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Preventing Staphylococcal Bacteremia: Beginning of a New Era?

ABSTRACT & COMMENTARY

Synopsis: *In this pilot study of a novel vaccine, the incidence of Staphylococcus aureus bacteremia was reduced by 57% in a group of hemodialysis patients.*

Source: Shinefield H, et al. *N Engl J Med*. 2002;346:491-496.

Staphylococcus aureus RANKS AMONG THE MOST FREQUENT causes of skin and soft tissue infection, surgical and other traumatic wound infection, osteomyelitis and septic arthritis, infective endocarditis, and hospital-acquired bacteremia. With the emergence of methicillin resistance in 40-50% of *S aureus* strains throughout the world, this microorganism has become a major therapeutic challenge. Because infection control methods have had only limited success, other effective preventive strategies—such as immunization—would be welcome.

In this study, Shinefield and colleagues tested a candidate vaccine in hemodialysis patients in a randomized trial. The vaccine, composed of 2 *S aureus* capsular polysaccharides (types 5 and 8) bound to a nontoxic protein, a recombinant variant of *Pseudomonas aeruginosa* exotoxin A, was administered to almost 900 patients, and a placebo was given to a comparable group of similar size. Enrolled patients were 18 years of age or older, had received hemodialysis treatment for at least 8 weeks, and had a Karnofsky score of at least 50. All were free of infection for at least 2 weeks before entry into the study. Demographic and clinical characteristics were similar; mean age was 58 years. Nasal carriage of *S aureus* was documented in 22% of subjects. Mild-to-moderate local reactions, malaise, and myalgia were experienced by nearly 40%, 25%, and 28%, respectively, of vaccine recipients. Other side effects such as headache, vomiting, and fever occurred with equal frequency in the 2 groups of subjects.

The occurrence of *S aureus* bacteremia was reduced by more than

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INSIDE

half—57% to be exact—during weeks 3 to 40 following vaccine administration, while fatality rates in the 2 study groups were similar. There was no demonstrable reduction in bacteremia rates in the period from 40-54 weeks after vaccination. Type 5 and type 8 isolates accounted for 33% and 46%, respectively, of *S aureus* blood culture strains from vaccine recipients. The 2 types constituted 27% and 54% of staphylococcal blood culture isolates, respectively, in placebo recipients, but these differences were not statistically significant.

Shinefield et al estimated the level of protective antibody to be 80 µg/mL at 40 weeks after vaccination, a concentration achieved by 75-80% of vaccine recipients. Geometric mean levels of antibody declined to less than 80 µg/mL 1 year after vaccine administration.

Shinefield et al hypothesize that antibody levels may have declined partly as a result of hemodialysis, and suggest that booster doses of vaccine should be investigated as a means to provide more long-lasting protection. They also opine that, because hemodialysis patients generally respond to vaccines less robustly than do nondialysis patients (without end-stage renal disease), the vaccine may have greater efficacy in other high-risk patient groups.

COMMENT BY JERRY D. SMILACK, MD, FACP

S aureus infections have been responsible for untold numbers of deaths and morbidity of cosmic proportions over the span of history. With the availability of penicillin in the early 1940s came the hope that a long era of human suffering might draw to a close, but such was not the case. Staphylococci quickly became resistant to penicillin and, subsequently, to methicillin and its congeners. The specter of resistance to vancomycin looms ominously as we look ahead to the 21st century, and preventing staphylococcal infections is becoming a high priority. Efforts to develop vaccines effective against *S aureus* have moved with fits and starts. Vaccine development has languished over the years, largely due to a sense of complacency about the ability of antibiotics to eradicate infection. Now that interest in developing a vaccine has resurfaced, several investigators have reported products that elicit protective antistaphylococcal antibody.[1-3] In this article from the Kaiser Permanente Vaccine Study Center in Oakland, Calif, we see the first glimmer of hope that an effective vaccine may be on the horizon.

Bacterial capsular polysaccharides inhibit polymorphonuclear cell opsonophagocytosis. Antibody to the polysaccharide blocks this inhibition and thereby promotes host defenses. Because staphylococcal polysaccharide itself is a weak immunogen, it must be linked to an adjuvant, in this case a bacterial exoprotein (a nontoxic variant of exotoxin A produced by *P aeruginosa*). The vaccine reported in this trial was comprised of capsular polysaccharides from 2 *S aureus* types that result in nearly 85% of all clinical infections. Shinefield et al administered the vaccine to hemodialysis patients, a group at considerably increased risk of serious staphylococcal infections, including bacteremia. They found that staphylococcal bacteremia occurred less than half as often in subjects who received vaccine compared with placebo recipients. Protection was demonstrated to last as long as 40 weeks. Shinefield et al did not state whether nonbacteremic staphylococcal infection rates were altered in vaccine recipients.

This study represents a major advance in the effort to combat staphylococcal disease. More research is needed to determine whether longer lasting protection can be achieved with booster doses in the hemodialysis popula-

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Please call **Robin Mason,** Managing Editor, at (404) 262-5517, or e-mail to robin.mason@ahcpub.com, or **Robert Kimball,** Senior Copy Editor, at (404) 262-5413, or e-mail to robert.kimball@ahcpub.com between 8:30 a.m. and 4:30 p.m. ET, Monday-Friday.

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tion, and whether greater protective effect can be afforded other high-risk patient groups, such as diabetics, patients with HIV infection, and illicit drug users. ■

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Conference Summaries: ICAAC 2001, IDSA 2001, and ASTMH 2001: Part V

CONFERENCE COVERAGE

Editor's Note: *The following summaries represent a selection of papers from those presented at the meetings listed below. It is important to recognize that many of these summaries are extracted only from the published abstract, and it is possible that some of the material presented at the conferences may have differed. The abstracts can be found online at the URLs given. The 41st Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC), Chicago, Ill, Dec. 16-19, 2001; http://www.icaac.org. The 39th Annual Meeting of the Infectious Diseases Society of America, San Francisco, Calif, Oct. 25-28, 2001; http://idsociety.org. The 50th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Atlanta, Ga, Nov. 11-15, 2001; http://www.astmh.org. — Stan Deresinski, MD, FACP.*

Filaria

THE FOLLOWING WAS REPORTED IN A REVIEW OF recent data concerning lymphatic filariasis: 1) children are commonly infected with the parasite prior to 5 years of age; 2) among life-long residents of filariasis-endemic areas, the principal lesion of lymphatic filariasis is lymphatic vessel dilatation, not obstruction; 3) subclinical lymphangiectasia occurs in virtually all those infected with the parasite; 4) no inflammatory reaction is seen at the site of the living adult worm; 5) secondary bacterial infections (not the parasite itself) are responsible for much of the progression of lymphedema and elephantiasis; and 6) a single 6 mg/kg dose of the antifilarial drug diethylcarbamazine (DEC) is as effective as a full 2- to 3-week course. (*ICAAC #597*.)

Serological analysis of 64 US military medical personnel deployed for 3 months to a tent compound in Haiti found no evidence of infection with either *Wucheria bancrofti* or dengue virus. (*IDSA #255*.)

Also, 59 Egyptians with asymptomatic *Bancroftian filariasis* (counts > 80/mL blood) were randomized to receive either 1 day or 7 days of treatment with diethylcarbamazine and albendazole. The multidose regimen was more effective in clearing microfilaremia through 6 months, although antigenemia remained detectable. (*IDSA #254, ASTMH #791*.)

Twenty-four percent of 17,317 Haitians reported an adverse reaction after treatment of lymphatic filariasis with diethylcarbamazine and albendazole, but only 15 were severe enough to warrant hospitalization. (*ASTMH #793*.) One fourth of Haitian men reported scrotal pain after treatment of lymphatic filariasis with diethylcarbamazine and albendazole. Of these, 70% had tender scrotal nodules. Pain began 1 to 7 days after treatment and persisted for a median of 3 days. Acute hydrocoele developed a mean of 2 days after treatment. Overall, approximately 18% developed painful scrotal nodules, 4% acute hydrocoele, and 0.7% chronic hydrocoele. (*ASTMH #792*.)

Viral Hemorrhagic Fevers

Of 27 confirmed cases of Crimean-Congo hemorrhagic fever in Iran, 16% of the patients died, although 80% had been given ribavirin. Nosocomial transmission occurred in 2 cases. (*IDSA #401*.)

A surgeon returned from Sierra Leone to The Netherlands with Lassa fever and died despite treatment with ribavirin. No clinical illness occurred in 121 unprotected contacts and none of 61 tested had serological evidence of asymptomatic infection. (*IDSA #262*.)

An outbreak of 12 confirmed cases of hantavirus infection among forestry workers in Brazil found that exposures associated with increased risk of disease were the presence of rodents at the worksite or in the vicinity of forest dwellings, as well as inhaling dust inside dwellings. (*ASTMH #50*.)

Fifteen of 31 patients with confirmed yellow fever in Minas Gerais, Brazil, died. Although most patients were urban dwellers, the evidence suggests sylvan acquisition of infection. (*ASTMH #750*.)

Rabies

"Disease-related-events" occurred in 23% of travelers to Bali and 29.5% to Goa, with 18.8% and 12.1%, respectively, having resultant temporary limitation in activities. Monkeys in Bali bit 5 tourists, none of whom

had received pretravel immunization against rabies, and only 2 received postexposure rabies prophylaxis. (*ASTMH #47*.)

Two individuals who received HCDV, but not rabies immune globulin, after rabies exposure, died of rabies. (*ICAAC #2286*.)

Mycobacteria

The estimated crude annual incidence of Buruli ulcer disease in a district of Ghana was 157 per 100,000 population—approximately 50% greater than the estimated incidence of tuberculosis. (*ASTMH #351*.)

Approximately one half of individuals in Ghana believed that Buruli ulcer was caused by witchcraft or curses. (*ASTMH #420*.)

Strongyloides

A renal transplant recipient with *Strongyloides* superinfection and persistent ileus survived after being given ivermectin as an enema preparation. (*IDSA #268*.)

Cysticercosis

Perilesional edema was observed by MRI in 34.5% of patients with only calcified cysticercal lesions and was associated with seizures and other neurological morbidity in some. (*ASTMH #388*.) ■

Parvovirus B19 Transmissions During Thoracic Surgery from a Pooled Plasma Product

ABSTRACT & COMMENTARY

Synopsis: *Following use of fibrin sealant in thoracic surgical procedures, 21% of previously seronegative patients developed evidence of acute parvovirus B19 infection. Viral DNA was detectable in blood for up to 48 weeks after infection.*

Source: Kawamura M, et al. Frequency of transmission of human parvovirus B19 infection by fibrin sealant used during thoracic surgery. *Ann Thorac Surg*. 2002;73:1098-1100.

Fibrin sealant, produced from pooled donor serum, is used to control bleeding in a variety of surgical procedures. The processing method includes pasteurization at 60°C for 10 hours. This is adequate to inactivate most bloodborne pathogens, but does not inactivate human parvovirus (HPV) B19. Kawamura and colleagues performed a prospective study to investigate potential transmission of HPV B19 by fibrin sealant in thoracic surgery patients. They entered 85 adult patients into the study; patients were excluded if they had received blood transfusion other than autologous transfusion. All patients had determination of anti-HPV B19 antibody. Twenty-three seronegative patients were followed at weeks 12, 24, and 48 with antibody titre and determination of HPV B19 in blood by PCR. Six of 23 (21%) patients developed evidence of HPV B19 infection based on seroconversion and detection of viral DNA in blood. Clinical illness was mild. Five of 6 developed marked depression in reticulocyte counts between 12 and 20 days postoperatively. Two patients developed low-grade fevers. None developed rash or arthralgia. Viral DNA was detectable in blood at 48 weeks in 3 patients.

■ COMMENT BY ROBERT MUDER, MD

Parvovirus B19 is a common infectious agent that causes one of the classic childhood exanthems, erythema infectiosum (Fifth disease). Infected adults may suffer an acute symmetrical arthritis of the small joints that may on occasion become chronic. The virus specifically infects erythrocyte precursors in the marrow, leading to transient suppression of red cell production. This is of little consequence in healthy patients. Those with hemolytic anemias, for example, sickle cell anemia, may suffer aplastic crises with dramatic drops in peripheral red cell counts. Primary infection of a pregnant woman may result in fetal infection and hydrops fetalis due to lack of red cell production. Immunosuppressed patients may have prolonged periods of red cell aplasia that respond variably well to intravenous immunoglobulin infusion.[1]

HPV B19 is typically transmitted by close contact with respiratory secretions; school and family-based outbreaks are common. However, pooled blood products may contain HPV B19; one survey detected HPV B19 DNA in 18 of 27 samples of factor VIII and IX concentrate.[2] HPV B19 is particularly resistant to a variety of disinfection methods, including the pasteurization process used in preparing fibrin sealant.

While the clinical consequences of HPV B19 infection reported by Kawamura et al were of little clinical consequence, infection in certain groups of patients could have serious sequelae. Use of fibrin sealant should, therefore, be avoided during surgical procedures

performed on immunosuppressed patients, pregnant women, or those with chronic hemolytic anemias. ■

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'Tapanuli Fever'

CASE STUDY

A MIDDLE-AGED MAN PRESENTED WITH FACIAL FLUSHing and fever a number of days after receiving in a box in the mail, which when opened, released a sharpened spring designed to puncture the recipient. On examination, he was noted to have "dark crusts" on his lips, to have a tremor and dysphonia, and appeared moribund.

The physician attending the patient believed him to be suffering from Tapanuli fever, also known to him as "the black death of Formosa." Fortunately, the leading expert on this disease was residing nearby, and the attending physician presented the case to him. The expert, while in Asia, had previously recovered the etiologic organism in pure culture on gelatin and had experimentally demonstrated its rapid lethality.

The expert, however, on visiting the patient and noting him to apparently be near death, reacted strangely. He forced the patient to recall receipt of the box and the sharpened spring. The expert then informed the patient that he himself had sent it and that it was the source of his illness.

The patient, however, immediately recovered from his apparent illness and had the expert arrested.

■ COMMENT BY STAN DERESINSKI, MD, FACP

The physician's name was Watson and the name of the "patient" was Holmes and the episode took place in "The Adventure of the Dying Detective" by Sir Arthur Conan Doyle. The subject of the lethal experiment had been the expert's nephew and Holmes, suspecting a homicide, had entrapped the expert (and fooled Watson) with what must have been a performance worthy of an Academy Award, if such had existed at the time.

Speculation has continued on the etiology of "Tapanuli fever" ever since. Vora expands[1,2] on a previous suggestion that the disease was meliodosis.[1] Infection with *Burkholderia pseudomallei* is endemic in southeast Asia, having been first identified in 1912 in drug addicts in Rangoon (now Yangon), and the perpetrator of the biological attacks was owner of a Sumatran plantation. Furthermore, *B pseudomallei* infection is known to be transmissible by direct inoculation and can be rapidly lethal. As pointed out by Vora, *B pseudomallei* has been identified by the CDC as an agent with potential use in bioterrorism. Doyle's use of the postal service as a delivery mechanism has also proven to be prescient. ■

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Eosinophilia in Travelers

ABSTRACT & COMMENTARY

Synopsis: *Eosinophilia in returning travelers has limited predictive value for travel-related infections, but Helminthic infections are the most common diagnoses, especially when the eosinophilia is moderate-to-marked in degree.*

Source: Schulte C, et al. Diagnostic significance of blood eosinophilia in returning travelers. *Clin Infect Dis*. 2002;34: 407-411.

A RETROSPECTIVE ANALYSIS WAS CONDUCTED ON 14,298 returned travelers seen in the Department of Infectious Diseases and Tropical Medicine at the University of Munich, Germany, from January 1995 through December 1999. The majority of patients (96.8%) had traveled to developing countries. Eosinophilia in this study was defined as at least 8% of the white blood cell count. The evaluation of patients with eosinophilia included: microscopic examination of stool, urine, blood, wounds, skin; rectal mucosal snips; 24-hour terminal urinalysis for *Schistosoma* ova; skin snips for *Onchocerca volvulus*; serology for fascioliasis, filariasis, hydatid disease, amebiasis, schistosomiasis, toxocariasis, trichinosis; antigen-capture ELISAs for *Giardia lamblia* and *Entamoeba histolytica*.

A total of 689 patients (4.8%) were found to have eosinophilia, with males more frequently affected

(male-to-female ratio = 1.77). The mean age of patients was 34.3 years, and the majority were Europeans. The duration of travel ranged from 3 days to 32 years, with a median stay of 35 days. Those who had traveled to west Africa had the highest risk (RR = 2.95), whereas travelers to Latin America, Southeast Asia, and the Indian subcontinent had reduced risks of developing eosinophilia (RR = 0.39-0.91).

Although some patients did present with fatigue (24.4%), diarrhea (21.3%), and skin lesions (17.1%), 33% of the patients with eosinophilia were asymptomatic. A definitive diagnoses was made in only 36% of patients, and only 18.9% were found to have a specific helminthic infection. The positive predictive value of eosinophilia for helminthic infections was 18.9%, whereas the negative predictive value was 98.7%. The probability of obtaining a definite diagnosis increased as the degree of eosinophilia increased, reaching more than 60% when eosinophils were greater than 16%. In patients with more pronounced levels of eosinophilia, the positive predictive value for helminthic infection reached 46.6%.

The highest percent eosinophil counts occurred among patients diagnosed with helminthic infections. A total of 52.4% of all definite diagnoses made were helminthic infections. On the other hand, only 41.5% of patients found to have helminthic infections actually showed eosinophilia at presentation, consistent with the concept that certain parasites cause eosinophilia only during their migration through tissues.

■ COMMENT BY LIN H. CHEN, MD

Eosinophilia is usually defined as > 450 eosinophils/mm^3, and can be associated with a wide variety of diseases including infectious, allergic, neoplastic, and idiopathic causes. Eosinophils are leukocytes produced in the bone marrow, and the development of eosinophils is controlled by cytokines, especially IL-5.[1] Eosinophil levels show a diurnal pattern, being highest in the early morning, and the levels also decrease with an increase in endogenous and exogenous steroids.[1] Following exposure to helminths, the eosinophil response tends to be greater in travelers than in those with chronic exposure.[2] Additionally, eosinophilia can precede patent infections.[1] Moreover, eosinophilia counts can transiently increase after treatment of parasitic infections such as schistosomiasis,[3] lymphatic filariasis,[3] and onchocerciasis.[4] Eosinophilia can also last for 3-6 months after treatment of some infections such as loiasis.[5]

Numerous helminth infections are associated with eosinophilia, but most protozoa are not. Two reported exceptions are *Isospora belli* and *Dientamoeba fragilis*. When other protozoa are identified in patients with eosinophilia, one should suspect and look for helminth infections. The helminth infections commonly associated with eosinophilia include:[1,8] *Angiostrongylus cantonensis*, ascariasis, clonorchiasis, fascioliasis, fasciolopsiasis, filaria (*Wuchereria bancrofti*, *Brugia malayi*, *Brugia timori*, *Loa loa*, *Onchocerca volvulus*), gnathostomiasis, hookworm (*Necator americanus*, *Ancylostoma duodenale*), flukes (*Nanophyetus salmincola*, *Heterophyes heterophyes*, *Metagonimus yokogawai*, *Paragonimus westermani*, schistosomiasis), strongyloidiasis, trichinellosis, and toxocariasis. Other causes of eosinophilia that may be encountered by travelers include scabies, myiasis, coccidioidomycosis, chronic indolent tuberculosis, HIV, and drug reactions, especially to antibiotics.[1,8]

Any search for parasites should depend on the specific risks encountered by the traveler. Therefore, a detailed exposure history is crucial in the evaluation of eosinophilia in a traveler. Especially important are preexisting allergies, medications, travel itinerary, specific areas visited, duration of travel, food, and water sanitation, accommodations, exposures to fresh water, animals, insects, and sexual contacts. Physical signs and symptoms such as skin lesions, pruritus, wheeze, cough, hepatomegaly, abdominal pain, and neurologic findings may suggest more specific investigations.

The laboratory evaluation of eosinophilia should be guided by the level of suspicion of specific pathogens. The initial tests usually include a complete blood count with differential, an absolute eosinophil count in order to characterize the degree of eosinophilia, chemistries, urinalysis, a PPD skin test, 3 stool samples for ova and parasites, and chest x-ray. IgE may not be helpful because of its lack of specificity. If the history indicates possible exposure, serologies for strongyloidiasis, schistosomiasis, toxocariasis, and filariases would be useful. Further evaluation can be sought with additional serology, skin snips, biopsy of tissue (skin, rectum, bladder, liver, muscle, cyst), and examination of tissues and fluids for ova and parasites. For those patients identified with strongyloidiasis, treatment is recommended to avoid possible hyperinfection syndrome at a later time. When no definite diagnosis is reached, common practice is to reevaluate in 3-6 months. If eosinophilia persists, repeat blood, stool, and urine studies should be done, and empiric treatment of strongyloidiasis or hookworm with, respectively, ivermectin or albendazole can be considered.[1]

It is often challenging to make a definite diagnosis in returned travelers presenting with eosinophilia, and this study confirms the low yield in establishing one. A previ-

ous study by Libman and colleagues[9] concluded that eosinophil counts had a limited role in screening asymptomatic expatriates for schistosomiasis, filariasis, and strongyloidiasis. The sensitivity of eosinophil count as a screening test for these parasites in the Libman study was 38%, and the positive predictive value of eosinophilia for these parasites was 9%. The Schulte study observed that travelers who visited West Africa had the highest risk for developing eosinophilia. Although eosinophilia only had a positive predictive value of 18.9% for all helminth infections, more than half of the definite diagnoses made were helminth infections. Finally, helminth infections were more likely to be identified when the eosinophil count reached a higher level (> 16%). Given the difficulty in establishing definite diagnoses in travelers presenting with eosinophilia, further study on the etiology and epidemiology of eosinophilia in travelers would be valuable for those who provide post-travel evaluations. ■

Dr. Chen is Clinical Instructor, Harvard Medical School and Travel/Tropical Medicine Clinic, Lahey Clinic Medical Center, Boston, Mass.

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CME Questions

21. An experimental conjugate vaccine has recently been shown to decrease the incidence of staphylococcal bacteremia in which group of patients?

a. Individuals with HIV/AIIDS
b. Patients who had recently undergone complicated surgical procedures
c. Individuals with poorly controlled diabetes mellitus
d. Patients with end-stage renal disease receiving maintenance hemodialysis

22. Which of the following is correct?

a. Pasteurization of pooled fibrin sealant at 60°C for 10 hours inactivates human parvovirus B19 (HPV B19).
b. HPV B19 DNA has been detected in factor VIII and IX concentrates.
c. HPV B19 is exquisitely sensitive to almost all disinfection methods.
d. HPV B19 infection of pregnant women causes hemolytic crises.

23. Infection with which of the following organisms is likely to cause significant blood eosinophilia?

a. *Entamoeba histolytica*
b. *Giardia lamblia*
c. *Plasmodium malariae*
d. *Paragonimus westermani*

Readers are Invited

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In Future Issues:

Antiretroviral Dosing in Renal Failure

UPDATES

By Carol A. Kemper, MD, FACP

Do Mosquitoes Love Patients with HIV?

Source: Greub G, et al. *Clin Infect Dis.* 2002;34:288-289.

GREUB AND COLLEAGUES WERE quick to listen to their HIV-infected patients complaining that they seemed to get bitten more often by mosquitoes now than *before* they were HIV-positive. Intrigued, they administered a questionnaire and performed additional testing. Multivariate analysis of risk factors and disease status revealed that lipoatrophy, possibly as the result of long-term administration of antiretroviral therapy, was indeed associated with a greater risk of more frequent mosquito bites. The loss of subcutaneous fat may result in greater exposure of the underlying capillary network—in turn, resulting in a greater loss of heat and volatiles from the skin surface. A similar mechanism may occur in pregnant women, who also appear to be more attractive to mosquitoes. HIV patients, especially those with lipoatrophy, are therefore preferred mosquito targets! While this is probably more of a nuisance to patients in Northern America and Europe, it may have important implications for HIV-infected patients undergoing treatment in Africa and Asia, especially as we contemplate how to best administer antiretrovirals to patients in these countries. ■

Pneumococcal Vaccination in SLE and RA

Source: Elkayam O, et al. *Clin Infect Dis*. 2002;34:147-153.

THE IMMUNOGENICITY AND SAFETY of pneumococcal vaccination in patients with rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE) remains controversial—the administration of tetanus and hepatitis B vaccine has reportedly preceded the development of SLE in certain cases—and concerns exit that superantigen production or other molecular mechanisms triggered by vaccination could exacerbate existing disease. Elkayam and associates administered the current 23-valent polysaccharide vaccine (Pneumovax, Merck) to 42 patients with RA and 24 patients with SLE. Clinical signs and symptoms of disease were assessed before and 2 months following vaccination. Anti-IgG levels to a panel of 7 pneumococcal polysaccharides were measured 1 month postvaccination. Seroresponse was defined as a 2-fold increase in antibody levels or an absolute increase > 1 µg/mL.

Most patients had mild disease activity before vaccination. The dosages of prednisone were similar between the 2 groups (62-69%), although the median daily dose for patients with RA was < 10 mg/dL and greater for patients with SLE.

While there was no appreciable change in disease activity post-vaccination, one third of patients with RA and 21% of patients with SLE failed to adequately respond to vaccine (response to none or one antigen). The proportion of patients responding to individual polysaccharides varied from 34% to 71% for patients with RA, and from 36% to 86% for patients with SLE.

These data suggest that, while vaccination of patients with RA and SLE is important and should be attempted, the adequacy of the response should be assessed postvaccination. For those patients who fail to mount an adequate response, repeat vaccination with either the 23-valent polysaccharide vaccine or the 7-valent conjugate vaccine may be possible within 1 year, although the relative merits of these approaches should be prospectively assessed. Whether pneumococcal vaccine is adequately immunogenic in such patients receiving higher dosages of corticosteroids require further investigation. ■

Highly Resistant GC Marches Toward the United States

Source: ProMED-mail post, May 10, 2002; promed@promedmail.org; *MMWR Morb Mortal Wkly Rep.* 2002; 51(RR-6);1-80.

MULTIDRUG-RESISTANT STRAINS OF *Neisseria gonorrhea*—prevalent in East Asia for years—have finally reached Hawaii and the Mainland—resulting in a change in current treatment guidelines. The Gonococcal Isolation and Surveillance Project (GISP), coupled with similar programs in Asia and Australia, have been documenting the increasing prevalence of these MDR strains, and their march toward the US mainland for years. Fluoroquinolone strains were first detected in San Francisco in 2000, and had increased to 4.1% of cases by the end of 2001. Fluoroquinolone-resistant strains now make up 20% of cases in Hawaii. Fortunately these isolates remain sensitive to ceftriaxone, but clinicians should be aware that 3 cases of gonorrhea highly resistant to quinolones and with intermediate resistance to a cephalosporin have just been identified in San Francisco.

As a result, the CDC now cautions that fluoroquinolones should not be used to treat gonorrhea acquired in Hawaii, the Pacific, or Asia. In addition, Public Health Experts in San Francisco are recommending that GC in California be treated with agents other than fluoroquinolones. Even if patients are presenting for treatment outside of California and Hawaii, a good travel history is necessary to determine where the infection may have been acquired. ■