

## SHEA Abstracts

### ABSTRACT #16

**Epidemiologic and Microbiologic Features of Nosocomial Bloodstream Infection (NBSI) Implicating a Vascular Catheter Source: A Case-Control Study of 85 Vascular Catheter-Related and 101 Secondary NBSIs**  
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Vascular catheters are a major cause of NBSI. The true incidence of vascular catheter-related NBSI is substantially underestimated because a catheter often is not suspected as the source of a patient's septic picture and thus is not cultured. We report a case/control study of 186 patients with NSBI in our hospital in which demographic and epidemiologic factors present at the outset of the patient's NBSI and the microbiologic profile of NSBI were compared by stepwise logistic regression. Patients with vascular catheter-related NBSI generally were younger than patients with secondary NBSI (47 versus 55 years,  $p = .05$ ), more likely to be a nonsurgical patient (OR= 5.1,  $p = .02$ ), were more likely to have no identifiable local nosocomial infection (OR= 40.0,  $p = .001$ ), and were more likely to have a central venous catheter (CVC) in place at the onset of sepsis (OR= 22.4,  $p < .001$ ); NBSIs caused by *Candida* (OR= 91.7,  $p < .001$ ), coagulase-negative staphylococci (OR= 16.3,  $p < .001$ ), or *S aureus* (OR= 91.7,  $p = .001$ ) were far more likely to have originated from an infected vascular catheter. In contrast, NBSIs caused by aerobic gram-negative bacilli (OR= 5.0,  $p < .001$ ), *P aeruginosa* (OR= 9.0,  $p = .002$ ), anaerobes, or hemolytic streptococci, (each,  $p < .05$ ) were more likely to originate from a local site of nosocomial infection. With hospitalized patients who exhibit signs or symptoms consistent with NBSI who do not have an identifiable local site of nosocomial infection and have a CVC in place, the vascular catheter should be strongly suspected as the source of the patient's septic picture. NBSI caused by staphylococci or *Candida* points very strongly toward a vascular catheter as the cause.

46 (41%) of 113 physicians took AZT, compared with 159 (26%) of 605 other healthcare workers ( $p = .002$ ). AZT was used after 190 (30%) of 638 percutaneous and 15 (19%) of 80 mucous membrane or nonintact skin exposures ( $p = .04$ ). Prescribed regimens varied (200-1800 mg/day for 1-180 days). Side effects were reported in 128 (74%) of 174 healthcare workers who have completed 6 weeks of followup, including nausea (81), malaise/fatigue (54), headache (40), and anemia (2). AZT was stopped prematurely because of adverse events in 56 (32%) healthcare

workers. Although often associated with reversible adverse events, the use of AZT postexposure is continuing at institutions reporting to CDC; the efficacy and toxicity of prophylaxis require further study.

### ABSTRACT #17

**PTCA Catheter In Section: Incidence and Risks**  
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A prospective evaluation of 296 patients undergoing a femoral percutaneous transluminal angioplasty (PTCA) was performed. Data included demographics, the length of the PTCA, the postoperative duration of indwelling vascular sheaths, and clinical complications. Standard cultures were done of all sheaths upon removal. Others were done as clinically indicated.

Risk factors for positive catheter culture included the following: PTCA procedure over 120 minutes, retained vascular catheter for >16 hours, and *Staphylococcus* in nares.

Femoral vascular catheters should be removed as soon as clinically safe. The role for early empiric therapy and antimicrobial prophylaxis in selected cases is being explored.

### ABSTRACT #18

**Molecular Epidemiology of Staphylococcus aureus Isolated From Patients on Chronic Ambulatory Peritoneal Dialysis**

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A previous study of 140 consecutive patients demonstrated that nasal carriers of *S aureus* were more likely than noncarriers to develop a catheter exit-site infection (ESI). The incidence of ESI in carriers and noncarriers was 0.40 and 0.10 episodes per year ( $p = .012$ ), respectively. To further define the epidemiology of infections in carriers in *S aureus*, we evaluated 138 *S aureus* isolates (110 from surveillance cultures and 28 from infections) from 77 patients by plasmid pattern analysis and phage typing. Twenty-one patients had 28 *S aureus* infections; 3 were tunnel infections with strains having plasmids that matched those from previous surveillance cultures, 8 (40%) patients (11 infections) were both colonized and subsequently infected by strains that did not have plasmids, and 8 (40%) patients (9 infections) became infected with strains that had plasmids that were different from those identified in the surveillance

isolates. Only 33% of patients infected with plasmid-containing strains became infected with strains identified in surveillance cultures. In contrast, by phage typing, 17 of 20 (85%) patients were infected with strains identified in surveillance cultures. In 6 (30%) patients, the results of plasmid pattern analysis and phage typing were discrepant. The results of plasmid pattern analysis suggested that the epidemiology of *S aureus* infections in patients on chronic ambulatory peritoneal dialysis is complex, while the results of phage typing suggested that the epidemiology of these infections is simple. Which picture is correct remains to be resolved—perhaps by techniques such as whole chromosomal DNA analysis.

#### ABSTRACT #19

**Secondary Measles Vaccine Failure in Five Healthcare Workers Exposed to Infected Children**  
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The Centers for Disease Control (CDC) recommendations for documentation of immunity to measles in healthcare workers includes laboratory evidence of measles immunity. Of 1,311 employees working in patient care areas from July to November 1990, 900 (68.6%) had sera tested for specific antibody to measles using a commercially available enzyme-linked immunosorbant assay (EIA). Of those tested, 14 (1.5%) were negative, 338 (37.6%) had low positive antibody levels, 372 (41.3%) were mid positives, and 171 (19%) were high positives; 5 (0.6%) showed equivocal results. From October 1990 to April 1991, a measles epidemic occurred in Philadelphia. During this time, 5 previously vaccinated healthcare workers developed symptoms of measles despite pre-existing low positive measles antibody levels. All had a 4-fold rise in specific IgG following exposure to children with measles. Three of the 5 healthcare workers had received at least 2 vaccinations prior to exposure. These cases raise important issues regarding secondary vaccine failure and detection of adequate immunity to measles. Healthcare workers with low positive antibody levels should observe both contact and respiratory precautions in caring for patients with measles.

#### ABSTRACT #20

**Viral Hepatitis in Healthcare Providers**  
**S.H. Factor, T.C. Quinn; Johns Hopkins University School of Medicine, NIAID, Bethesda Maryland**

The demographics and prevalence of hepatitis B virus (HBV) infection in healthcare providers have been described. Recently, hepatitis C virus (HCV) has been recognized as another parenterally transmitted virus that might pose an additional risk to healthcare

providers. We initiated a study of healthcare providers to determine the HCV and HBV seroprevalence, the associated risk factors, and the proportion and characteristics of those who have not been HBV-vaccinated.

Healthcare providers at the Johns Hopkins Hospital were offered anonymous testing for HBV and HCV and asked to complete a questionnaire. Eight hundred twenty-eight (>90%) consented. Antibodies to HCV (RIBA-2 confirmed) and HBV core antigen were found in 0.5% (4/803) and 6.3% (51/803), respectively. A total of 23.3% of healthcare providers were unvaccinated. Many factors were evaluated for association with anti-HNc, but by multivariate analysis, only race (black,  $p = .009$ ) and lack of vaccination ( $p = .0001$ ) were significant. Those unvaccinated were more likely to be female (OR= 3.8,  $p = .0001$ ), black (OR= 4.8,  $p = .0001$ ), nurses (OR= 74,  $p < .001$ ), and older ( $\geq 7$  years, OR= 4.3,  $p < .001$ ). After multivariate analysis, nursing ( $p < .0001$ ), age ( $p = .007$ ), and race ( $p < .0001$ ) were significant. Forty-two percent (79/187) stated having “not gotten around to it” as the reason for no vaccination. A total of 84.4% (520/616) of those vaccinated had measurable antibody to HBsAG. Vaccination without seroresponse was associated with an incomplete course (OR= 6.4,  $p < .0001$ ).

We conclude that among our healthcare providers, evidence of past infection with HBV is more common than with HCV, and that older, unvaccinated black nurses are at greatest risk. Incomplete vaccination and healthcare provider procrastination are reversible factors that correlate with absence of vaccine protection in a significant minority of healthcare providers. Further vaccine promotion should be specifically targeted at these high-risk groups.

#### ABSTRACT #21

**Hepatitis B Vaccination: The Effect of Informed Refusal, Intradermal (ID), and Intramuscular (IM) Options on Program Success**  
**F. Varner, B. Simmons, L. Fowler, C. Arheart**

Many hospitals have poor acceptance of hepatitis B vaccination among healthcare workers at risk for blood exposure. We assessed the value of a signed informed refusal and of 2 options, ID and IM, on compliance. Twenty-six percent (545/2,087) signed informed refusal; of these, 7% were because the healthcare worker didn't “like needles,” and only 6.2% were afraid of an infection from the recombinant vaccine. Of 1,542 vaccinated, 15% chose ID and 85% IM. Healthcare workers reported severe local (1) and systemic (4) side effects after IM only. Those choosing IM did so because it was “proven” (71%); physician and manufacturer recommendations influenced less than 5% each. Forty-seven percent chose ID because it was “less painful,” and 26% because they didn't like IM

injections. Vaccine was provided free, but 9% listed cost as a reason for ID. One hundred eighty-six of 230 receiving ID had serology 1 month after the 6-month dose. Sixty (32%) had less than 25 mIU/ml and 22% less than 10 mIU/ml; only smoking was associated with a poor response ( $p = .024$ ). Offering ID may increase compliance, but overall response rates are low compared with historical IM deltoid injections.

#### ABSTRACT #22

##### ***Infection with Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and Human Immunodeficiency Virus (HIV) Among Orthopedic Surgeons***

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Healthcare workers risk occupationally acquired infection with bloodborne viruses. HBV seroprevalence has been well studied in healthcare workers, but few data are available for HCV and HIV. We conducted an anonymous serosurvey for HBV, HCV, and HIV at the AAOS annual meeting in April 1991. Of 7,147 eligible orthopedic surgeons, 3,420 (47.9%) participated. The rate of past or current HBV infection was 12.5% overall and increased with years in practice from 4.7 (0-9 years) to 27.0% (30 or more years,  $p < .001$ , chi square test for trend); 21.8% were HBV-susceptible, and 65.8% had serologic evidence or a history of HBV vaccination. The rate of anti-HCV antibody was 0.9% overall and also increased with years in practice from 0.5% (0-9 years) to 1.9% (30 or more years,  $p = .02$ ). Among 3,267 participants without reported nonoccupational risk factors for HIV infection, none were positive for HIV antibody (0%, upper limit of the 95% confidence interval [UL CI<sub>95</sub>] = 0/09%); among 108 participants with nonoccupational HIV risk factors, 2 were positive for HIV antibody (1.9%, UL CI<sub>95</sub> = 0.18%). These data support that an occupational HIV infection was found among study participants. These findings underscore the importance of infection control precautions and hepatitis B vaccination.

#### ABSTRACT #23

##### ***Zidovudine Use After Occupational Exposure to HIV-Infected Blood***

**R. Marcus, J.I. Tokars, D.H. Culver, P.S., McKibben, D.M. Bell, Cooperative Needlestick Surveillance Group; Centers for Disease Control, Atlanta, Georgia**

In August 1983, the CDC began prospective evaluation of healthcare workers exposed to HIV-infected blood; in October 1988, surveillance was expanded to collect data on zidovudine (AZT) use and toxicity. The objectives of this study are to describe patterns of AZT use and the occupational risk of HIV infection. As of

November 30, 1991, 1,623 healthcare workers were tested at least 6 months after exposure; 3/1,427 healthcare workers (0.21%, UL CI<sub>95</sub> = 0.54%) with percutaneous, 0/95 with mucous membrane, and 0/101 with nonintact skin exposures seroconverted. Of 718 healthcare workers enrolled from October 1988 to November 1991, none have seroconverted to date; 205 (29%) took AZT postexposure. The proportion of healthcare workers using AZT by calendar quarter has increased from 3/55 (5%) in the period of October through December 1988 to 22/54 (41%) in July through September 1991 ( $p < .001$ , chi square test for trend). AZT use varied by occupation; 46 (41%) of 113 physicians took AZT, compared with 159 (26%) of 605 other healthcare workers ( $p = .002$ ). AZT was used after 190 (30%) of 638 percutaneous and 15 (19%) of 80 mucous membrane or nonintact skin exposures ( $p = .04$ ). Prescribed regimens varied (200-1800 mg/day for 1-180 days). Side effects were reported in 128 (74%) of 174 healthcare workers who have completed 6 weeks of followup, including nausea (81), malaise/fatigue (54), headache (40), and anemia (2). AZT was stopped prematurely because of adverse events in 56 (32%) healthcare workers. Although often associated with reversible adverse events, the use of AZT postexposure is continuing at institutions reporting to CDC; the efficacy and toxicity of prophylaxis require further study.

#### ABSTRACT #24

##### ***HIV 'Look-Back' Involving an OB/GYN Resident*** **B.H. Hamory, M. Zanotti, V.G. Rohrer; M.S. Hershey Medical Center, Penn State University, Hershey, Pennsylvania**

In June 1991, an Ob/GYN resident was involved in a needlestick incident and was discovered to be HIV positive. A decision was made to notify and offer testing to all patients on whom this individual had performed or assisted in performing oncology surgery, GYN surgery, or an episiotomy repair. Because of Pennsylvania Act 148 on "The Confidentiality of HIV-Related Information," implementing this decision required a court order and affirmation by an Appellate Court. Review of medical records required the assistance of 10 individuals.

A total of 374 patients at one hospital and 120 at another were identified as "possibly exposed" and were notified. A total of 366/374 and 116/120 (98%) were tested at more than six months after possible exposure. The identity of the resident has not become public. Timing of the announcement and arrangements for dealing with the public, patients, and the press were instrumental in the orderly management of this "outbreak investigation." To our knowledge, this is the only such instance in which this unique law has played a role.