

Medical Center in Chicago, Illinois, reported on the findings of an investigation of the role of resistance genes and clindamycin use associated with an epidemic of *C difficile* in four hospitals in the United States between 1989 and 1992.

Case-control studies were performed at three of the four hospitals to assess the relation of the use of clindamycin to *C difficile*-associated diarrhea. All isolates of the epidemic strain and representative isolates of other strains identified during each outbreak were tested for susceptibility to clindamycin. Chromosomal DNA from these representative isolates was also analyzed by dot blot hybridization and amplification with the polymerase chain reaction (PCR) with the use of probes and primers from a previously described determinant of erythromycin resistance—the erythromycin ribosomal methylase B (*ermB*) gene—found in *Clostridium perfringens* and *C difficile*.

The use of clindamycin was found to be significantly increased among patients with diarrhea due to the epidemic strain of *C difficile*, as compared with patients whose diarrhea was due to nonepidemic strains. Exposure to other types of antibiotics or hospitalization in a surgical ward was not significantly associated with the risk of *C difficile*-associated diarrhea due to the epidemic strain. All epidemic-strain isolates were highly resistant to clindamycin (minimal inhibitory concentration, >256 µg/mL). DNA hybridization and PCR analysis showed that all these isolates had an *ermB* gene, which encodes a 23S ribosomal RNA methylase that mediates resistance to macrolide, lincosamide, and streptogramin antibiotics. Only 15% of the nonepidemic strains were resistant to clindamycin.

The investigators concluded that a strain of *C difficile* that is highly resistant to clindamycin was responsible for the outbreaks of diarrhea in four hospitals in different states. The use of clindamycin is a specific risk factor for diarrhea due to this strain. Resistance to clindamycin further increases the risk of *C difficile*-associated diarrhea, an established complication of antimicrobial use.

FROM: Johnson S, Samore MH, Farrow KA, Killgore GE, Tenover FC, Lyras D, et al. Epidemics of diarrhea caused by a clindamycin-resistant strain of *Clostridium difficile* in four hospitals. *N Engl J Med* 1999;341:645-651.

TB Transmission to Embalmer

The risk of acquiring TB varies according to occupation and is high among funeral home workers. Embalmers are at particularly high risk for reactivity on tuberculin skin testing. The increased risk may be due to exposure to *Mycobacterium tuberculosis* during the embalming process, which involves the aspiration of blood and other body fluids from the cadaver, resulting in the generation of potentially infectious aerosols. However, the transmission of *M tuberculosis* from a cadaver to an embalmer, with the subsequent development of active TB, has not been described.

Sterling and colleagues recently reported transmission of TB from a cadaver (case 1) to an embalmer (case 2) confirmed by DNA fingerprinting by restriction fragment-length polymorphism (RFLP) analysis. The only known

contact between the cases occurred at the time of embalming.

Case 1 was a 35-year-old man with AIDS who was hospitalized with fever and a cough. A chest radiograph showed infiltrates in the upper and middle portions of both lungs. A sputum sample was obtained for staining for acid-fast bacteria and culture, but the patient died on the day it was obtained. After the patient's death, the acid-fast smear was reported to be positive, and the culture grew *M tuberculosis*. Blood cultures for mycobacteria were not performed.

Case 2 was a 45-year-old man who worked as an embalmer. A test for antibodies to HIV, performed 2 years before presentation, had reportedly been negative. The patient did not have a history of TB and had not undergone tuberculin skin testing. He had been an embalmer for 15 years and could not remember ever embalming a cadaver that he knew had active TB. He performed at least 300 embalmings per year, always wearing gloves and usually wearing a mask. He had no history of percutaneous exposure to blood or of chronic skin lesions. He was diagnosed with pulmonary TB 31 months after exposure to case 1.

These cases were identified as part of an ongoing study of the epidemiology of TB. DNA fingerprinting was performed with *M tuberculosis* isolates from more than 90% of patients in Baltimore, Maryland, who had received a diagnosis of TB, confirmed by culture, between January 1994 and December 1998. Cases 1 and 2 were part of this study. RFLP analysis showed that the *M tuberculosis* isolates from patient 1 and patient 2 had an identical 10-band fingerprint pattern.

FROM: Sterling TR, Pope DS, Bishai WR, Harrington S, Gershon RR, Chaisson RE. Transmission of *Mycobacterium tuberculosis* from a cadaver to an embalmer. *N Engl J Med* 2000;342:246-251.

Epidemic Transmission of HIV in Egyptian Renal Dialysis Centers

In 1993 an epidemic of HIV infection occurred among 39 patients at two renal dialysis centers in Egypt. El Sayad and coinvestigators from the National AIDS Programme, Ministry of Health and Population, Cairo, Egypt, and the CDC's Hospital Infections Program investigated the outbreak. The hemodialysis centers, private center A (PCA) and university center A (UCA), were visited, HIV-infected patients were interviewed, seroconversion rates at UCA were calculated, and relatedness of HIV strains was determined by sequence analysis; 34 (62%) of 55 patients from UCA and 5 (42%) of 12 patients from PCA were HIV-infected. The HIV seroconversion risk at UCA varied significantly with day and shift of dialysis session.

Practices that resulted in sharing of syringes among patients were observed at both centers. Unmarked syringes were reused and stored on shared trays in between use at both centers. No documentation of prescreening HIV tests for patients at the PCA was available, and the dialysis staff at this center had no trained nurses. The analyzed V3 loop sequences of the HIV strain of 12 outbreak patients were >96% related to each other. V3 loop sequences from each of 8

HIV-infected Egyptians unrelated to the 1993 epidemic were only 76% to 89% related to those from outbreak strains.

Based on the remarkable nucleotide sequence homology of the outbreak HIV strains analyzed, it was concluded that HIV infection was introduced into PCA and later into UCA from a common source late in 1992 or early in 1993. The authors pointed out that dialysis patients may be at risk for HIV infection if basic infection control guidelines are not followed.

From: El Sayed NM, Gomatos PJ, Beck-Sague CM, Dietrich U, von Briesen H, Osmanov S, et al. Epidemic transmission of human immunodeficiency virus in renal dialysis centers in Egypt. *J Infect Dis* 2000;181:91-97.

EPA Issues Stop Sale on Disinfectant Product

On December 23, 1999, the EPA issued a Stop Sale, Use, or Removal Order for a commercial disinfectant spray because of potential bacterial contamination in hospital and healthcare settings. The order halts sale by the manufacturer of Medaphene Plus Disinfectant Deodorant (EPA registration no. 11694-98) registered by ITW Dymon, Inc (Olathe, KS), until the agency can further evaluate the extent of the contamination. The Agency is working with the CDC to take appropriate steps to notify healthcare facilities nationwide of the order.

The product is currently used on environmental surfaces such as countertops, walls, chart racks, bedside furniture, and wheelchairs in hospitals, medical and dental offices, schools, and other healthcare facilities. It is not used on critical medical devices.

During testing, agency staff determined that three lots of the samples were contaminated with the microorganism *Bacillus subtilis*, a bacterium that may cause infections in immunosuppressed or traumatized patients. At this time, neither the agency nor the CDC have received any reports regarding incidents linking *B subtilis* infections to this susceptible group.

For further information, call Ellen Kramer, 202-260-4376.

FROM: EPA issues stop sale on disinfectant product [press release]. Washington, DC: Environmental Protection Agency; December 23, 1999.

Gender-Based Differences in Sepsis Outcomes

It has been hypothesized that among factors postulated to affect outcome in sepsis is the gender of the patient, with a suggestion that females may have lower mortality. Eachempati and coinvestigators from Department of Surgery, Weill Medical College of Cornell University, New York, conducted a study to test the hypothesis that female patients admitted to the surgical ICU (SICU) with a documented infection have a lower mortality rate. They performed retrospective analysis of a prospectively collected data set in an SICU of a university hospital medical center. They analyzed a consecu-

utive series of 1,348 patients who had signs of systemic inflammatory response syndrome on admission to an SICU. A cohort of 443 patients (32.9%) admitted with documented infection—and who therefore had sepsis, severe sepsis, or septic shock—constituted the study population. For each patient, APACHE II and III scores, systemic inflammatory response syndrome score, gender, age, and hospital mortality were recorded. Chi-squared with Fisher's Exact Test was performed to compare mortality rates between males and females. Univariate analysis of variance was used to compare continuous variables in discrete populations. Multivariate analysis of variance (ANOVA) was used to determine which factors independently predicted mortality. Primary outcome measures were mortality, ICU length of stay, hospital length of stay, and maximal multiple organ dysfunction score. Outcomes were stratified by gender.

Patients had a mean age of 67 years and mean APACHE II and III scores of 20.1 and 67.7, respectively. There were no demographic differences between genders. Overall, 104 (23.5%) of 443 patients with sepsis died. The difference in mortality rates between female and male patients was not significant, except in octogenarians ($P=.05$). Multivariate ANOVA, APACHE III ($P<.001$), maximal multiple organ dysfunction score ($P<.001$), and female gender ($P=.02$) predicted mortality. In females, APACHE III ($P=.03$) and maximal multiple organ dysfunction score ($P<.001$) predicted mortality, but age did not.

It was concluded that female gender is an independent predictor of increased mortality in critically ill surgical patients with documented infection.

FROM: Eachempati SR, Hydo L, Barie PS. Gender-based differences in outcome in patients with sepsis. *Arch Surg* 1999;134:1342-1347.

Influenza Vaccination of HCWs Reduces Risk to LTCF Elderly

Vaccination of healthcare workers (HCWs) has been recommended to prevent nosocomial influenza infection of elderly patients in long-term care (LTC). Data are, however, limited on this strategy. Carman and colleagues from the Institute of Virology at the University of Glasgow, United Kingdom, conducted a study to determine whether vaccination of HCWs lowers mortality and the frequency of virologically proven nosocomial influenza in elderly patients in LTC facilities.

HCWs in 20 long-term elderly care hospitals (range, 44-105 patients) were randomly offered or not offered influenza vaccine. All deaths among patients were recorded over 6 months in the winter of 1996-1997. A random sample of 50% of patients was selected for virological surveillance for influenza, with combined nasal and throat swabs taken every 2 weeks during the epidemic period. Swabs were tested by tissue culture and PCR for influenza viruses A and B.

Influenza vaccine uptake in HCWs was 50.9% in hospitals in which they were routinely offered vaccine, compared with 4.9% in those in which they were not. The uncorrected rate of mortality in patients was 102 (13.6%) of 749 in vaccine