Third Dose of Mumps Vaccine May Halt Outbreaks

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WASHINGTON — Despite recent mumps outbreaks in vaccinated populations, a two-dose vaccination strategy appears effective, according to findings from an analysis of the 2006 mumps outbreak in the United States.

That said, a third dose may be warranted during an outbreak, Dr. Jane Seward suggested during a presentation at the joint annual meeting of the Interscience Conference on Antimicrobial Agents and Chemotherapy and the Infectious Diseases Society of America.

"A resurgence of mumps in countries using mumps vaccine programs should be kept in the perspective of the tremendous gains from the entire program," said Dr. Seward, deputy director of the division of viral diseases at the National Center for Infectious Diseases, a division of the Centers for Disease Control and Prevention.

Findings from previous studies demonstrate that the effectiveness of one dose of mumps vaccine is approximately 80%, and the effectiveness of two doses is about 90%. Outbreaks have been reported in several countries in populations that have received a single dose of vaccine.

After vaccination was introduced in the United States in 1977, the number of mumps cases underwent a "sharp and sustained decline," Dr. Seward said.

Nevertheless, two recent outbreaks in populations that were highly vaccinated with two doses of mumps vaccine raise concerns that the vaccine's effectiveness might be waning, she said.

The 2006 mumps outbreak in the United States involved 6,584 people. The outbreak was heavily centered on college campuses in the Midwest. Most cases occurred in individuals aged 18-24 years, and the vaccine coverage rate among the cases was more than 95%.

Most people in the United States who

had received two doses of vaccine didn't get mumps, Dr. Seward emphasized. Before the 2006 outbreak, fewer than 300 cases had been reported annually for several years.

In addition to waning vaccine effectiveness, possible factors associated with the 2006 outbreak also include a lack of exposure to the wild mumps virus, the high-transmission environment of university settings, and transmission of the mumps virus from subclinical infections, Dr. Seward said.

Data from studies conducted during the outbreak showed that infection was most common among college freshman and that infection was more likely among individuals who had received their second dose of vaccine more than 10 years before the outbreak.

An analysis of blood samples from students at an unaffected campus indicated that mumps antibody levels were significantly higher in those who had received their second dose of vaccine less than 5 years earlier, compared with those who had received it more than 15 years earlier.

During a similar outbreak in the Czech Republic, 6,000 cases of mumps were reported over an 18-month period in 2006-2007. The median age of the patients during this outbreak was 16 years. The incidence was 230/100,000 in 15- to 19-year-olds, compared with the national incidence of 39/100,000. About 70% of those infected had received two doses, and the median age of the two-dose recipients was 15 years, Dr. Seward said.

"We are starting a project to understand the immune response to a third dose, and we will follow those patients," Dr. Seward said at a press conference. The cause of mumps outbreaks in vaccinated populations remains unknown, and more research is needed to determine whether a third dose of vaccine given routinely or in cases of outbreaks would be beneficial, she noted.

"If we see outbreaks [as] we saw in 2006, especially on college campuses where there is a lot of transmission, we would consider offering a third dose during an outbreak."

Adolescents and adults without evidence of immunity should receive two doses of the mumps vaccine. Mumps vaccination has had a dramatic impact on morbidity and mortality in the United States, and has reduced the rates of serious complications including meningitis and deafness. "There were probably 2 million cases of mumps per year before the vaccine came into use," Dr. Seward said.

Dr. Seward stated that she had no financial conflicts to disclose. ■

References: 1. U.S. Department of Health and Human Services. *The Surgeon General's Call to Action to prevent deep vein thrombosis and pulmonary embolism: 2008.* US Department of Health and Human Services, Office of the Surgeon General, 2008. **2. Hooper WC,** Evatt BL. The role of activated protein C resistance in the pathogenesis of venous thrombosis. *Am J Med Sci.* 1998;316(2):120-128. **3. Gerotziafas GT,** Samama MM. Prophylaxis of venous thromboembolism in medical patients. *Curr Opin Pulm Med.* 2004;10(5):356-365. **4. Moll S,** Mackman N. Venous thromboembolism: a need for more public awareness and research into mechanisms. *Arterioscler Thromb Vasc Biol.* 2008;28(3):367-369. **5. Geerts WH,** Bergqvist D, Pineo GF, et al. Prevention of venous thromboembolism: American College of Chest Physicians evidence-based clinical practice guidelines (8th edition). *Chest.* 2008;133(6 suppl):381S-453S. **6. Wheeler AP.** Identifying at-risk patients for venous thromboembolism prophylaxis. In: Merli GJ, ed. *Thrombosis: Prophylaxis of Venous Thromboembolism.* Bridgewater, NJ: Elsevier; 2005:9-21. **7. American Public Health Association.** Deep-vein thrombosis: advancing awareness to protect patient lives: white paper. Paper presented at: Public Health Leadership Conference on Deep-Vein Thrombosis; February 26, 2003; Washington, DC. **8. Mismetti P,** Laporte-Simitsidis S, Tardy B, et al. Prevention of venous thromboembolism in internal medicine with unfractionated or low-molecular-weight heparins: a meta-analysis of randomised clinical trials. *Thromb Haemost.* 2000;83(1):14-19. **9. Amin A,** Stemkowski S, Lin J, Yang G. Thromboprophylaxis rates in US medical centers: success or failure? *J Thromb Haemost.* 2007;5(8):1610-1616. **10. Goldhaber SZ,** Tapson VF; DVT FREE Steering Committee. A prospective registry of 5,451 patients with ultrasound-confirmed deep vein thrombosis. *Am J Cardiol.* 2004;93(2):259-262. **11. Guyatt GH,** Cook DJ, Jaeschke R, Pauker SG, Schünemann HJ. Grades of recommendation for antithrombotic agents: American College of Chest Physicians evidence-based clinical practice guidelines (8th edition). *Chest.* 2008;133(6 suppl):123S-131S. **12. Samama MM,** Cohen AT, Darmon J-Y, et al; Prophylaxis in Medical Patients with Enoxaparin Study Group. A comparison of enoxaparin with placebo for the prevention of venous thromboembolism in acutely ill medical patients. *N Engl J Med.* 1999;341(11):793-800. **13. LOVENOX® (enoxaparin sodium injection) Prescribing Information.** sanofi-aventis, Bridgewater, NJ. **14. Kleber F-X,** Witt C, Vogel G, Koppenhagen K, Schomaker U, Flosbach CW; THE-PRINCE Study Group. Randomized comparison of enoxaparin with unfractionated heparin for the prevention of venous thromboembolism in medical patients with heart failure or severe respiratory disease. *Am Heart J.* 2003;145(4):614-621. **15. ENOXACAN Study Group.** Efficacy and safety of enoxaparin versus unfractionated heparin for prevention of deep vein thrombosis in elective cancer surgery: a double-blind randomized multicentre trial with venographic assessment. *Br J Surg.* 1997;84(8):1099-1103. **16. Colwell CW Jr,** Collis DK, Paulson R, et al. Comparison of enoxaparin and warfarin for the prevention of venous thromboembolic disease after total hip arthroplasty: evaluation during hospitalization and three months after discharge. *J Bone Joint Surg Am.* 1999;81-A(7):932-940. **17. Fitzgerald RH Jr,** Spiro TE, Trowbridge AA, et al; Enoxaparin Clinical Trial Group. Prevention of venous thromboembolic disease following primary total knee arthroplasty: a randomized, multicenter, open-label, parallel-group comparison of enoxaparin and warfarin. *J Bone Joint Surg Am.* 2001;83-A(6):900-906.