

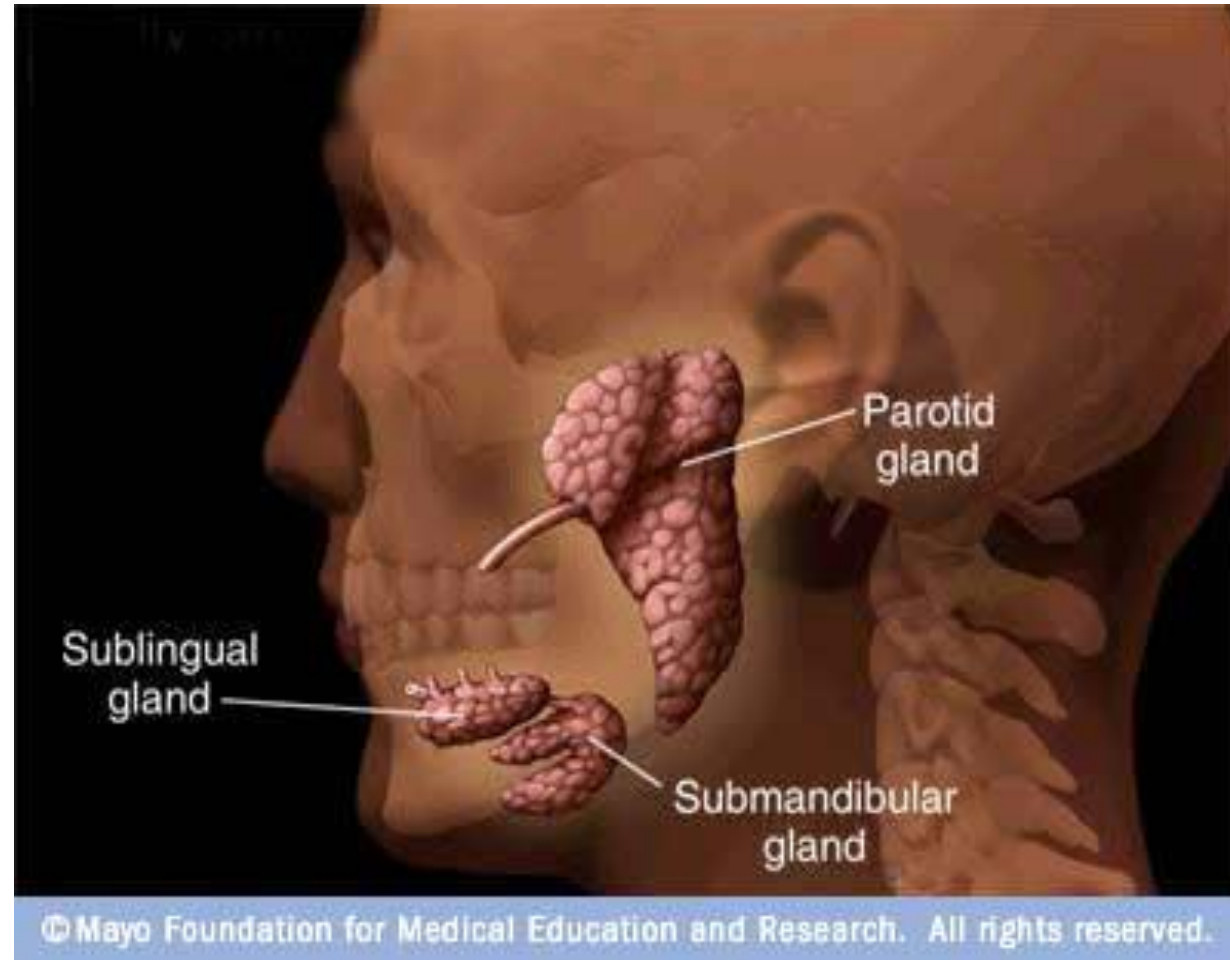
Epidemiology of mumps

Mon.20-11-2023



Assistant prof. Mayasah A. Sadiq FIBMS-FM

Salivary glands .





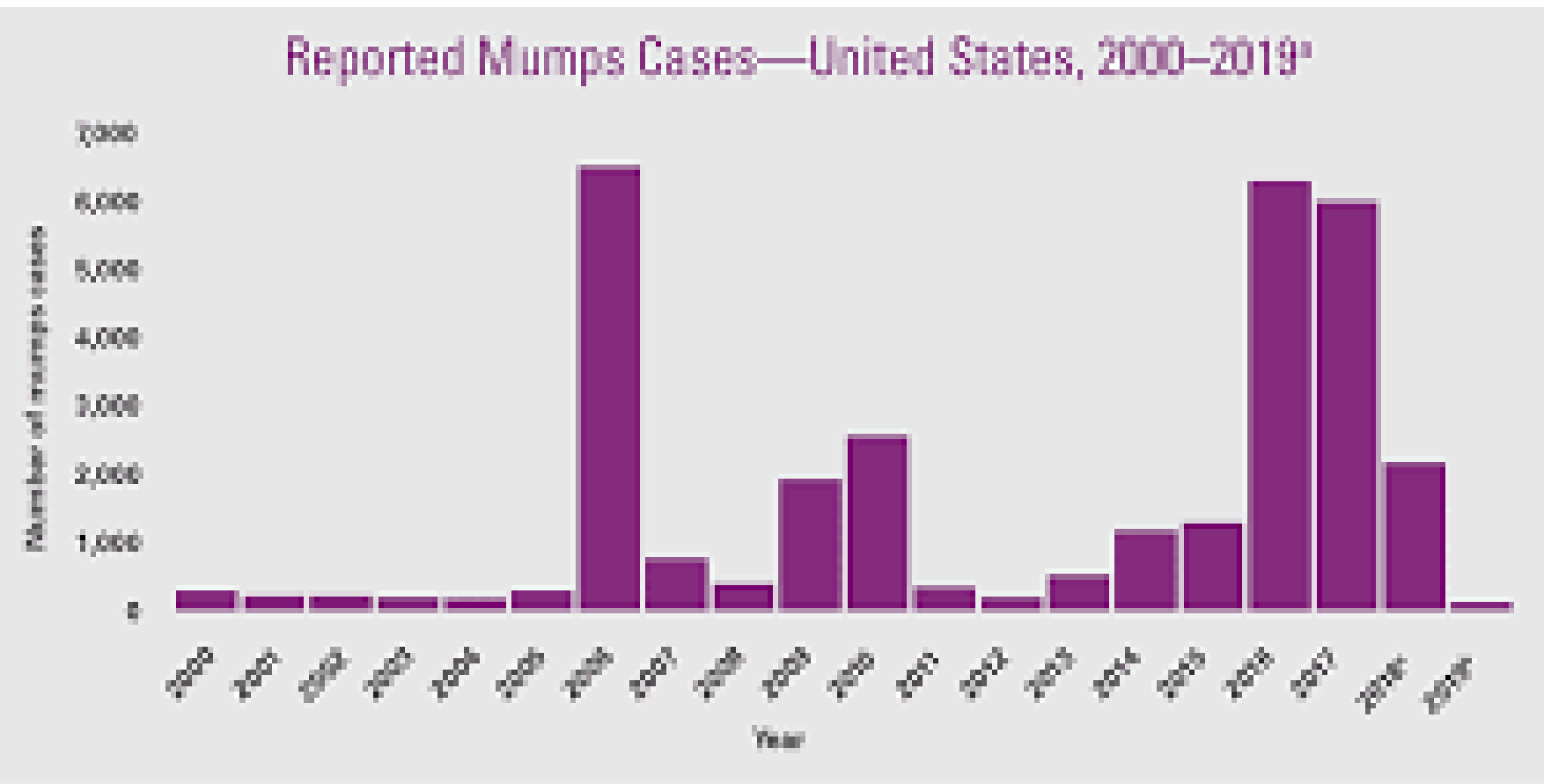
Definition

- Mumps is **an acute viral infection** of childhood that typically involves **swelling of one or both parotid glands**, although many different organs can be infected.

DISEASE BURDEN

- In most part of the world, the annual incidence of mumps in the absence of immunization is in the range of 100-1000 cases/100,00 population with epidemic peak every 2-5 years.

Figure 1



^a Preliminary counts; subject to change. ^b Preliminary count as of February 28, 2019; subject to change.
Source: Reference 6.

- **Natural infection confers a life long immunity.**

Epidemiology of mumps in IRAQ

- Two major outbreaks of mumps occurred between 2001 and 2016 in Iraq, with more than 10,000 cases reported in each incident.
- The first outbreak was in 2004, and a second, larger episode, extended from 2015 to 2016. In 2004, the governorate of Baghdad witnessed the most cases of all governorates in that year (3,768 cases).
- In 2016 around 73919 mumps cases were reported in Iraq, while 36367 cases in 2017 .

AGENT

- The causative agent, Myxovirus parotiditis is a RNA virus of the myxovirus family.
- The virus can be grown readily in chick embryo or tissue culture. There is only one serotype.

SOURCE OF INFECTION

- **Both clinical and subclinical cases.**
- **The virus can be isolated from saliva or from swabs taken from the surface of Stensen's duct.**

- **Virus has also been found in the blood, urine, human milk and cerebro spinal fluid (in one case)**

COMMUNICABILITY

- Usually 4-6 days before and at the onset of parotitis.
- Once the swelling has subsided, the case may be regarded as no longer infectious.

SECONDARY ATTACK

- Estimated to be about 86 %

HOST FACTORS

- **AGE AND GENDER** : Mumps is frequently seen among children of the age group 5-9 yrs.
- **However no age is exempt if there is no previous immunity. The disease tends to be more severe in adults than in children.**

IMMUNITY

- One attack, clinical or subclinical infection confers a life long immunity.
- Most infants below the age of 6 months are immune because of maternal antibodies.

ENVIRONMENTAL FACTORS

- Mumps is largely an endemic disease.
- Cases are reported throughout the year, the peak incidence is in winter and spring.
- Epidemics are associated with over crowding.



Epidemiology

- Mumps is **endemic** in most **unvaccinated populations**
- The virus is **spread** from human reservoir **by** ;
 - * **Direct contact**
 - * **Airborne droplets**
 - * **Fomites** contaminated by saliva
 - * possibly by **urine**
- It is distributed **worldwide**
- Affects **both sexes equally**

Epidemiology (cont.)

- Before **introduction of the vaccine in 1967**:
 - * the **peak incidence** of the disease occurred in children **5-9 yr** of age
 - * **85%** of infections occurred in children **younger than 15 yr of age**.
- **Now** most cases occur in **young adults**, producing outbreaks in colleges or in the workplace.

Epidemiology (cont.)

- **Outbreaks** appear to be primarily related to a **lack of immunization**, especially in an underimmunized cohort of children born from 1967-1977, **rather than to waning to immunity**.
- **Epidemics** occur at **all seasons** but are slightly **more frequent** in **late winter** and **spring**.

Epidemiology (cont.)

- Virus has been isolated from saliva as long as 6 days before and up to 9 days after appearance of salivary gland swelling.
- Transmission **does not seem to occur more than 24 hr before** the appearance of the swelling or **later than 3 days after** it has subsided.
- Virus has been isolated from urine from the 1st-14th day after the onset of salivary gland swelling.



Pathogenesis

- After entry into the last and initial multiplication in the **cells of the respiratory tract**, the virus is **bloodborne** to many tissues, among which the **salivary** and **other glands** are the most susceptible.



Clinical Manifestations

- The incubation period ranges from 14-24 days, with a peak at 17-18 days.
 - Approximately 30-40% of infections are subclinical
 - In children, prodromal manifestations are rare but may be manifest by:
 - * Fever
 - * Muscular pain (especially in the neck)
 - * Headache
 - * Malaise
- typically precede the parotid swelling by 12 to 24 hours

Clinical Manifestations (cont.)



*Common complaints are:

- Earache on the side of parotid involvement
 - Discomfort with eating or drinking acidic food
- * Parotid pain is most pronounced during the first few days of swelling



Clinical Manifestations (cont.)

- The swollen parotid gland lifts the earlobe upward and outward, and the angle of the mandible is obscured
- the opening of the Stensen duct on the buccal mucosa is edematous and erythematous.
- Trismus (spasm of the masticatory muscles) can occur.

Toddler with mumps parotitis

(Courtesy of A. Margileth.)





Clinical Manifestations (cont.)

- Other salivary glands such as the **submandibular** and **sublingual glands** may also be involved.
- In **10-15%** of patients **only** the **submandibular gland(s)** may be swollen
- **Presternal edema** can be notable.
- **Morbilliform rash** has been reported in association with mumps infection

Clinical Manifestations (cont.)

- Systemic symptoms, including fever, usually resolve within 3 to 5 days
- the parotid swelling subsides within 7 to 10 days
- Adolescents and adults have more severe disease than young children.





Diagnosis

- The diagnosis of mumps parotitis is usually apparent from the clinical symptoms and physical examination
- Routine laboratory tests are nonspecific; usually leukopenia is present with relative lymphocytosis.
- An elevation in serum amylase levels is common; the rise tends to parallel the parotid swelling and then to return to normal within 2 wk



Diagnosis (cont.)

- The microbiologic diagnosis is by **serology** or **virus culture**
- **Enzyme immunoassay** for **mumps immunoglobulin (Ig)**.
- **IgG** and **IgM** antibodies are most commonly used for diagnosis.
- **IgM antibodies** are detectable **in the first few days of illness** and are considered diagnostic

Diagnosis(cont.)

Laboratory definitive evidence for a confirmed case requires at least one of the following:

- **detection of mumps virus nucleic acid (PCR)**
- **isolation of mumps virus by culture.**



DIFFERENTIAL DIAGNOSIS

The differential diagnosis of parotitis is **broad** and includes:

- **bacterial (suppurative) parotitis**
- **parotid duct stone**
- **drug reactions**
- **recurrent parotitis of childhood**
- **Other viruses**, such as *influenza*, *coxsackievirus A*, *echovirus*, and *parainfluenza viruses 1 and 3*, can cause parotitis and are usually responsible for “recurrent mumps”
- **parotid tumor**
- **Sjögren syndrome**

Boy with parotitis not due to mumps virus. (Courtesy of J.H. Brien.)





Treatment

- There is **no specific antiviral therapy**; treatment is entirely **supportive**.
- **Antipyretics** (acetaminophen or ibuprofen) are indicated for fever.
- **Bed rest** should be guided by the patient's needs, but no evidence indicates that it prevents complications. The diet should be adjusted to the patient's ability to chew.



Treatment (cont.)

- Orchitis should be treated with local support and bed rest.
- Mumps arthritis may respond to a 2-wk course of a nonsteroidal anti-inflammatory agent or corticosteroids.
- Salicylates do not appear to be effective



Complications

- **MENINGOENCEPHALOMYELITIS**

1. The most frequent complication in childhood
2. Clinical manifestations occur in more than 10% of patients
3. The incidence of mumps meningoencephalitis is approximately 250/ 100,000 cases
4. The mortality rate is about 2%



Complications

- **MENINGOENCEPHALOMYELITIS** (cont.)

5. may be either:

I. **Primary infection** of neurons:

parotitis frequently appears **at the same time or following** the onset of **encephalitis**

II. **Postinfectious encephalitis** with demyelination :

encephalitis follows parotitis by an average of **10 days**.



Complications

- **MENINGOENCEPHALOMYELITIS** (cont.)

- *Mumps meningoencephalitis is clinically indistinguishable from meningoencephalitis of other origins
- * Moderate stiffness of the neck is seen, but the remaining findings on neurologic examination are usually normal
- *The cerebrospinal fluid may show a lymphocytic pleocytosis of less than 500 cells/ mm³, although occasionally the count may exceed 2,000 cells/mm³.



Complications (cont.)

- **ORCHITIS AND EPIDIDYMITIS**

1. These complications **rarely** occur in **prepubescent** boys but are **common** (14-35%) in **adolescents and adults**.
2. The **testis** is most often infected **with or without epididymitis**; **epididymitis** may also occur **alone**.
3. **Bilateral orchitis** occurs in approximately **30%** of patients. Rarely, there is a hydrocele.
4. The orchitis usually **follows parotitis within 8 days**. Orchitis may **also occur without** evidence of salivary gland infection. .

Complications



- **ORCHITIS AND EPIDIDYMITIS** (cont.)

5. The **onset** is usually **abrupt**, with a rise in temperature, chills, headache, nausea, and lower abdominal pain;
6. The **affected testis** becomes **tender** and **swollen**, and the adjacent skin is edematous and red.
7. The **average duration** of illness is **4 days**.
8. Approximately **30-40%** of **affected testes atrophy**, leaving a cosmetic imbalance.
9. **Infertility** is **rare** even with bilateral orchitis.



Complications (cont.)

- OOPHORITIS

Pelvic pain and tenderness are noted in about 7% of postpubertal female patients. There is no evidence of impairment of fertility.



Complications (cont.)

● PANCREATITIS

- * Mild or subclinical pancreatic involvement is common, but severe pancreatitis is rare.
- * It may be unassociated with salivary gland manifestations and may be misdiagnosed as gastroenteritis.
- * Epigastric pain and tenderness, which are suggestive, may be accompanied by fever, chills, vomiting, and prostration.
- * An elevated serum amylase value is characteristically present in patients with mumps, with or without clinical manifestations of pancreatitis

IDDM & MUMPS

- **Risk of type one diabetes post mumps infection is Less than 1%**



Complications (cont.)

- MYOCARDITIS

- * Serious cardiac manifestations are extremely rare
- * mild infection of the myocardium may be more common than is recognized.
- * Electrocardiographic tracings revealed changes, mostly depression of the ST segment, in 13% of adults in one series.
- * Such involvement may explain the precordial pain, bradycardia, and fatigue sometimes noted among adolescents and adults with mumps.



Complications (cont.)

● ARTHRITIS

- * Migratory polyarthralgia and even arthritis are occasionally seen in adults with mumps but are rare in children.
- * The knees, ankles, shoulders, and wrists are most commonly affected.
- * The symptoms last from a few days to 3 mo, with a median duration of 2 wk



Complications (cont.)

● THYROIDITIS

- * It is uncommon in children
- * A diffuse, tender swelling of the thyroid may occur about 1 wk after the onset of parotitis
- * Antithyroid antibodies subsequently develop



Complications (cont.)

- DEAFNESS

- * **Unilateral**, rarely bilateral, nerve deafness may occur
- * the **incidence** is **low** (1/15,000 cases)
- * mumps was **historically a leading cause** of unilateral nerve deafness.
- * The hearing loss may be **transient** or **permanent**.



Complications (cont.)

● OCULAR COMPLICATIONS

- * **Dacryoadenitis** may occur with painful swelling, usually bilateral, of the lacrimal glands.
- * **Optic neuritis** (papillitis) may occur
- * Symptoms **vary** from **loss of vision to mild blurring**, with **recovery** in **10-20 days**.



Prognosis

- The prognosis of mumps in childhood is **excellent**.
- Infection usually confers **permanent immunity**
- **Reinfections** have been documented

Prevention



- **A single dose of (0.5ml) intramuscularly produces detectable antibodies in 95% of vaccinees.**
- **MMR vaccine is administered as a trivalent vaccine for children**



Prevention

- Mumps vaccine is derived from the **Jeryl Lynn strain** of mumps virus,
- The vaccine **induces antibody** in **96%** of **seronegative** recipients and has **97% protective efficacy**.
- The **initial mumps immunization**, usually as measles-mumps-rubella (MMR) vaccine, is recommended at **12-15 mo of age**.
- A **second immunization**, also as MMR, is recommended routinely **at 4-6 yr of age** but may be administered at any time during childhood provided at least 4 wk have elapsed since the first dose.



Prevention (cont.)

- Women should **avoid becoming pregnant for 30 days after monovalent mumps vaccination** (3 mo if vaccination was performed with rubella vaccine).
- **Other contraindications** to vaccination include:
 - * allergy to a vaccine component (anaphylaxis to neomycin)
 - * moderate or severe acute illnesses with or without fever
 - * immunodeficiency (primary immunodeficiencies, cancer and cancer therapy, long-term high-dose corticosteroid therapy, severely immunocompromised, including those with HIV infection)
 - * recent immune globulin administration



Prevention (cont.)

- Children who have not previously received the second dose should be immunized by 11-12 yr of age.
- Rarely, parotitis and low-grade fever can develop 10-14 days after vaccination.
- Vaccinees do not shed virus.
- Maternal antibody is protective in the infant in the first 6 mo of life.

MMR Vaccine and Autism

- There is no **scientific evidence** that the risk of autism is higher among children who receive measles or MMR vaccine than among unvaccinated children

“The evidence favors a rejection of a **causal relationship at the population level between MMR vaccine and autism spectrum disorders (ASD).**”

- Institute of Medicine, April 2001

CONTROL

- The control of mumps is difficult because the disease is infectious before a diagnosis can be made.
- However cases should be isolated till the manifestations subside.

- **Measures should be taken to disinfect the articles used by the patient.**
- **Contacts should be kept under surveillance.**

Vaccination campaign against measles, mumps and rubella concludes in Iraq

- The Ministry of Health, in collaboration with WHO, completed a 10-day vaccination campaign to immunize children aged from 9 to 59 months in Iraq against measles, mumps and rubella (MMR) from 10 to 24 March 2019.
- A subnational vaccination round against MMR has already been successfully implemented in 2 phases. Phase I was conducted between 3 and 11 September 2018 and covered 10 provinces. Phase II targeted 2 592 858 children aged 9–59 months in 9 provinces (Baghdad-Kerkh, Baghdad-Resafa, Diyala, Wassit, Diwania, Muthanna, ThiQar, Missan and Basra) over 10 days.

REFERENCE : MSNUAL OF COMMUNICABLE
DISEASES