0.97).

The researchers concluded that the incidence of bloodstream infections was significantly reduced in patients with central vascular lines who received chlorhexidine gluconate versus povidone-iodine for insertion-site skin disinfection. Use of chlorhexidine gluconate was a simple and effective means of reducing vascular catheter-related infections.

FROM: Chaiyakunapruk N, Veenstra DL, Lipsky BA, Saint S. Chlorhexidine compared with povidone-iodine solution for vascular catheter-site care: a meta-analysis. *Ann Intern Med* 2002;136:792-801.

Hepatitis B e Antigen Positivity Increases the Risk of Hepatocellular Carcinoma

The presence of hepatitis B e antigen (HBeAg) in serum indicates active viral replication in hepatocytes. HBeAg is thus a surrogate marker for the presence of hepatitis B virus DNA. Yang and colleagues from the

National Taiwan University, Taipei, conducted a prospective study to determine the relationship between positivity for hepatitis B surface antigen (HBsAg) and HBeAg and the development of hepatocellular carcinoma.

In 1991 and 1992, 11,893 men (age range, 30 to 65 years) without evidence of hepatocellular carcinoma from seven townships in Taiwan were enrolled. Serum samples obtained at the time of enrollment were tested for HBsAg and HBeAg by radioimmunoassay. The diagnosis of hepatocellular carcinoma was ascertained through data linkage with the computerized National Cancer Registry in Taiwan and with death certificates. Multiple regression analysis was performed to determine the relative risk of hepatocellular carcinoma among men who were positive for HBsAg alone or for HBsAg and HBeAg, as compared with those who were negative for both.

There were 111 cases of newly diagnosed hepatocellular carcinoma during 92,359 person-years of follow-up. The incidence rate of hepatocellular carcinoma was 1,169 cases per 100,000 person-years among men who were positive for both HBsAg and HBeAg, 324 per 100,000 person-years for those who were positive for HBsAg only, and 39 per 100,000 person-years for those who were negative for both. After adjustment for age, gender, the presence or absence of antibodies against hepatitis C virus, cigarette smoking status, and use or nonuse of alcohol, the relative risk of hepatocellular carcinoma was 9.6 among men who were positive for HBsAg alone and 60.2 among those who were positive for both HBsAg and HBeAg, as compared with men who were negative for both.

The authors concluded that positivity for HBeAg is associated with an increased risk of hepatocellular carcinoma.

FROM: Yang HI, Lu SN, Liaw YF, et al. Hepatitis B e antigen and the risk of hepatocellular carcinoma. *N Engl J Med* 2002;347:168-174.

Feeding Tubes Are a Reservoir for Nosocomial Antibiotic-Resistant Pathogens

Patients and their surroundings are known reservoirs for nosocomial pathogens. Enteral feeding tubes and formula are not thought of as reservoirs for nosocomial organisms. Mehall and colleagues from the University of Arkansas for Medical Sciences, Little Rock, conducted a prospective observation study comparing methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococcus* (VRE) cultured from nosocomial infec-

tions and MRSA/VRE cultured from enteral feeding tubes used in the same neonatal intensive care unit during the same time period but in different neonates. DNA fingerprinting then was used to compare MRSA and VRE cultured from feeding tubes with MRSA/VRE isolates cultured from clinical infections.

There were 23 *S. aureus* isolates; 12 of 23 were methicillin resistant (MRSA). There were 4 MRSA infections in patients without feeding tubes. DNA fingerprinting showed that the MRSA species causing each of the clinical infections also was in the feeding tubes of other infants. There were no VRE infections during the study period.

The authors concluded that feeding tubes are a reservoir for antibiotic-resistant pathogens that can be transmitted to other infants.

FROM: Mehall JR, Kite CA, Gilliam CH, Jackson RJ, Smith SD. Enteral feeding tubes are a reservoir for nosocomial antibiotic-resistant pathogens. *J Pediatr Surg* 2002;37:1011-1012.

Intranasal Mupirocin to Prevent Postoperative *Staphylococcus aureus* Infections

Patients with nasal carriage of *Staphylococcus aureus* have an increased risk of surgical-site infections caused by that organism. Treatment with mupirocin ointment can reduce the rate of nasal carriage and may prevent postoperative *S. aureus* infections. Perl, from Johns Hopkins, Baltimore, Maryland, and co-investigators, from the University of Iowa Colleges of Medicine and Public Health, Iowa City, conducted a randomized, double-blind, placebo-controlled trial to determine whether intranasal treatment with mupirocin reduces the rate of *S. aureus* infections at surgical sites and prevents other nosocomial infections.

Of 4,030 enrolled patients who underwent general, gynecologic, neurologic, or cardiothoracic surgery, 3,864 were included in the intention-to-treat analysis. Overall, 2.3% of mupirocin recipients and 2.4% of placebo recipients had *S. aureus* infections at surgical sites. Of the 891 patients (23.1% of the 3,864 who completed the study) who had *S. aureus* in their anterior nares, 444 received mupirocin and 447 received placebo. Among the patients with nasal carriage of *S. aureus*, 4.0% of those who received mupirocin had nosocomial *S. aureus* infections, as compared with 7.7% of those who received placebo (odds ratio for infection, 0.49; 95% confidence interval, 0.25 to 0.92; $P = .02$).

The authors concluded that prophylactic intranasal application of mupirocin did not significantly reduce the rate of *S. aureus* surgical-site infections overall, but it did significantly decrease the rate of all nosocomial *S. aureus* infections among the patients who were *S. aureus* carriers.

FROM: Perl TM, Cullen JJ, Wenzel RP, et al. Intranasal mupirocin to prevent postoperative *Staphylococcus aureus* infections. *N Engl J Med* 2002;346:1871-1877.

Risk of Airborne Transmission of MRSA in an Otolaryngology Surgery Unit

Shiomori and colleagues from the University of Occupational and Environmental Health, School of Medicine, Kitakyushu, Japan, conducted a study to quantitatively investigate the existence of airborne methicillin-resistant *Staphylococcus aureus* (MRSA) in a hospital environment. They performed phenotyping and genotyping of MRSA isolates to study MRSA epidemiology. They also performed prospective surveillance of patients with MRSA infections or colonization. Air samples were taken by an air sampler; samples were also obtained from object surfaces. An epidemiologic study of MRSA isolates was performed with an antibiotic susceptibility test, coagulase typing, and pulsed-field gel electrophoresis. The study was conducted in three single-patient rooms in a 37-bed otolaryngology-head and neck surgery unit. Three patients with squamous cell head and neck cancer were observed to have been colonized or infected with MRSA after surgery.

The MRSA samples were collected from the air in single-patient rooms during both a period of rest and when bed sheets were being changed. Isolates of MRSA were detected in all stages (from stage 1 [$> 7 \mu\text{m}$] to stage 6 [0.65 to $1.1 \mu\text{m}$]). Approximately 20% of the MRSA particles were within a respirable range of less than $4 \mu\text{m}$. MRSA was also isolated from inanimate objects, such as sinks, floors, and bed sheets, in the rooms of the patients with MRSA infections and from the patients' hands. An epidemiologic study demonstrated that clinical isolates of MRSA in the patient ward were of one origin and that the isolates from the air and from inanimate objects were identical to the MRSA strains that caused infection or colonization in the patients.

The authors concluded that MRSA was recirculated among the patients, the air, and the inanimate objects, especially when there was movement in the rooms. Airborne MRSA may play a role in MRSA colonization in the nasal cavity or in respiratory tract MRSA infections. Measures should be taken to prevent the spread of airborne MRSA to control nosocomial MRSA infection in hospitals.

FROM: Shiomori T, Miyamoto H, Makishima K. Significance of airborne transmission of methicillin-resistant *Staphylococcus aureus* in an otolaryngology-head and neck surgery unit. *Arch Otolaryngol Head Neck Surg* 2001;127:644-648.

Nosocomial Outbreak of Fluoroquinolone-Resistant Salmonella Infection

Infection with fluoroquinolone-resistant strains of salmonella is rare, as is nosocomial salmonella infection. Olsen and colleagues from the Division of Bacterial and Mycotic Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia, describe the first recognized outbreak of fluoroquinolone-resistant salmonella infections in the United States, which occurred in two nursing homes and one hospital in Oregon. They interviewed medical staff and reviewed patients' charts and death certificates. In