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General Science & Ability
Assignment # 2

Topic:
Malaria / Typhoid / Dengue / Hepatitis / Polio :-

- Definitions
- Symptoms
- Causal Agents
- General causes
- Treatment
- Preventive Measures

MALARIA:

Definition:

Malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of infected female Anopheles mosquitoes.

Symptoms:

The symptoms of malaria typically appear 10-15 days after the infected mosquito bite. They include fever, chills, headache, nausea, vomiting, muscle pain, fatigue, sweating, cough, chest pain, abdominal pain and

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diarrhea. Severe cases can cause complications like severe anemia, respiratory distress and organ failure which can be fatal if not treated promptly.

Causal Agent:

Malaria is caused by Plasmodium parasites. There are five species of Plasmodium that cause malaria in humans, plasmodium falciparum (most severe and common), plasmodium vivax, plasmodium ovale, plasmodium malariae and plasmodium knowlesi.

General Causes:

Malaria is primarily spread through the bite of an infected Anopheles mosquito. It can also be transmitted through transfusions with infected blood. Sharing needles contaminated with infected blood can also spread the disease. Moreover, malaria can be transmitted from a mother to her unborn baby.

Treatment:

Treatment of malaria involves the use of antimalarial medications, such as chloroquine, quinine and mefloquine. The choice of medication

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and duration of treatment depend on the type of Plasmodium species, the severity of symptoms, and the region where the infection was acquired due to drug resistance patterns.

Prevention:

Malaria can be prevented through the use of insecticide-treated bed nets (ITNS), indoor residual spraying (IRS) with insecticides and environmental management to reduce mosquito breeding sites. Secondly, one can protect himself or herself by using insect repellant on the skin, wearing long-sleeved clothing and using bed nets. Thirdly, travelers to malaria-endemic areas can take antimalarial drugs as a preventive measure. Fourthly, early diagnosis and prompt treatment of malaria can prevent the disease from becoming severe and reduce transmission.

TYPHOID:

Definition:

Typhoid fever is a bacterial infection caused by Salmonella enterica serotype Typhi. It is characterized by prolonged

fever, abdominal pain and systemic illness. It is a serious disease, particularly in developing countries where access to clean water and sanitation is limited.

Symptoms:

Symptoms of typhoid fever generally appear one to three weeks after exposure and can range from mild to severe. They include prolonged high fever, weakness, fatigue, headache, abdominal pain, loss of appetite, diarrhea or constipation, rash (rose-coloured spots), and enlargement of the liver and spleen. Severe cases can lead to confusion, delirium and intestinal perforation.

Causal Agent:

Typhoid fever is caused by the bacterium Salmonella enterica serotype Typhi (S. Typhi).

General Causes:

The general causes of typhoid fever include the ingestion of food or water contaminated with the feces of an infected person, environments with poor sanitation and

hygiene practices where the bacteria thrive and direct contact with an infected person.

Treatment:

Treatment of typhoid fever involves the use of antibiotics to kill the bacteria. Commonly used antibiotics include ciprofloxacin, azithromycin and ceftriaxone. In cases of antibiotic resistance, sensitivity testing helps guide the choice of antibiotics. Moreover, supportive care, including hydration and proper nutrition, is also important.

Preventive Measures:

Typhoid fever can be prevented through vaccination. These vaccines are recommended for people travelling to areas where typhoid is common. Secondly, safe food and water practices, such as drinking bottled or boiled water, eating well-cooked food and avoiding unpeeled raw fruits and vegetables, can be adopted. Thirdly, it is recommended to wash hands thoroughly with soap and water, especially after using the bathroom and before preparing food. Fourthly, public health

measures, such as improving sanitation infrastructure, ensuring access to clean water and conducting public health education campaigns can also help reduce the incidence of typhoid fever.

Dengue:

Definition:

Dengue is a mosquito-borne viral infection that causes a flu-like illness and, occasionally, develops into severe dengue (also known as dengue hemorrhagic fever), which can be lethal. It is prevalent in tropical and subtropical regions worldwide, particularly urban and semi-urban areas.

Symptoms:

Symptoms of dengue usually appear within 4-10 days after a mosquito bite and include high fever, severe headache, pain behind the eyes, severe muscle and joint pain, nausea, vomiting, swollen glands and rash. In severe cases, additional symptoms may include severe abdominal pain, persistent vomiting, rapid breathing, bleeding gums or nose, fatigue, restlessness, blood in vomit or stool, and

fluid accumulation in the chest and abdomen.

Causal Agent:

Dengue is caused by the dengue virus (DENV), which has four distinct serotypes: DENV-1, DENV-2, DENV-3 and DENV-4. Infection with one serotype provides life long immunity to that serotype but only partial and temporary immunity to the others.

General Causes:

Dengue is primarily transmitted through the bites of infected female Aedes aegypti mosquitoes, and less commonly by Aedes albopictus mosquitoes. These mosquitoes typically bite during the day, with peak periods early in the morning and before dusk. Moreover, dengue can also be transmitted through infected blood products and organ donations, however, this mode of transmission is rare.

Treatment:

There is no specific antiviral treatment for dengue. Management focuses on relieving

symptoms. It includes the prevention of dehydration from fever and vomiting, and the use of acetaminophen (paracetamol) to reduce pain and fever. In severe cases, hospitalization may be necessary for close monitoring and supportive care to manage complications such as bleeding and shock.

Preventive Measures:

Dengue fever can be prevented through reducing mosquito breeding sites by eliminating standing water in containers, covering water storage containers and ensuring proper waste disposal. For personal protection, one can use mosquito repellent on exposed skin, wear long-sleeved shirts and long pants, and use mosquito nets, especially during the day. Travelers to endemic areas should take precautions to avoid mosquito bites and stay informed about outbreaks. Moreover, dengvaxia, the first dengue vaccine is available in some countries and is recommended for people who have had a previous dengue infection.

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HEPATITIS:

Definition:

Hepatitis is an inflammation of the liver that can be caused by infectious viruses, other pathogens or non-infectious factors, such as alcohol, drugs and autoimmune diseases. The inflammation can lead to liver damage, scarring (cirrhosis), liver cancer, and, in severe cases, liver failure.

Symptoms:

Symptoms of hepatitis can vary depending on the type (A, B, C, D, E) and stage of the disease but often include fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, dark urine, pale stool, joint pain and jaundice, that is, yellowing of the skin and eyes.

Causal Agent:

Hepatitis is most commonly caused by viral infections. The main hepatitis viruses include hepatitis A virus (HAV), hepatitis B virus (HBV), hepatitis C virus (HCV), hepatitis D virus (HDV) and hepatitis E virus (HEV). Other

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causes of hepatitis include alcohol abuse which leads to alcoholic hepatitis, non-alcoholic fatty liver disease (NAFLD) that is associated with obesity and metabolic syndrome, autoimmune diseases leading to autoimmune hepatitis, and medications and toxins resulting in drug-induced hepatitis.

General Causes:

Hepatitis A and E typically spread through the fecal-oral route, often due to consuming contaminated food or water. Hepatitis B, C and D spread through contact with infected blood and body fluids. Their common modes of transmission include unprotected sexual contact, sharing needles or other drug-injection equipment, blood transfusions and organ transplants, and from mother to child during childbirth.

Treatment:

Treatment varies depending on the type of hepatitis. Hepatitis A and E are usually self-limiting, requiring supportive care, such as rest, hydration and proper nutrition. Acute

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cases of hepatitis B may not need specific treatment beyond supportive care. Chronic HBV may require antiviral medications to suppress the virus and liver damage. Hepatitis C is treated with direct-acting antiviral (DAA) medication that can often cure the infection, for example, sofosbuvir and ledipasvir. Hepatitis D is treated with antiviral drugs like those used for HBV and pegylated interferon. The treatment of non-viral hepatitis involves addressing its underlying cause.

Preventive Measures:

Effective vaccines are available for hepatitis A and B. Hepatitis B vaccination also provides protection against hepatitis D. To prevent hepatitis A and E, one has to avoid consuming contaminated food and water, especially when travelling to endemic areas. The spread of hepatitis A and E can also be prevented through practicing good personal hygiene, including regular handwashing. Other preventive measures include ensuring safe sex practices, using sterile needles and equipment, blood screening, and

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limiting alcohal intake and avoiding exposure to hepatotoxic substances.

POLIO:

Definition:

Polio, or poliomyelitis, is a highly infectious viral disease that primarily affects young children. The poliovirus, which causes the disease, can invade the nervous system and lead to paralysis, and in severe cases, it can be fatal.

Symptoms:

Most people infected with poliovirus do not become sick and are asymptomatic. However, in symptomatic cases, the disease can be present in three forms. Subclinical infection with no symptoms or mild flu-like symptoms, such as fever, sore throat, headache, vomiting, fatigue and muscle weakness, can be found in 95% of the cases. Non-paralytic polio, which occurs in about 4-8% of cases, have similar flu-like symptoms and some additional symptoms, such as back pain, neck pain, stiffness in arms and legs, and muscle

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tenderness and spasms. Paralytic polio, which occurs in less than 1% of cases, has initial symptoms similar to non-paralytic polio followed by severe muscle pain and stiffness, rapid onset of paralysis affecting the legs more than the arms, breathing difficulties, and permanent disability or death in severe cases.

Causal Agent:

Polio is caused by poliovirus, a member of the Enterovirus group of the Picornaviridae family. There are three serotypes of wild poliovirus: PV1, PV2 and PV3. All three can cause paralysis.

General Causes:

Poliovirus primarily spreads through the fecal-oral route through the ingestion of contaminated food or water. Less commonly, it can spread through the droplets from a sneeze or cough of an infected person. Moreover, the virus can spread more easily in areas with inadequate sanitation and hygiene.

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Treatment:

There is no cure for polio; treatment focuses on alleviating symptoms and preventing complications. This includes supportive care in the form of bed rest, pain relievers, physical therapy and heat packs for muscle pain. In cases of respiratory muscle paralysis, ventilators may be required. Moreover, braces and corrective surgery may be needed for deformities and mobility issues.

Preventive Measures:

The most effective way to prevent polio is through vaccination. Two types of vaccines are available; inactivated poliovirus vaccine (IPV) and oral poliovirus vaccine (OPV). IPV is used by injection. It is highly effective and used in most developed countries. OPV is administered orally. It is easy to distribute and provides community immunity, but has a rare risk of vaccine-derived poliovirus (VDPV). Moreover, the transmission of polio can be reduced by ensuring access to clean water, proper sanitation and hygiene practices. Public health measures which include surveillance and rapid response to outbreaks.

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such as mass vaccination campaigns in affected areas can also help prevent polio. Global efforts through initiatives like the Global Polio Eradication Initiative (GPEI) have significantly reduced the incidence of polio worldwide, bringing the disease close to eradication.

Good structure, arguments and paper presentation

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