Technique, Weight Should Dictate Needle Length

BY BRUCE K. DIXON
Chicago Bureau

CHICAGO — When immunizing adolescents, body weight and injection technique should guide the choice of needle length, according to a poster study presented at the annual Interscience Conference on Antimicrobial Agents and Chemotherapy.

"We looked at the performance of a 5/8-inch vs. a 1-inch needle—using both pinching and flattening of the injection site—in relation to the recipient's body weight," said Dr. Michael Koster.

A needle that is too short might result in reduced immunogenicity and more adverse reactions to vaccines intended for intramuscular injection, whereas a needle that is too long may strike bone and injure underlying neurovascular structures, he said in an interview.

With use of the pinching technique on adolescents weighing 88-155 pounds, a 1-inch needle is appropriate. For those weighing less than 88 pounds, the shorter needle is best, said Dr. Koster, who conducted the study at Schneider Children's Hospital at North Shore in Manhasset, New York.

With use of the muscle-flattening technique, the longer needle likewise is recommended when body weight is 88-155 pounds, and the 5/8-inch needle is appropriate for adolescents weighing less than 88 pounds, said Dr. Koster, who is now a pediatric infectious disease fellow at Hasbro Children's Hospital in Providence, R.I.

The study included 141 participants. They were aged 11-15 years, with 87% of them aged 12-13 years. Of the total, 28% weighed less than 88 pounds, and about 20% weighed more than 132 pounds.

The researchers noted subjects' height, weight, and arm circumference, and conducted upper-arm ultrasonography during both muscle pinching and skin flattening of the participants' nondominant arms. The measurements were duplicated by a second researcher and averaged for analysis.

"When injecting someone [using] the pinching technique, you increase muscle and subcutaneous tissue layers, in which case you'll want a little longer needle. When flattening, typically using the forefinger and thumb, you can go up to [a weight of] about 50 kilos [110 pounds] and be safe in terms of getting the vaccine into the muscle without striking bone," Dr. Koster said at the meeting, which was sponsored by the American Society for Microbiology.

If a needle is too short, it may cut immunogenicity; if it's too long, it may injure underlying structures.

DR. KOSTER

As a general rule, with the pinching technique, a 1-inch needle is appropriate most of the time, and the shorter needle is appropriate only for patients who weigh less than 88 pounds.

With the flattening technique, the shorter length is appropriate only three-quarters of the time and only on patients weighing less than 110 pounds. "Independent of technique, it would be appropriate to use a 5/8-inch needle on subjects less than 88 pounds," he said.

Although females had a larger subcutaneous layer than did males of the same body weight, the difference did not result in the use of a different needle length, Dr. Koster said, adding that body weight was a better predictor of required needle size than was arm circumference.

The American Academy of Pediatrics Red Book makes needle length recommendations for adolescents only in terms of body weight and sex. For example, both sizes of needles are advised for girls and boys who weigh less than 132 pounds. The 1-inch needle is recommended for girls who weigh 132-198 pounds and boys who weigh 132-260 pounds. The AAP recommends an even longer (1½-inch) needle for females over 198 pounds and males over 260 pounds. Only 2 of the 141 subjects were that heavy, and the data on these two still are being analyzed.

Data from previous studies have suggested obese teens who are immunized with 1-inch needles develop lower hepatitis B virus (HBV) vaccine titer levels, compared with those vaccinated with 1½-inch needles. In one study, 24 obese subjects aged 14-24 years were randomized to 1-inch and 1½-inch needle groups, and the subjects (girls over 198 pounds and boys over 265 pounds) were given an HBV vaccination using a 0, 1-, and 4-month schedule. HBV surface antibody was obtained 2 months after the third vaccination, and data showed that the final titer levels in the 1½-inch needle group were significantly higher than those in the 1-inch needle group (J. Adol. Health 2006;38:101).

Dr. Koster said he hoped his findings would be included in the 2009 Red Book, especially since meningococcal conjugate vaccine and human papillomavirus vaccine have been recommended for all adolescents. ■

Watchful Waiting Reduced Antibiotic Use for Acute Otitis Media in the ED

BY PATRICE WENDLING
Chicago Bureau

TORONTO — A strategy of watchful waiting reduced antibiotic use and was well accepted by parents of children diagnosed with acute otitis media in the emergency department in a randomized trial of 223 children.

Previous trials have evaluated a management strategy for otitis media in which the use of antibiotics was optional, but most were conducted in office settings in which parents had an established relationship with their providers.

A more recent study in the emergency department (ED) found a 56% reduction in antibiotic use when parents of children with acute otitis media were given a prescription but asked not to fill it unless the child's condition remained unchanged or worsened in 48 hours (JAMA 2006;296:1235-41).

The current study looked at parental acceptance of such a policy in the ED, Dr. Jennifer Chao said at the annual meeting of the Pediatric Academic Societies.

The American Academy of Family Physicians and American Academy of Pediatrics 2004 practice guidelines suggest minimizing antibiotic side effects by giving parents of select children the option of fighting the infection on their own for 48-72 hours, then starting antibiotics if the symptoms do not improve.

The investigators randomized 232 children, aged 2-12 years, diagnosed with acute otitis media who met AAP criteria for delayed antibiotic treatment to a watchful-waiting strategy that included pain medications and no antibiotic prescription, or to safety net antibiotic protocol (SNAP) that included pain medications and an antibiotic prescription.

Watchful-waiting parents had to return to the ED or to the child's provider if symptoms persisted for 2 or 3 days, whereas SNAP parents had to fill their prescription if symptoms persisted for 2 or 3 days. A research assistant, blinded to group assignment, conducted telephone surveys with parents 7-10 days after the ED visit. One hundred watchful-waiting parents and 106 SNAP parents completed follow-up. The mean age of the children was 5 years.

During the 2-3 day observation period, 87% of the watchful-waiting group adhered to the management protocol and did not use antibiotics, vs. 62% of the SNAP group, Dr. Chao and colleagues of the Jacobi Medical Center, N.Y., reported. During the 7-10-day follow-up period, 81% and 53%, respectively, did not use antibiotics.

Both watchful waiting and SNAP were well accepted by parents, with 91% vs. 95% of parents "very" or "extremely satisfied" with the protocol. The difference was not statistically significant.

Both groups were equally willing to consider observation therapy in the future (65% vs. 62%). "Observation therapy without a prescription substantially improves adherence and reduces antibiotic exposure," Dr. Chao said.

In a logistic regression analysis, predictors of parental adherence to observation therapy included assignment to therapy, duration of fever before and after the visit, height of fever, and physician predictions of adherence.

No complications were reported. Antibiotics were used in 9 patients who reported fever for more than 4 days and in 16 patients reporting pain longer than 4 days. Data on patients who returned to the ED and/or went to see another provider were not available, said Dr. Chao, who is now with the State University of New York Downstate Medical Center in Brooklyn. ■

Pneumonia Burden Eased With Introduction of PCV7

BY MARY ANN MOON
Contributing Writer

The pneumococcal vaccine appears to have markedly reduced the overall burden of pediatric pneumonia, results of a large retrospective study suggest.

Rates of hospitalization and ambulatory medical visits for all-cause and pneumococcal pneumonia fell dramatically by 2004, 4 years after the 7-valent pneumococcal conjugate vaccine (PCV7) was introduced into the routine childhood immunization schedule in the United States. Associated medical expenditures also dropped considerably, the researchers reported.

Studies have found substantial decreases in the incidence of invasive pneumococcal disease such as meningitis and septicemia after the PCV7 vaccine was introduced, but few have examined its effect on all-cause pneumonia and pneumococcal pneumonia in the general population, and none to date have tallied the economic effects.

Fangjun Zhou, Ph.D., and associates at the Centers for Disease Control and Prevention, Atlanta, analyzed data from more than 100 large health insurance plans covering about 500 million claims between 1997 and 2004, including more than 40,000 each year for children younger than 2 years, the population targeted by the vaccine.

They found a 52% decline in hospitalizations for all-cause pneumonia and a 58% decline in hospitalizations for pneumococcal pneumonia after use of the PCV7 vaccine became widespread. The mean length of stay per all-cause pneumonia hospitalization also decreased significantly. During the same period, the number of ambulatory visits for all-cause pneumonia declined by 41%, and the number of visits for pneumococcal pneumonia declined by 47%.

"This suggests that [*Streptococcus*] *pneumoniae* was a major contributor to the burden of pneumonia hospitalizations and ambulatory visits in children younger than 2 years," they noted (Arch. Pediatr. Adolesc. Med. 2007;161:1162-8).

They estimated annual national medical expenditures for all-cause pneumonia hospitalizations and ambulatory visits for children younger than age 2 dipped by 45%, from roughly $688 million to $377 million. Annual medical expenditures for pneumococcal pneumonia treatment declined 27%, from $122 million to $89 million.

"Total net savings from the vaccine would be much greater if indirect costs such as work loss by parents or productivity loss by disability or death due to the disease were included," said the investigators, none of whom reported any financial conflicts of interest. ■