

Mumps

(Epidemic parotitis)

Mumps is an acute, contagious disease caused by a *paramyxovirus* that has a predilection for glandular (salivary glands, pancreas, gonads) and nervous tissue.

ETIOLOGY

- The **causative agent in mumps** is a filterable virus family Paramyxoviridae; genus *Paramyxovirus*)
- It contains ribonucleic acid (RNA).
- The virus is of low stability and is rapidly inactivated by high temperatures, ultraviolet rays, weak formalin solutions, and alcohol. It is grown on developing chick embryos.

Epidemiology

- The **source of infection** is a patient. Patients cease to be contagious by the **9 day**. Patients with an atypical forms of mumps are of epidemiological value.
- **Infection is transmitted:**
 - mainly by the **aerial-droplet route**,
 - **by various objects contaminated** by the patient's saliva (such as dishes, toys, etc.) if they are passed to a healthy child within a short time and he puts them into his mouth.

Immunity

- After disease - postinfectious, persists throughout life. Antibodies **IgM** appear at the end of the first week of illness and persist 60-120 days. Antibodies **IgG** appear later, titer increases in 3-4 week and persists throughout life.
- Children first year of life transplacental receive specific antibodies, which are kept up to 9-10 months.

- **Epidemic features.** Sporadic cases of mumps and **epidemic outbreaks** occur in children's institutions, hospitals, and barracks, and epidemics involving the whole community of a locality are also sometimes encountered.
- Overcrowding and poor sanitary conditions favors the development of epidemic outbreaks.

- The disease shows a **seasonal** prevalence, with the greatest incidence in **winter and spring**.
- After the introduction of mumps vaccine in 1967, the incidence of clinical mumps declined.
- One attack of mumps usually confers lifelong immunity. Long term immunity is also associated with immunization.

PATHOGENESIS

- It is a general infection in which the virus develops not only in the salivary glands, but also in the blood and other organs. The possibility of primary infection in the meninges or testes has been established.
- **The portal of entry** is apparently the mucous membrane of the mouth, nose, and pharynx from which the virus penetrates into the blood and is carried secondarily to the **salivary glands** and **other organs** where it predominantly affects the interstitial tissue. The parotid gland is apparently the site of accumulation of the virus from which it is discharged into the environment with saliva.
- The antibodies, whose titer attains its maximum in 2-4 weeks, appear during the first days of the disease.

Clinical Manifestations

- The **incubation period** of mumps lasts on average for 18 to 21 days, but extremes **of 11 and 25 days occur.**

Mumps parotitis

- Its **onset** is characterized by elevation of temperature (up to 38°C or 39°C), loss of appetite, achiness, and headache with a moderately high temperature, usually lasting for 3-4 days.
- Swelling of the glands under and in front of the ear usually starts on one side and then progresses to the other side rapidly.
- The swelling obliterates the fossa retromaxillaris and may spread downwards anteriorly and posteriorly to the neck. When the swelling is considerable the auricle is lifted upward.

- ❑ Swelling may last from 7-10 days.
- ❑ The center of the swelling is **elastic-solid** on palpation and painful when pressed; the thickness and the tenderness of the swelling fall off toward the periphery. A painless or slightly tender inflammatory edema is seen on the periphery. At times it spreads to the face and far to the neck.
- ❑ The skin over the inflamed gland is tense and lustrous, but remains usually of **normal color**.
- ❑ Swelling of the parotid gland is accompanied with pain irradiating to the ear or neck, that becomes more intense **during chewing or swallowing**.
- ❑ In 1-2 days the parotid gland on the opposite side may become involved.

- In about half the cases the **submaxillary**, and sometimes the **sublingual**, glands are affected.
- In submaxillitis palpation directly inward from the margin of the lower jaw displays a swollen, solid, and painful submaxillary gland, oval or round in shape.
- Submaxillitis is sometimes accompanied with extensive edema of the cervical cellular tissue; cases of isolated inflammation of the submaxillary gland and of its primary affection with subsequent supervention of parotitis have been observed.

- The swelling of the affected gland increases for the first three to five days, then begins to regress and subsides by the eighth to tenth day.
- Resolution of the inflammatory infiltrate may be prolonged to several weeks, but as a rule the glands do not suppurate.
- Simultaneously with subsidence of inflammation the temperature falls, the pain declines, and the patient's general condition improves.
- If several glands are affected one after the other the disease may last for two and more weeks.
- The orifice of Stenon's duct is commonly red and swollen.

- A variety of mumps that must be mentioned is the **atypical** forms expressed in mild swelling of the parotid gland with little or no rise of temperature.
- Pathological involvement of the nervous system and of various glandular organs is typical of mumps. The lesions of these organs are more correctly considered a symptom rather than a complication of the disease, whose causative agent has a definite tropism.

Pancreatitis

- Pancreatitis normally manifests by strong epigastric pains and pains in the region of the left hypochondria.
- Palpation is markedly painful.
- Nausea, anorexia,
- Sometimes vomiting and diarrhea occur.
- The diastase of the blood and urine increases highly.
- The pancreas may be affected in the presence of only part of these symptoms, or the symptoms may be nonmanifest.

Orchitis

- which occurs in **10 to 30%** of young men and boys at puberty, usually develops on the 6 to 8 day of the disease.
- Rise of temperature, often accompanied with chill, malaise, and adynamia, and sometimes with delirium, excitation, and symptoms of circulatory failure are noted. More or less strong pain developing in one of the testes irradiates to the inguinal and lumbar regions.
- The testis enlarges, becomes tender and painful; the scrotum is edematous and its skin is often tense and red. A bilateral process is rare (10-15%).
- The symptoms begin to subside in 2-3 days, and usually disappear completely by the end of the first week or the beginning of the second.
- Primary orchitis without previous affection of the salivary glands has been reported.
- Severe cases may progress to include epididymo-orchitis in prepubescent males, which can cause atrophy of the testes, but rarely sterility.

Clinical symptoms of rare localization

Oophoritis

- abdomen pains

Bartholinitis (are rare manifestations mumps in older girls and young women).

Tirioiditis:

- fever;
- tachycardia;
- thyroid gland increases;
- pains local.

Dacryocystitis:

- the century has swelled;
- eyes pains.

Mastitis

- Pains and a swelling of mammary glands.



Neurological infections such as encephalitis and meningitis are possible and represent the most common extra salivary gland manifestations of mumps.

Acute serous meningitis, meningoencephalitis

- **Acute serous meningitis** mostly arises when the affection of the salivary glands is mild or moderate.
- It usually develops at the height of the disease, and is characterized by symptoms of meningeal irritation (headache, frequent vomiting, rigidity of the occipital muscles, Kernig's and Brudzinsky's signs).
- **Meningoencephalitis:** disturbed consciousness, delirium, focal symptoms (paralysis, paresis, aphasia, etc.),

Cerebrospinal fluid

- The **transparent or opalescent** cerebrospinal fluid flowing in lumbar puncture is at normal or elevated pressure.
- Its **protein** content are normal or slightly increased.
- The cytosis is increased at the expense of lymphocytes (**30-700 cells per mm³**, or $30-700 \times 10^6$ per l in SI units).
- The **sugar** and **chloride** content is normal.
- The mumps virus is often discovered in the cerebrospinal fluid.

- All these symptoms persist for **5-10 days** and then subside gradually leaving no traces. Residual phenomena remain, however, in some patients for long periods of time. Primary serous meningitis with or without subsequent affection of salivary glands has been encountered. The true nature of such meningitis is proved by the presence of characteristic epidemiological links, and by serological tests.

Classification

Typical forms:

- **glandular**: the isolated defeat only glands (a parotitis, submaxilitis, a pancreatitis, orchitis);
- **nervous** (serous meningitis, meningoencefalitis)
- **mixt** - in various combinations (serous meningitis + parotitis or submaxilitis, + pancreatitis + meningoencefalitis, etc. combinations)

Atypical (in outbreaks is 20-30% of cases)

Degree of a swelling of salivary glands:

- **I degree** – a swelling of salivary glands is defined only at a palpation;
- **II degree** – a swelling of salivary glands is defined not only at palpation, but also visually
- **III degree** – a swelling of salivary glands is expressed and accompanied by a hypostasis of a hypodermic cellulose of a neck.

Diagnosis and Prognosis

- Difficulties in diagnosing mumps occur in **mild** and **abortive** forms, and when only submaxillary glands are affected, or the meningitis or orchitis is its first manifestation.
- Diagnosis is established from the features of the clinical course described above and the epidemiological data.

Differential diagnosis

- **Toxic oropharyngeal diphtheria**
- **Cervical lymphadenitis**
- **Toxic parotitis**
- **Infectious mononucleosis**
- **Secondary parotitis**

Differential diagnosis

- ✓ The **secondary parotitis** developing in the course of severe acute infections (typhoid fever and typhus, sepsis, pneumonia, etc.) is usually unilateral and, as a rule, suppurative.
- ✓ **Toxic parotitis** is met mainly in adults suffering from acute or chronic mercury, lead, or iodine poisoning; it develops slowly, does not run a cyclic course, and is often accompanied with changes in the buccal mucous membrane.
- ✓ **Cervical lymphadenitis** is differentiated from mumps by an inflammatory focus in the fauces with localization of the swelling in the region of superior cervical lymph nodes. In mumps the swelling first obliterates the sulcus between the mandible and the mastoid process (directly under the auricle). Determination of diastase in the urine may be useful in diagnostication of pancreatitis.

Primary **meningitis** of mumps etiology can be confused with **tuberculous meningitis**. The latter develops slowly and gradually, the pressure of the cerebrospinal fluid is increased and its sugar content lowered; it may contain *Mycobacterium tuberculosis*. It is more difficult to differentiate primary meningitis of mumps etiology from **acute serous meningitis** caused, for instance, by an enterovirus. Diagnosis is established either on the basis of subsequent inflammation of the salivary glands, or when there is a history of exposure to mumps.

Criteria for Diagnosis:

- medical history, including immunisation status
- physical examination
- travel history
- laboratory tests

Laboratory Criteria for Diagnosis:

- ✓ Isolation of mumps virus from clinical specimen (nasopharyngeal swab, saliva, urine or CSF), or
- ✓ Detection of mumps nucleic acid (e.g., standard or real time RT-PCR assays), or
- ✓ The presence of IgM antibodies as determined by ELISA or a fourfold rise between acute and convalescent serology on complement fixation, HAI, ELISA, or neutralization testing

TREATMENT

- Treatment is symptomatic. Bed rest - 10-14 days.
- Diet is restricted to fluids or semifluids to spare the affected glands. Heat is applied to the glands by means of cotton or wool bandages, Sollux lamp, etc.
- The administration of analgesics and the application of warm or cold compresses to the parotid area may be helpful.
- Oral hygiene - the mouth should be rinsed with weak disinfecting solutions.
- Antipyretic
- Vitamins

Medical supervision will last 3 weeks of the onset of illness (meningitis rarely occurs in the 14-21 day).

Criteria for hospitalization of patients with mumps

- Disease with poliglandulare forms
- Parotitis - severe form
- Orchitis
- Pancreatitis
- Meningitis, meningoencefalitis
- Mumps with complications
- Epidemiological date
- Male patients aged 12 years and older with risk

Treatment

Parotitis - severe form

- Antipyretic
- Vitamins
- Diuretics
- Immunomodulatory:

Treatment of orchitis

- Strict confinement to bed is called for in orchitis; the testis should be supported and cold applied.
- Testicular pain may be minimized by the local application of cold compresses and gentle support for the scrotum.
- Corticosteroid preparations produce considerable alleviation of pain and subjective improvement.

Treatment of orchitis

- **Corticosteroids:**
- **Nonsteroidal anti- inflammatory drugs:**
- **Antibiotics**
- **Immunomodulatory**

Discharge from hospital - after 5-6 days of the disappearance of local signs.

Treatment of severe meningitis (meningoencephalitis)

- To relieve the severe headache and other meningeal symptoms in concomitant meningitis lumbar puncture.
- Dehydration therapy is carried out.
- **Corticosteroids**
- **Immunomodulatory**

Prophylaxis

- Mumps vaccine is usually administered as part of the **measles-mumps-rubella (MMR)** vaccine at the age of:
 - **MMR-1 - children at 12 to 15 months;**
 - **MMR-2 - children at 6-7 years of age**
 - **MMR-3 - children at 15-16 years of age.**

PREVENTION

- The patient is isolated at home or hospitalization. Considering that the patients are infective for a relatively short time the period of isolation has been reduced to **9 days**.

Contacts who have not previously had the disease should be segregated on the **21st day from the beginning of the disease**. When the time of their contact is definitely known, they are allowed to attend the children's institution during the first ten days of incubation, and are only isolated from the **11-th to the 21-st day from the time of contact**.