

Medical News

EDITED BY GINA PUGLIESE, RN, MS; MARTIN S. FAVERO, PHD

Additional news items in this issue: *Rising Incidence of Hepatocellular Carcinoma in the United States*, page 311; *Surgical-Wound Surveillance*, page 317; *PCR and Conventional Tests Used for MRSA Detection*, page 330; *Group A Streptococcus Outbreaks Linked to Healthcare Workers*, page 340; *Russia's TB Epidemic*, page 361.

Heparin Bottles Source of Pseudobacteremia due to *Pseudomonas fluorescens*

Pseudobacteremia might be responsible for up to 50% of all positive blood cultures, and is important to recognize early to avoid unnecessary treatment with antibiotics and delay in the search for the true cause of the fever. Namnyak and coinvestigators describe a pseudobacteremia outbreak of *Pseudomonas fluorescens* related to contaminated lithium heparin bottles in a pediatric ward. Twelve patients were involved in this outbreak from December 1996 to January 1997. None of the patients had clinical evidence of sepsis, but, nevertheless, most children were treated with antibiotics. Blood-collection bottles were suspected as the source of pseudobacteremia, and lithium heparin bottles were found to be contaminated with *P fluorescens* indistinguishable from the blood isolates taken from these children. Withdrawal of these bottles led to the termination of the pseudobacteremia.

FROM: Namnyak S, Hussain S, Davalle J, Roker K, Strickland M. Contaminated lithium heparin bottles as a source of pseudobacteremia due to *Pseudomonas fluorescens*. *J Hosp Infect* 1999;41:23-28.

A Liposomal Hydrogel for the Prevention of Bacterial Adhesion to Catheters

The adhesion of bacteria to medical implants and the subsequent development of a biofilm frequently results in the infection of surrounding tissue and may require removal of the device. DiTizio and coinvestigators from the Institute of Biomedical Engineering, Department of Botany, University of Toronto, Ontario, Canada, have developed a liposomal hydrogel system that significantly reduces bacterial adhesion to silicone catheter material. The system consists of a poly (ethylene glycol)-gelatin hydrogel in which liposomes containing the antibiotic ciprofloxacin are sequestered. This mixture was applied to a silicone surface that had been pretreated with phenylazido-modified gelatin. Hydrogel cross-linking and attachment to surface-immobilized gelatin was accomplished through the formation of urethane bonds between gelatin and nitrophenyl carbonate-activated poly (ethylene glycol). Liposomal

hydrogel-coated catheters were shown to have an initial ciprofloxacin content of $185 \pm 16 \mu\text{g}/\text{cm}^2$. Ciprofloxacin was released over 7 days, with an average release rate of $1.9 \pm 0.2 \mu\text{g}/\text{cm}^2/\text{h}$ for the first 94 hours.

In vitro assays using a clinical isolate of *Pseudomonas aeruginosa* established the antimicrobial efficacy of the liposomal hydrogel. A modified Kirby-Bauer assay produced growth-inhibition zone diameters of 39 ± 1 mm, while bacterial adhesion was inhibited completely on catheter surfaces throughout a 7-day in vitro adhesion assay. This new antimicrobial coating shows promise as a prophylactic or for treatment for catheter-related infection.

FROM: DiTizio V, Ferguson GW, Mittelman MW, Khoury AE, Bruce AW, DiCosmo F. A liposomal hydrogel for the prevention of bacterial adhesion to catheters. *Biomaterials* 1998;19:1877-1884.

TB Transmission During Train and Bus Travel

In January 1996, smear- and culture-positive TB was diagnosed in a 22-year-old black man who had traveled on two US passenger trains (29.1 hours) and a bus (5.5 hours) over 2 days. To determine if transmission had occurred, passengers and crew were notified of the potential exposure and instructed to undergo a tuberculin skin test (TST). Of the 240 persons who completed screening, 4 (2%) had a documented TST conversion (increase in induration of ≥ 10 mm between successive TSTs), 11 (5%) had a single positive TST ≥ 10 mm, and 225 (94%) had a negative TST (< 10 mm). For two persons who underwent conversion, no other risk factors for a conversion were identified other than exposure to the ill passenger during train or bus travel. These findings support limited transmission of *Mycobacterium tuberculosis* from a potentially highly infectious passenger to other persons during extended train and bus travel.

FROM: Moore M, Valway SE, Ihle W, Onorato IM. A train passenger with pulmonary tuberculosis: evidence of limited transmission during travel. *Clin Infect Dis* 1999;28:52-56.

Efficacy of Influenza Vaccine Among Healthcare Workers

Wilde and colleagues conducted a study to determine the effectiveness of trivalent influenza vaccine in reducing

infection, illness, and absence from work in young, healthy healthcare professionals. The study was a randomized, prospective trial over a 3-year period (1992/1993–1994/1995) in two large teaching hospitals in Baltimore.

Two hundred sixty-four hospital-based healthcare professionals without chronic medical problems were recruited. A total of 359 person-winters of serological surveillance (99.4% follow-up) and 4,746 person-weeks of illness surveillance (100% follow-up) was conducted. Twenty-four (13.4%) of 179 control subjects and 3 (1.7%) of 180 influenza vaccine recipients had serological evidence of influenza type A or B infection during the study period. Vaccine efficacy against serologically defined infection was 88% for influenza A and 89% for influenza B. Among influenza vaccinees, cumulative days of reported febrile respiratory illness were 28.7 per 100 subjects compared with 40.6 per 100 subjects in controls, and days of absence were 9.9 per 100 subjects versus 21.1 per 100 subjects in controls.

The authors concluded that influenza vaccine is effective in preventing infection by influenza A and B in healthcare professionals and may reduce reported days of work absence and febrile respiratory illness. These data support a policy of annual influenza vaccination of healthcare professionals.

FROM: Wilde JA, McMillan JA, Serwint J, Butta J, O'Riordan M, Steinhoff MC. Effectiveness of influenza vaccine in health care professionals: a randomized trial. *JAMA* 1999;281:908-913.

HIV Rarely Transmitted by Saliva

Oral transmission of HIV by the millions of HIV-infected individuals is a rare event, even when infected blood and exudate is present. Saliva of viremic individuals usually contains only noninfectious components of HIV, indicating virus breakdown.

Because most of the infectious HIV that is shed mucosally by asymptomatic individuals is found in, produced by, and transmitted by infected mononuclear leukocytes, Baron and colleagues conducted a study to determine whether saliva, which is hypotonic, may disrupt these infected cells, thereby preventing virus multiplication and cell-to-cell transmission of HIV. Specifically, they measured whether mononuclear leukocytes were lysed by saliva and whether the lysis by saliva inhibits the mul-

tiplication of HIV and other viruses in infected leukocytes and other cells.

The results indicated that saliva rapidly disrupted 90% or more of blood mononuclear leukocytes and other cultured cells. Concomitantly, there was a 10,000-fold or higher inhibition of the multiplication of HIV and surrogate viruses. Further experiments indicated that the cell disruption is due to the hypotonicity of saliva.

Thus, hypotonic disruption may be a major mechanism by which saliva kills infected mononuclear leukocytes and prevents their attachment to mucosal epithelial cells and production of infectious HIV, thereby preventing transmission.

FROM: Baron S, Poast J, Cloyd MW. Why is HIV rarely transmitted by oral secretions? *Arch Intern Med* 1999;159:303-310.

MRSA at a National Cystic Fibrosis Center

In many patient populations, there has been a progressive increase in the prevalence of methicillin-resistant *Staphylococcus aureus* (MRSA). Thomas and coinvestigators from the Imperial College School of Medicine, London, examined the prevalence and consequences of acquiring MRSA in the adult cystic fibrosis (CF) population at Royal Brompton Hospital. Patients who became colonized by MRSA between 1965 and 1997 were identified from an existing database, and case notes were reviewed. Clinical and microbiological data were recorded. Twenty-six patients became colonized with MRSA during this period. Median age at acquisition was 23.4 (range, 11.8-43.3) years. In 17 patients, MRSA isolates were first identified while under the care of a total of 11 other institutions. Since the first case of MRSA infection in 1982, there has been an increase in prevalence to a current rate of nine cases in the first 7 months of 1997. The most common site of colonization was the lower airway (96%); the nose (23%) and skin sites (15%) were affected more rarely. Duration of colonization was frequently brief, with nine cases (35%) lasting less than 1 month.

The identification of MRSA appeared to be of little clinical significance and did not generally affect outcomes. Only three patients were MRSA-positive at the time of death, and in only one of these was MRSA considered a possible contributing factor.

FROM: Thomas SR, Gyi KM, Gaya H, Hodson ME. Methicillin-resistant *Staphylococcus aureus*: impact at a national cystic fibrosis centre. *J Hosp Infect* 1998;40:203-209.