EDITORIAL

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Mumps surveillance and prevention: Putting mumps back on our radar screen

AFTER THE LICENSURE of the live mumps virus vaccine in the United States in 1967, the number of cases of mumps reported to the US Centers for Disease Control and Prevention (CDC) decreased by 99%—from 185,691 cases in 1967 to 300 in 2001 to 2003.[1] As a consequence of this large decline, many clinicians practicing today have never seen mumps, and its detection poses challenges.

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The clinical update by Dr. John D. Shanley in this month's issue summarizes the epidemiology, clinical manifestations, diagnosis, treatment, and prevention of mumps for a new generation of clinicians who may not have experience in mumps diagnosis, mumps disease, and its complications. To help fill this generation gap, we would like to provide some insights into mumps surveillance, case identification, diagnosis, and prevention.

CHALLENGES TO MUMPS CASE IDENTIFICATION

Accurate identification of mumps cases is not straightforward and poses several diagnostic challenges. In unvaccinated populations, an estimated 30% to 70% of infections are associated with typical acute parotitis.[2,3] However, as many as 20% of infections are asymptomatic, and nearly half of all mumps infections are associated with nonspecific or primarily respiratory symptoms with or without parotitis.[2]

These clinical features, which may be further modified among people who have been vaccinated, pose a challenge for ascertaining cases and for conducting accurate surveillance and may delay the diagnosis and facilitate the spread of the disease. Moreover, other infectious agents such as Epstein-Barr virus, parainfluenza viruses, and adenovirus can cause mumps-like illnesses, although they typically do not cause epidemics of parotitis.[4] Therefore, laboratory confirmation of cases is important, especially during the early stages of an epidemic.

Suspect mumps even in vaccinated individuals

LABORATORY CONFIRMATION IS IMPORTANT, BUT LIMITED

Mumps infection can be confirmed by detecting:

- Immunoglobulin M (IgM) directed against the mumps virus in the serum,
- A significant rise in mumps IgG titers between acute (collected at the time of clinical diagnosis) and convalescent (collected 2–4 weeks later) sera, or
- The mumps virus itself, by reverse transcriptase-polymerase chain reaction (RT-PCR) or culture, from clinical specimens collected from the buccal cavity, throat, urine, or cerebrospinal fluid.

Clinicians are advised to seek serologic and viral detection testing for all suspected mumps cases in non-outbreak settings and for some cases, especially at the beginning and end of the outbreak, in outbreak settings. Genotyping of mumps virus strains is helpful in tracing pathways of mumps virus transmission.

Timing is everything

Clinicians need to understand that the usefulness of current laboratory tests for diagnosing mumps have limitations, especially in vaccinated persons. Some data indicate that the timing of specimen collection is critical in detecting IgM antibody and in isolating mumps virus, whether by culture or by molecular methods.[5,6] In vaccinated people, the serologic response may be delayed and the period of viral excretion may be shorter.[7]

Therefore, at the initial visit, physicians should obtain a specimen for culture or RT-PCR studies and a serum sample to test for mumps IgM. The preferred specimen site is the buccal cavity, which should be massaged for about 30 seconds before collection with the buccal swab, and the specimen should be taken from adjacent to the parotid duct or other affected salivary gland ducts. Ideally, this first (acute) serum specimen should be collected within 5 days of illness onset. If the IgM antibody titer is negative, a second (convalescent) serum specimen for IgM antibodies is recommended 2 to 4 weeks after the onset of signs or symptoms. The paired serum specimens also can be used to detect a significant rise in IgG (IgG seroconversion).

A negative lab test does not rule out mumps

Negative laboratory tests, especially in vaccinated persons, should not be used to rule out a mumps diagnosis because these tests are not sensitive enough to detect infection in all persons with clinical illness.

ELIMINATING MUMPS IS STILL A NATIONAL GOAL

The elimination of mumps has been a national goal in the United States since the introduction of measles-mumps-rubella (MMR) vaccine into the routine childhood immunization schedule.[8] Thus, accurate surveillance for mumps is important for evaluating the impact of mumps vaccination programs, identifying groups at risk, and establishing control measures. Clinicians are encouraged to report mumps cases as soon as possible according to state health department requirements.

Evidence of vaccine efficacy

Monovalent mumps vaccine has shown 95% efficacy in two prelicensure clinical trials.[9,10] However, postlicensure experience demonstrates lower estimates of vaccine effectiveness (75%–91%).[2]

Currently, data are limited about the effectiveness of two doses of MMR vaccine against mumps. One case-control study in the United Kingdom estimated that the mumps component of the MMR vaccine was 64% effective with one dose and 88% effective with two doses.[11] In a mumps outbreak in the United States in the late 1980s, the risk of acquiring mumps was five times higher in people who received only one dose than in those who received two doses.[12]

Given the high rate of vaccination with MMR vaccine in the United States[13] and given that even two doses of mumps vaccine are not 100% effective in preventing mumps, mumps cases are likely to occur in previously vaccinated persons. Thus, clinicians should suspect mumps even in people who have been vaccinated.

THE NEED TO UPDATE PREVIOUS RECOMMENDATIONS

The recent mumps outbreak in the United States underscored the need to further enhance the 1998 recommendations of the CDC Advisory Committee on Immunization Practices (ACIP) for the prevention of mumps.[14,15] The recommendations, updated in 2006, call for[15]:

- One dose of a live mumps virus vaccine for preschool children and adults not at high risk for mumps
- Two doses for children in grades K-12 and adults at high risk (eg, health care workers, international travelers, and post-high-school students)
- One dose of live mumps virus vaccine for health care workers born before 1957 who do not have documented mumps immunity (although people born before 1957 are assumed to have mumps immunity)
- During an outbreak, a second dose of mumps vaccine for children aged 1 to 4 years and for adults who have received one dose, if they are affected by the outbreak, and (strongly recommended) two doses for health care workers without other evidence of immunity to mumps.

Mumps vaccination in the United States is highly effective in reducing the burden of mumps disease and its complications. As vaccination is the only primary prevention available for mumps, adherence to current mumps vaccination policy is critical to controlling circulation of mumps virus in the community.

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