DENGUE- viral infection

Dengue is a viral infection transmitted by mosquitoes.

The infection causes flu-like symptoms and sometimes develops into a potentially deadly complication called severe dengue. The global incidence of dengue has increased significantly in recent decades. About half of the world's population is now at risk.

Dengue occurs in tropical and subtropical climates worldwide, mainly in urban and semi-urban areas. Severe dengue is a leading cause of serious illness and death in children in some Asian and Latin American countries.

There is no specific treatment for dengue/severe dengue, but early detection and access to appropriate medical care reduce the mortality rate to below 1%.

Prevention and control of dengue depend on effective vector control measures

(mosquitoes).

The dengue vaccine has been approved by several national regulatory bodies for use in individuals aged 9 to 45 years living in endemic areas.

Pathogenic microorganism

Dengue virus of the genus Flavivirus in the family Flaviviridae. There are four closely related viruses or serotypes of the virus (dengue virus,). Among humans, dengue is transmitted by the vector, the mosquitoes, Aedes aegypti and Aedes albopictus.

It should be noted that some people, despite not having significant symptoms of the disease, can infect mosquitoes. After entering the mosquito with the blood it ingests, the virus requires about 8-12 days of incubation before it can be transmitted to another person.

The mosquito remains infectious throughout its entire life, which is a few days or weeks in tropical regions, but can be up to a year for females that spend the winter in certain temperate zones.

Epidemiology

Dengue and dengue hemorrhagic fever (DHF) are acute febrile diseases that occur predominantly in subtropical regions and can be life-threatening. They are common in urban areas. Today, the disease is endemic in over 100 countries worldwide.

Infection with one of the serotypes does not protect against the others, and sequential infections create a higher risk of dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS).

Situation in 2023-2025 in the Republic of Macedonia

In the Republic of North Macedonia, during 2023 and 2024, 2 laboratory-confirmed imported cases of dengue were reported. One case each was reported from Veles and Skopje, with a travel history to the Maldives and Egypt.

By the Department of Virology at the PHI of the Republic of North Macedonia - Skopje, the Department of Epidemiology of Infectious Diseases was informed of a case of dengue, through a received Report for an isolated/proven infectious disease agent, on 16.07.2025 of a person from Skopje.

Clinical picture

The disease begins after an incubation period of 3-15 days (usually 5-8) with fever, headache, pain when moving the eyes (retrobulbar) and lower back pain. During the first hours of the disease, severe pain in the legs and joints occurs. The temperature quickly reaches 40°C and is accompanied by relative bradycardia and hypotension.

The eyes become red, and a reddish or pale pink rash appears on the face that quickly disappears. The cervical and inguinal lymph nodes are often enlarged. The temperature and other signs last 2-4 days, followed by a sudden/rapid drop to normalization of the temperature and profuse sweating.

A short period with normal temperature follows when the patient feels better, which lasts only about a day, and then a second, rapid increase in temperature follows. In addition to the temperature, a characteristic rash appears that spreads from the extremities to the entire body, except for the face. The palms and soles may be bright red and swollen.

From a practical point of view, the three clinical forms of dengue can be observed as a progressive-evolutionary pattern. Classical dengue is characterized by high fever without signs of a localized source of infection, a petechial rash with thrombocytopenia and relative leukopenia.

Dengue hemorrhagic fever (DHF) is manifested by:

• High fever, persistent headaches, eye pain, severe dizziness, anxiety

and loss of appetite.

• Bleeding tendency (spontaneous bruising, bleeding from mucous membranes, gums and injection sites, etc., vomiting blood and bloody diarrhea).

• Thrombocytopenia (less than 100,000 platelets per mm3 or estimated by less than 3 platelets per high power field).

Diagnosis

The diagnosis of dengue is usually made clinically, and is confirmed by isolation of the virus from serum or autopsy material, a fourfold or greater increase in antibody titer to one or more dengue virus antigens in paired serum samples, documentation of dengue virus antigen in autopsy material – tissue, serum or CSF by immunohistochemical, immunofluorescence or ELISA techniques, or by detection of dengue virus genomic sequence by PCR.

Therapy

There is no specific, causal therapy. Paracetamol is recommended to reduce fever (NSAIDs are not given due to the risk of bleeding), and intravenous fluid replacement is recommended if necessary. The infected person should be isolated from other family members until fully recovered to prevent further spread of the infection.

Prevention of diseases transmitted by mosquitoes:

1. **Environmental measures** (reducing the mosquito population and their presence in people's living spaces).

✓ Prevent the breeding of mosquitoes in your environment:

▪ Do not leave open barrels, bins, watercraft (boats, canoes) and old tires in yards where rainwater can collect!

▪ Clean gutters regularly to allow water to drain!

▪ Keep swimming pools, decorative pools, fountains clean!

▪ Do not create puddles (stagnant water) in yards.

✓ Reduce the possibility of being exposed to mosquito bites:

Use scented candles, coils, as protective repellents while staying outdoors (garden, yard).

▪ Use special lamps, lanterns (scorching mosquitoes),

devices that repel mosquitoes with sound!

▪ Install screen doors and windows in your home!

▪ Avoid going out and staying outside at dawn or dusk, when

mosquitoes are most active!

2. **Personal protection measures against mosquito bites.**

✓ Wear appropriate clothing, preferably in light colors, which will leave as few exposed parts of the body/skin as possible (long sleeves, long pants, socks, hats...)!

✓ Apply protective agents (repellents) in the form of lotion, stick, aerosol spray or cream for the skin and clothing, which repel mosquitoes!

✓ Do not use means to protect cuts, open wounds, under clothing, around the eyes and mouth, on the palms of your hands! Caution with small children!!!

✓ Travelers traveling/staying in countries or areas where diseases transmitted by mosquitoes are recorded, must use repellents during their stay, and windows and sleeping beds should be closed with protective nets, impregnated with an adequate insecticide!!!

✓ Upon returning home, these individuals should be aware of their possible infection while staying in such areas, and monitor their health. If symptoms of illness appear, they should seek medical attention immediately and inform the doctor about their recent stay in areas where mosquito-borne diseases exist. Early diagnosis and timely treatment can prevent the occurrence of a severe form of the disease, which can end in serious health impairment and severe consequences or death.