Introduction

Mumps is a viral infection of humans, primarily affecting the salivary glands. Although it is mostly a mild childhood disease, with peak incidence occurring among those aged 5 - 9 years, the mumps virus may also affect adults.

In the fifth century BC Hippocrates first described the features of mumps. The infectious nature of the disease was recognized in the 19th century. Large outbreaks of mumps occurred among the armed forces during the 1st World War. In 1934 Johnson and Goodpasture demonstrated that a virus in human saliva was responsible for this disease.

Virology

Mumps virus belongs to the genus Rubulavirus of the family *Paramyxoviridae*, whereas only one distinct serotype of mumps virus exists.

Mode of transmission

Humans are the only known natural host for mumps virus, which is spread by airborne droplets released when an infected person sneezes or coughs and by direct contact with an infected person. The average incubation period for mumps infection is approximately 16 - 18 days with a range of 2 - 4 weeks.

Natural infection with this virus is thought to confer lifelong protection. Most adults are likely to have been infected naturally in the past and may be considered to be immune, even if they did not have the apparent illness. Approximately 85% of adults have evidence of past mumps infection.

Clinical Features

Mumps typically begins with non-specific symptoms, such as myalgia, headache, malaise and low-grade fever; within a day these are followed by the characteristic unilateral or bilateral swelling of the parotid glands. Other salivary glands are visibly affected in approximately 10% of cases. After about 1 week, fever and glandular swelling disappear, and unless complications occur, the illness resolves completely. In approximately 30% of cases, only non-specific symptoms occur or the infection is asymptomatic. Most infections in children aged less than 2 years are subclinical. It should be noted that subclinical infections can also be communicable. People with mumps are contagious from about 2 days before the onset of swelling of the salivary glands up to 9 days after the onset of swelling. No specific therapy for mumps exists.

Complications:

Mumps is generally a mild self-limiting disease, although complications may occur. They may occur even without the involvement of salivary glands. In up to

20% of affected post-pubertal males, an inflammatory condition of testicles (orchitis) may occur. This condition is characterized by painful swelling and sometimes may cause sterility. In up to 5% of affected post-pubertal females, oophoritis and/ or mastitis may occur.

There are other rare complications that can occur in people infected at any age. Symptomatic meningitis is reported in as many as 15%. Mumps encephalitis is reported in 0.02 - 0.3% of cases. Although the case fatality rate of mumps encephalitis is low (1.4%), permanent sequelae, including paralysis, seizures, cranial nerve palsies and hydrocephalus may occur. Acquired sensory nerve deafness (usually unilateral) caused by mumps is one of the leading cause of deafness in childhood, affecting approximately 5/100,000 patients. Pancreatitis is reported as a complication in approximately 4% of cases, but the relationship between mumps pancreatitis and diabetes mellitus remains speculative. The overall mumps case fatality rate is reported as 1 per 10,000 cases. Mumps in the first trimester of pregnancy may cause spontaneous abortion (25% incidence), but there is no evidence that it causes foetal abnormalities.

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Epidemiology

Global Situation

Mumps remains endemic in many countries throughout the world. In most parts of the world, the annual incidence of mumps in the absence of immunization is in the range of 100 - 1000 cases per 100,000 populations with epidemic peaks every 2 - 5 years. In hot climates the disease may occur at any time of the year, whereas in temperate climates the incidence peaks in winter and spring.

In Western countries, before the widespread use of mumps vaccine, mumps was the leading identified cause of viral meningitis and encephalitis in children. Since the introduction of mumps vaccine, disease is now responsible for only 0.5% of cases of viral encephalitis and the overall incidence of reported mumps and its complications has reduced dramatically. Still, these countries experience small epidemics of mumps among older teenagers and young adults.

Situation in Sri Lanka

Mumps is a notifiable disease in Sri Lanka and all cases of mumps should be notified to the Medical Officer of Health.

According to the statistics available at the medical statistics unit 3127 and 3441 cases of live discharges of mumps cases have been reported from the government hospitals during the years of 2008 and 2009 respectively. This may not be the true situation as generally mumps is considered as a mild disease and only cases with complications seek inward medical attention. Majority either seek care at out patients departments or do not seek formal medical care.

Mumps vaccine

Safe and efficacious vaccines against mumps – based on live, attenuated viral strains have been available since the 1960s. By December 2005, 110 of the 193 (57%) WHO Member States had included mumps vaccine in their National Immunization Programmes, the vast majority using the combined MMR vaccine. In countries where large-scale immunization against mumps has been implemented, the incidence has dropped dramatically.

In view of the moderate morbidity and low mortality of mumps, information on the burden of the disease, including the socioeconomic impact, is important when deciding whether to introduce mumps vaccines into the EPI. Cost effectiveness studies indicate that the incorporation of effective mumps vaccines into the EPI is highly beneficial from the standpoints of costs and benefits and from a societal perspective.

Characteristics of the Mumps Vaccine

Mumps vaccine is a live attenuated freeze dried vaccine [lyophilized] and must be reconstituted before use. Depending on the manufacturer, gelatin and/or sorbitol are used as stabilizers and neomycin is added as a preservative to the mumps vaccines. Mumps vaccine is prepared in chick embryo fibroblast tissue culture.

Mumps vaccines are produced as monovalent, bivalent measles-mumps (MM) vaccine and trivalent measles-mumps-rubella vaccine (MMR). In most countries including Sri Lanka, immunization against mumps is delivered through MMR.

Measles –Mumps- Rubella (MMR) Vaccine

Each 0.5mL dose of the reconstituted MMR vaccine contains not less than 103.0 CCID50 (cell culture infectious dose 50%) of the Schwarz measles, not less than 103.7 CCID50 of the RIT 4385 mumps and not less than 103.0 CCID50 of the Wistar RA 27/3 rubella virus strains. The three virus strains are mixed prior to lyophilisation. The lyophilised vaccine also contains lactose, neomycin sulphate, amino acids and sorbitol and mannitol as stabilizers.

Indications

Mumps containing vaccines are indicated for:

- primary and booster immunization of infants and children against mumps,
- preventing infection in susceptible contacts during mumps outbreaks.

Efficacy

The protective efficacy of the mumps containing vaccine against mumps is about 95% i.e. a single dose of mumps containing vaccine produces an antibody response in 95% of susceptible individuals. However, field studies have demonstrated lower estimates of vaccine effectiveness usually around 80% with single-dose regimens. Serologic and epidemiologic data show the persistence of antibody after vaccination suggesting continued protection against infection for at least 20 years, though the antibody levels following vaccination are lower than those that follow natural disease. A two-dose strategy and good immunization coverage have led to the elimination of mumps in some countries e.g. Finland.

Although mumps immunization after exposure to mumps may not prevent the disease, it is not harmful. Should the exposure not result in an infection the vaccine should confer protection against future exposures.

Immunization Schedule

Accumulated global experience shows that two doses of the vaccine are required for long-term protection against mumps. The first dose of the mumps containing vaccine should be given at the age of 12 - 18 months. This is because of persistent maternal antibodies to mumps virus from previous infection or vaccination interferes with the response to mumps vaccines in young infants. The age of administration of the second dose may range from the second year of life to age at school entry. The minimum interval between the first and second doses is 4 weeks.

Mumps immunization schedule recommended for routine immunization of infants and children in Sri Lanka has been decided based on the epidemiology of Mumps, feasibility of implementation of the EPI in the country and the objectives of the EPI Programme. A two-dose schedule has been adopted by the EPI for Mumps immunization considering the above factors and to achieve very high levels of immunization coverage.

First dose of the MMR vaccine is given to all infants on completion of one year of age. This has been decided considering the protection offered by the residual maternal antibodies and the risk of infection during the first year of life.

The second dose of the MMR vaccine is administered on completion of 3 years. This second dose would boost up the suboptimal immunity achieved from the first dose due to the possible interference from the residual maternal antibodies.
Absence of previous documented doses, catch-up for MMR consists of 2 doses given at least 4 weeks apart. If only 1 dose was given earlier, 2nd dose should be given as early as possible.

Dosage & Administration

MMR is a lyophilized vaccine and is provided with a vaccine specific diluent. It should be reconstituted only with the diluent supplied using a sterile syringe and needle.

After reconstitution, MMR vaccine should be used within six hours of reconstitution. A dose consists of 0.5 ml is recommended for children and adults and should be administered by subcutaneous injection into the upper arm.

MMR can be administered simultaneously with other vaccines, at separate anatomical sites and in separate syringes. When administered with other live vaccines, MMR should be given at the same time or separated by a minimum 4-week interval.

Storage

MMR vaccine should be stored in the dark at +2°C to +8°C temperature. For long term storage, a temperature at –20°C is recommended. It is important to protect both the lyophilized and reconstituted vaccine from direct sun light. The diluent should not be frozen but should be kept cool in the main compartment of the refrigerator.

The reconstituted MMR vaccines can be stored at +2°C to +8°C for up to 6 hours if not used immediately. Any opened vaccine vials remaining at the end of an immunization session (or after 6 hours) should be discarded.

Cautions and contraindications

The following conditions are considered as contraindications for the use of mumps containing vaccine preparations .

- Presence of one of the general contraindications for any vaccine
- History of an allergy to neomycin, gelatin or other vaccine components
- Anyone who has experienced anaphylaxis to a previous dose of mumps containing vaccine preparations
- persons who are severely immunocompromised as a result of congenital disease, HIV infection, advanced leukaemia or lymphoma, serious malignant disease, or treatment with high-dose steroids, alkylating agents or antimetabolites, or in persons who are receiving immunosuppressive therapeutic radiation.

Precautions

The expected immune response to mumps vaccination may be impaired after receipt of antibody-containing blood products. The duration of interference with response to mumps vaccination depends on the amount of immunoglobulin contained in each product, and ranges from 3 to 11 months.

Adverse Events

In general, adverse reactions to mumps vaccination are rare and mild. Apart from slight soreness and swelling at the injection site, the most common adverse reactions are parotitis and low-grade fever. Occasionally, orchitis and sensorineural deafness have been observed after mumps vaccination. Very rarely moderate fever and aseptic meningitis has been reported following mumps vaccination.

For adverse events following MMR –Refer to measles chapter.

Usage of vaccine in specific circumstances

MMR vaccine can be given in the following circumstances:

- may be given from 9 months of age if in contact with mumps case, but dose must be repeated at 12 months of age,
- can be administered to HIV-infected children at 12 months of age unless they have severely impaired immunity,
- can be used to immunize susceptible adults against mumps.

Sources

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