



Study of Diseases like Malaria, Chikungunya and Dengue caused by Mosquitoes in human kind.

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ABSTRACT

Generally mosquitoes are causing various diseases to humans, in the present study we have performed case study on patients suffering from Malaria, Chikungunya and Dengue. Malaria is caused by Plasmodium species and is transmitted via the bites of Mosquitoes. The common symptoms include fever, chills, headache, and vomiting. Diagnosis can be done by rapid diagnosis tests and microscopy. Dengue is an acute infectious disease caused by a flavivirus transmitted by aedes mosquitoes. Symptoms include Sudden, high fever, Severe headaches, Pain behind the eyes, Severe joint and muscle pain, Nausea, Vomiting and Skin rash. Diagnosis can be done by using Polymerase Chain Reaction (PCR) for detecting viral genomic sequence from Serum or Cerebro Spinal Fluid (CSF) samples collected from the patient, which is more expensive and complicated. Chikungunya a febrile disease is caused by a toga virus of the genus Alpha virus. Symptoms include muscle pain, headache, nausea, fatigue, and rash. Diagnosis can be done by Common laboratory tests for chikungunya include for instance RT-PCR and serological tests. We monitor the patients suffering from these studies regarding usage of drugs.

Keywords: Malaria, Chikungunya, Dengue, Plasmodium, flavivirus and toga virus

MALARIA

Malaria is caused by a parasite called Plasmodium, which is transmitted via the bites of infected mosquitoes. In the human body, the parasites multiply in the liver and then infect red blood cells.

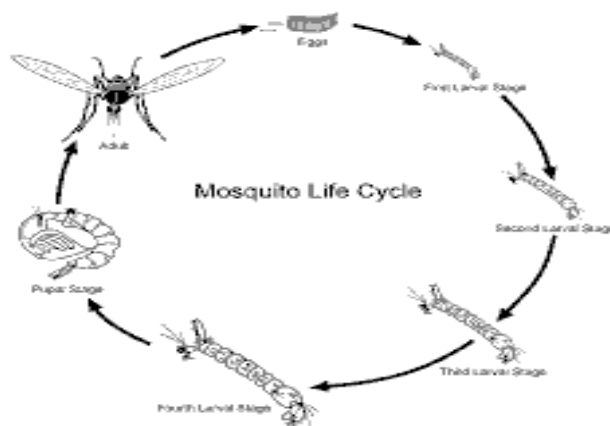
Pathogenesis of malaria

The parasite life cycle illustrates the interplay of parasite and host interactions. Pathogenesis of Plasmodium

falciparum is the area of greatest study, since this species causes the most severe clinical disease (other species include *P. ovale*, *P. vivax*, *P. malariae*, and *P. knowlesi*). *P. knowlesi* malaria can also cause life-threatening illness and although rare, severe illness (including severe respiratory disease and anemia) and death due to *P. vivax* have been reported^[1,2].

The Parasite Life Cycle

- Human malaria occurs by transmission of Plasmodium sporozoites via a bite from an infected anopheline mosquito. The sporozoites travel from the salivary glands of the mosquito through the bloodstream of the host to the liver, where they invade hepatocytes. These cells divide many 1000-fold until mature tissue schizonts are formed, each containing thousands of daughter merozoites. This exoerythrocytic stage is asymptomatic.
- The liver schizonts rupture after 6 to 30 days; 98 percent of patients experience liver schizogony by 90 days (there is typically a longer liver phase in species other than *P. falciparum*). This event releases thousands of merozoites into the bloodstream, where they invade red blood cells (the erythrocytic stage). *P. falciparum* may invade any red cell, while *P. vivax* and *P. ovale* prefer the younger reticulocytes. The merozoites mature successively from ring forms to trophozoites to
 - mature red cell schizonts (asexual forms) over 24 hours (*P. knowlesi*), 48 hours (*P. vivax*, *P. ovale*, *P. falciparum*), or 72 hours (*P. malariae*). Within red blood cells, the parasites digest hemoglobin. As hemoglobin is digested, nontoxic metabolite hemozoin (a polarizable crystal) is formed.
 - The intracellular parasites modify the erythrocyte in several ways. They derive energy from anaerobic glycolysis of glucose to lactic acid, which may contribute to clinical manifestations of hypoglycemia and lactic acidosis. Parasites reduce red cell membrane deformability, resulting in hemolysis and accelerated splenic clearance, which may contribute to anemia. Alterations to uninfected red blood cells, such as the addition of *P. falciparum* glycosyl phosphatidyl inositol (GPI) to the membrane, may play a role in increased clearance of uninfected cells and contribute to anemia.



Symptoms

Symptoms of malaria include fever, headache, and vomiting, and usually appear between 10 and 15 days after the mosquito bite. If not treated, malaria can quickly become life-threatening by disrupting the blood supply to vital organs. Symptoms usually begin 10 days to 4 weeks after infection^[1,2].

Complications

Malaria is a serious disease that can kill people if it is not diagnosed and treated quickly, particularly pregnant women, babies, young children and the elderly. Why

malaria is a serious disease and what could be the resulting complications. In India, the most common species that cause malaria are *Plasmodium falciparum* and *Plasmodium vivax* and most cases of complications are seen in falciparum malaria. It may also happen that a patient directly presents to a doctor with a complication due to delayed diagnosis.

1. Cerebral malaria: In some cases, the malaria parasite can affect the brain and cause brain damage. This is known as cerebral malaria and can lead to paralysis and even permanent damage to the brain.

2. Acute Respiratory Distress syndrome (ARDS):

Most common complication of malaria is respiratory distress or breathing problems. It is seen widely in children who suffer from severe malaria.

3. Convulsions: Convulsions can be associated with cerebral malaria but high fever can also contribute to it.

4. Haemolysis: The malaria parasite is capable of destroying the RBCs completely. This lead to severe haemolysis in some patients. Hemoglobin released from the destroyed RBCs can even enter organs like kidneys and cause kidney failure.

Diagnosis

Rapid diagnostic tests

Malaria rapid diagnostic tests have the potential to significantly improve management of malaria infections, especially in remote areas with limited access to good quality microscopy services.

Microscopy

Microscopy remains the mainstay of malaria diagnosis in most large health clinics and hospitals but the quality of microscopy-based diagnosis is frequently inadequate^[2,3].

Treatment

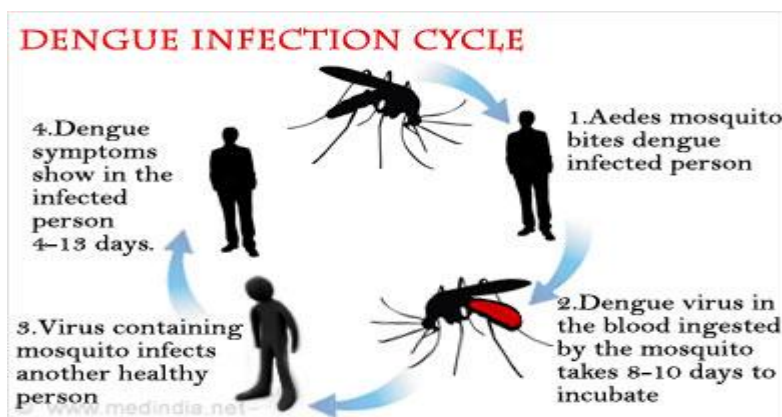
The most common antimalarial drugs include, Chloroquine (Aralen), Quinine sulfate (Qualaquin), Hydroxy chloroquine (Plaquenil), Mefloquine, Combination of atovaquone and proguanil (Malarone)^[4]

DENGUE

An acute infectious disease caused by a flavivirus (species Dengue virus of the genus Flavivirus), transmitted by aedes mosquitoes, and characterized by headache, severe joint pain, and a rash called also break bone fever, dengue fever.

Dengue Virus Replication and Infectious Cycle

The dengue viral replication process begins when the virus attaches to a human skin cell. After this attachment, the skin cell's membrane folds around the virus and forms a pouch that seals around the virus particle. This pouch is called an endosome. A cell normally uses endosomes to take in large molecules and particles from outside the cell for nourishment. By hijacking this normal cell process, the dengue virus is able to enter a host cell.



Symptoms of dengue

Symptoms, which usually begin four to six days after infection and last for up to 10 days, may include Sudden, high fever, Severe headaches, Pain behind the eyes, Severe joint and muscle pain, Nausea, Vomiting, Skin rash, which appears three to four days after the onset of fever and mild bleeding (such a nose bleed, bleeding gums, or easy bruising)^[4,5].

Complications Involved with Dengue

Dengue causes the dengue fever, which sometimes may develop into more dangerous forms such as dengue haemorrhagic fever or dengue shock syndrome, which may lead to the development of life-threatening symptoms. Some of the complications caused due to the disease are Severe dehydration, Continuous bleeding, Low platelets, due to which clotting of blood doesn't occur, Blood pressure may go dangerously low,

Enlargement of liver and damage to it, Brady cardia (heart beating less than 60 counts per minute), Damage to brain due to bleeding, seizures or encephalitis and Damage to the immune system.

Diagnosis

Diagnosis of dengue infection can be done by the following methods:

- Isolating the virus by collecting serum sample from patients within 5 days of appearance of symptoms
- Detection of specific antibodies can be done by collecting serum within 6 days after onset of symptoms. The serum is tested for specific anti-dengue antibodies by Enzyme-linked Immunosorbent assay (ELISA). Titres of IgM and IgG antibodies increase four-fold in serum sample

Using Polymerase_Chain_Reaction_(PCR) for detecting viral genomic sequence from Serum or Cerebro Spinal Fluid (CSF) samples collected from the patient, which is more expensive and complicated^[6,7].

Treatment for Dengue

There are actually no known antiviral drugs or injections available for the cure of dengue. However, the disease can be treated with plenty of supportive care and treatment that would eventually help save the patient's life. Dengue is characterized by fever and intense body ache. The fever can be treated with antipyretic drugs such as paracetamol and the body ache can be treated with analgesics that help relieve the pain. Drugs such as aspirin and ibuprofen should be avoided as they may increase the risk of hemorrhage. The patient can also be treated with natural home remedies such as papaya leaves, kiwi and other food items that have been proven to help in the increase of platelet count, which gets affected during dengue^[8,9].

CHIKUNGUNYA

A febrile disease that resembles dengue, occurs especially in parts of Africa, India, and southeastern Asia, and is caused by a toga virus of the genus Alpha virus (species Chikungunya virus) transmitted by Alpha virus.

Pathophysiology

- The exact Pathophysiology of Chikungunya virus remains to be investigated. To date, most of the

research in this field has been from the Indian subcontinent and other Asian countries.

- Chikungunya virus infection has a clinical presentation that overlaps with that of Ross River virus infection (fever, rash, polyarthritis) and dengue fever virus transmitted by the same mosquitoes. Evaluation of the T-cell- and B-cell-mediated immunity has shed light on some possible mechanisms.
- Using a murine model, Lum et al have shown that anti-Chikungunya virus antibodies were elicited early in the course of the illness and were directed against the C-terminus of the viral E2 glycoprotein. They showed that both natural and Chikungunya virus infection-induced specific antibodies were essential for controlling Chikungunya virus infections^[4,10].

Symptoms

Chikungunya is characterized by an abrupt onset of fever frequently accompanied by joint pain. Other common signs and symptoms include muscle pain, headache, nausea, fatigue and rash. The joint pain is often very debilitating, but usually lasts for a few days or may be prolonged to weeks. Hence the virus can cause acute, subacute or chronic disease.

Diagnosis

Common laboratory tests for chikungunya include for instance RT-PCR and serological tests.

Treatment

There is currently no effective antiviral treatment for Chikungunya. Treatment is therefore purely symptomatic and is based on non-salicylate analgesics and non-steroidal Anti-inflammatory drugs. Synergistic efficacy was reported between interferon- α and ribovirin on Chikungunya virus in vitro.

Common drugs for chickengunya

Paracetamol, Ambroxol, Levocetirizine, Phenylephrine, Diclofenac Potassium, Serratiopeptidase, Cetirizine, Pseudoephedrine^[10,11].

Prevention

Pending vaccine development, the only effective preventive measures consist of individual protection against mosquito bites and vector control. Control of

both adult and larval mosquito populations uses the same model as for dengue and has been relatively effective in many countries and settings. Mosquito control is the best available method for preventing chikungunya. Breeding sites must be removed, destroyed, frequently emptied, and cleaned or treated within septicides. 65 Large-scale prevention campaigns

using DDT have been effective against *A. aegypti* but not *A. albopictus*.

Details of Patients

We have done case study of Malaria, Chikungunya and Dengue patients in Guntur nursing home under the guidance of Dr. Joship Rani for few patients.

S.No	Patient name	Gender	Age	Disease	Prescription	Dose in daily
1	N.Venkateswa reddy	Male	46	Malaria	E-mol Campoules-3 Monosef(1gm),Viales-6,Becocell-10,Dolo-650 tablets-9	3 Days
2	S.Raja rao	male	40	Malaria	Chloroquine	7days
3	k.Shirisa	Female	15	malaria	Quinine sulfate(qualaquin) E-mol Campoules-3	5 days
4	J.Srinivas	Male	22	Malaria	Monosef(1gm),Viales-6,Becocell-10,Dolo-650 tablets-9	3 Days
5	P.Narayanamma	Female	63	Malaria	Chloroquin combinations	15 Days
6	T.Nagalaksmi	Female	54	Chikungunya	Paracetamol, Ambroxol, Levocetirizine, Phenylephrine Paracetamol, Diclofenac	7 days
7	D.Anil reddy	Male	56	Chikungunya	Potassium, Serratiopeptidase	10 days
8	N.Sanyasi rao	Male	66	Chikungunya	Dolonex-5 Olaxacin-5	5 Days
9	R.Syamuuel	Male	43	Degue	Falsigo 120mg Mebet-1.5gms	3 Days

CONCLUSION

The aim of the present project is to aware the people about their health and we followed the best quote that "Prevention is better than cure".

In this way we worked a lot to find the preventive measures of some common and susceptible diseases like

Malaria, Chikungunya and Denu, however there is no standard prescription for these diseases because several factors should be maintained while giving treatment. This is the exact reason why we concentrated more on preventive measures than prescription.

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