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Review Article

Role of homoeopathy of AYUSH in dengue fever

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ABSTRACT

In 21st century, dengue came to the limelight. Earlier, it was taught that this is one of the eruptive fevers in human beings where in dengue, the eruption appears typically on the 6th day of the fever. Knowledge and approaches to dengue took a paradigm shift in 21st century. It came to be clubbed under the National Vector Borne Disease Control Program. A mosquito borne single stranded RNA virus is the leading cause of arthropod borne viral diseases like dengue globally. All the types of dengue virus are capable of inducing severe diseases like dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS). No one wants to be in DHF or DSS stage as these are mortal stages while other stages are morbid. A vector borne disease (VBD) transmitted by mosquito has no specific cure in modern medicine. To add to that, the issue of platelet transfusion that is made universal because of the inherent panic does more harm than good. It is here that homoeopathy has a role to play therapeutically. The article discusses the disease and the related physiology as well as pathology that goes inside the body during an episode of dengue fever. Along with the diagnosis and management approaches, the article elicits the role of homoeopathy through a suggested treatment protocol. Through the inherent properties of homoeopathy such as cost effectiveness, clinical effectiveness and zero side effects, the article proposes large scale application of homoeopathy at all levels.

Keywords: Dengue, DENV, Homoeopathy, IgM, NS1, Platelets

INTRODUCTION

Viruses are tiny agents that can infect a variety of living organisms, including bacteria, plants, and animals. Like other viruses, the dengue virus is a microscopic structure that can only replicate inside a host organism.[1-3]

The dengue viruses are members of the genus *Flavivirus* in the family *Flaviviridae*. Along with the dengue virus, this genus also includes a number of other viruses transmitted by mosquitoes and ticks that are responsible for human diseases. *Flavivirus* includes the yellow fever, West Nile, Japanese encephalitis, and tick-borne encephalitis viruses.[1-3]

In 1943, Ren Kimura and Susumu Hotta first isolated the dengue virus. These two scientists were studying blood samples of patients taken during the 1943 dengue epidemic in Nagasaki, Japan. A year later, Albert B. Sabin and Walter Schlesinger independently isolated the dengue virus. Both pairs of scientists had isolated the virus now referred to as dengue virus 1 (DEN-1).[1-3]

As per World Health Organization (WHO), nearly half of the world's population is at the risk of dengue. It is

estimated that there are 100-140 million infections every year.[4]

SOME REVIEWS

Each dengue outbreak starts with high death and morbidity that has a significant socioeconomic impact. As of September 2022, India had 63, 280 dengue cases as per National Centre for Vector Borne Disease Control (NCVBDC). Among all regions, North India is most severely impacted by each outbreak.[1]

As the fear of DHF and DSS spread, people panic and such panic was observed during the dengue epidemic in Delhi in 1999. A study on this epidemic found that there was 56.2% of inappropriate platelet transfusion among the cases in the hospitals. Many times the prescription for this blood component were not based on medical rationale but as a response to an intense social pressure on the treating physicians by the patients and their relatives.[5]

Another study suggests that high risk patients with platelet count less than 20,000/cu mm require urgent platelet transfusion. Those with 21-40,000/mm^3 are in moderate risk and require platelet transfusion only if they have any hemorrhagic manifestations and other super added conditions.[6]

Another study cites that bleeding during DHF may result from a combination of factors such as thrombocytopenia, coagulation defects and vasculo-pathy.[7]

A study in the current year 2023 has found that eggs of the *Aedes aegypti* survive dehydration for months and thus desiccation by rewiring their polyamine and lipid metabolism. The study cites that it is fundamental to understand *Aedes* embryo survival and in controlling the spread of these mosquitoes.[8] Hence, it is evident that the mosquito control measures need to be aggressive and for longer periods to control dengue fever.

The current Conference of Parties (COP) 28 held in the first week of December 2023 focused on resilience of public health to climate change. Changing weather patterns and rising temperatures are altering the life cycle of vector borne diseases such as dengue and malaria that disproportionately impact poorer and marginalized groups. The spread of dengue has increased in India over the last two decades as per studies. Climate change is influencing the incidence of *Aedes aegypti* and *Aedes albopictus* mosquito-borne dengue illnesses.[9,10]

THE DENGUE SEROTYPES

Dengue infections are caused by four closely related viruses named DEN-1, DEN-2, DEN-3, and DEN-4. These four viruses are called serotypes because each has different interactions with the antibodies in human blood serum. The four dengue viruses are similar as they share approximately 65% of their genomes but even within a single serotype, there is some genetic variation. Despite these variations, infection with each of the dengue serotypes results in the same disease and range of clinical symptoms.[2,3,6-8]

In the 1970s, both DEN-1 and DEN-2 were found in Central America and Africa, and all four serotypes were present in Southeast Asia. By 2004, however, the geographical distribution of the four serotypes had spread widely. Now all four dengue serotypes circulate together in tropical and subtropical regions around the world. The four dengue serotypes share the same geographic and ecological niche. Scientists hypothesize that the dengue viruses evolved in nonhuman primates and jumped from these primates to humans in Africa or southeast Asia between 500 and 1,000 years ago.[2,3,6-8]

In October 2013, a fifth variant, DENV 5 was reported from samples taken from Sarawak state of Malaysia. After being infected with a serotype, a person is immune to re-infection with the same serotype. However, infection with a different serotype can occur later because heterologous immunity is short lived.[11,12]

PATHO-PHYSIOLOGY, SYMPTOMS

In the current season of dengue in 2023, it is found that the DENV-2 strain is in circulation in India. Its symptoms are similar to all other variants of dengue with patients more prone to DHF and DSS. Timely diagnosis and timely intervention will reduce the number of high risk cases in which the platelets drop significantly.[2,3,6-8,13,14]

Regarding symptoms, cases show sudden onset of persistence high grade fever. The infection is characterized by severe muscle spasms, joint pain, fever or particularly 7-day fever because of the usual duration of symptoms. The accompanied symptoms are nausea, pain in the eye socket, severe fatigue, bodyache, abdominal pain, bone pains and rashes. At this stage, platelets do not fall but the white blood corpuscles (WBC) fall. If the fever progress having been undiagnosed, the liver complains follow. These are pain in the liver, vomiting, mucosal bleeding, reduced urination and low blood pressure. The peripheral blood picture (PBP) shows increase in red blood corpuscles (RBC) and a decrease in platelets.[2,3,6-8,11-14]

In severe cases like DHF, the patient has severe plasma leakage leading to a haemorrhagic shock, fluid retention in the pleural, abdominal cavities with severe breathing difficulty. All these complications lead to severe bleeding and eventually organ failure.[2,3,6-14]

Increased vascular permeability resulting in intravascular volume lowering and shock is usually observed in 2-4% of cases. Due to re-infection by another dengue virus serotype and the pathological immune response of the body and shock occurs in patients with DHF. According to research, antibodies to one dengue virus serotype react

with another type of dengue but fail to neutralize it. This results in the formation of antibody-virus complex.[11-16]

The fragment crystallizable (Fc) part of these antibodies binds to their corresponding receptors expressed in immune cells, resulting in the proximity of the virus and the cell thereby aiding infection and proliferation of the virus.[11-16]

This pathological process is known as antibody dependent enhancement (ADE) that plays a critical role in the pathogenesis of shock in dengue. The monocyte or macrophage is central to the pathogenesis of DHF and DSS. Various inflammatory factors are released by monocytes that increase vascular permeability. Besides monocytes, cluster differentiation 4 (CD4) thymus (T) cells also have a crucial role in DHF and DSS.[11-16]

Human cytotoxic factor (HCF) produced by these T cells induces macrophages to produce free radicals, nitrite and reactive oxygen species (ROS) further catalysing inflammation. Thromboplastin produced during this hyper activation increases vascular permeability and leads to decreased circulating blood volume in blood vessels. As an after effect, blood becomes more concentrated. The human body is adapted to make up for 10-15% loss of circulatory blood volume. A loss more than 20% leads to shock which is known as hypovolemic shock. When the loss is above 35-40% it leads to complete abrogation of blood pressure.[11-16]

Increased vascular permeability combined with coagulopathy, suppressed myocardial function, respiratory distress and dehydration contribute to DSS and thus leading to multi organ failure. DSS is many times sudden, dramatic and rapidly progressive.[11-16]

The dengue virus has a 2–14-day incubation period (IP) but usually the signs and symptoms are manifested between 4-7 days. In most of the cases, the cases feel better after the fever subsides in 4-5 days. Hydration is critical during this period for all cases. If not hydrated well, complications arise after this 4-5-day stage. Dehydration is the worst enemy of the body during dengue fever. An intake of 3-5 litres of water a day will prevent hospitalization in most of the cases. Here, patients with liver and kidney diseases need to be under medical supervision regarding water intake.[2,3,5-14]

DIAGNOSIS

As mentioned above, hydration is the most critical element in the management of dengue, early and prompt diagnosis is critical as well. That's why all the current fever cases must take the dengue test that detects the non-structural protein 1 (NS1) of the dengue virus that is secreted into the blood during the acute infection. Ideally, it is preferable that the test is done within the first 2 days of infection to get a quick diagnosis in the initial stages of the disease.[2,3,5-8,11-14]

Following that, ideally on the 5th day of infection, it is essential to take the IgM (immunoglobulin M) anti body test as the immune system fights the disease for the first 5 days of the disease. During the end of 4th or the 5th day, the IgM antibodies are detectable after onset of symptoms. These antibodies continue to remain in the blood and can be detected for the next 12 weeks. This is the way the immune response works in the body in case of an infection. In the primary response to a stimulus, here dengue fever, the body produces IgM during the induction period of 3-10 days in which it peaks in the initial 3 days and declines. After this, the IgG antibody takes over.[2-14]

Simultaneously, the patient should get a complete blood count (CBC) that may have to be repeated on alternate days or even every day to check for platelet levels. Along with that, liver function tests (LFT) should be done as liver markers are deranged during dengue. One of the most important markers is the packed cell volume (PCV) that is a measure of blood viscosity.[2,3,6-14]

Once the blood viscosity rises, the platelets count dip. This phenomenon indicates an increase in RBCs or dehydration. The common knowledge on dengue focuses on platelets but the concept of hemo-concentration is also critical. It is a marker of the severity of infection. This is often indicative of leaking of plasma in the blood that causes fluid accumulation in abdomen and lungs. This is the result of severe dehydration and at this stage the case needs intra-venous (i.v.) fluids to increase the blood volume thereby preventing the case to go to shock.[2-16]

TREATMENT

There is no specific treatment for dengue fever in modern medicine. Paracetamol is given every six to eight hours to reduce fevers. If someone uses painkillers or non steroidal anti-inflammatory drugs (NSAID) brings the platelet count further down. This can cause breathing difficulties. Antibiotics are useless as the fever is viral. Hospitalization is essential if the platelet count falls to 50,000/mm^3 with bleeding and low blood pressure. As discussed above, a platelet transfusion is required only when platelets fall low to less than 20,000/mm^3 with bleeding.[1-16]

HOMOEOPATHIC APPROACH

Homoeopathy of the ministry of AYUSH has effective and specific cure for dengue fever cases. The treatment does not allow the platelets to go down thereby preventing hemorrhage and shock, the process that has been mentioned above. One of the issues with the dengue fever is that attack by one serotype does not offer immunity from other serotypes. This is where homoeopathy can play an active role as it will nullify the chances of re-attack in each dengue case.[17-26]

The treatment protocol is described according to the symptoms and manifestations mentioned in the previous sections. This treatment protocol becomes the need of the hour in view of the viral issues that lingers on because of COVID 19. The protocol adheres to all the qualities of essential medicines as per the NLEM and the NLEAM.[27-30]

As it is a viral fever, the drugs for the fever are 'ferrum phos', '*Brucella melitensis*', 'acetanilidum'. 'septicimin', 'sulpur hydrogenisatum', 'staphyloccocin', 'streptococcin'. Among mother tinctures, '*Swertia chiraita*' and 'cedron' can be prescribed.[17-26]

For bone pains, drugs like 'eupatorium perf', 'ipecac', 'asafoetida', 'symphytum', 'terminalia arjuna' can be prescribed both in mother tinctures and potencies.[17-26]

For nausea 'cascarilla' for and vomiting, drugs like '*Amygdalus persica*', '*Symphoricarpus racemosa*' and 'acetic acid' can be given in mother tinctures and 'cerium metallicum' can be prescribed in potencies.[17-26]

For muscular pains, drugs like 'bellisper', 'rhustox' and 'arnica' in mother tinctures can be given.[17-26]

For pain in the eye socket, drugs like 'comocladia' and 'ruta' can be prescribed.[17-26]

To ensure that platelets do not go down, drugs like 'bothrops', '*Crotalus horridus*', 'leucas aspera', 'echinacea', '*Azadirachta indica*', 'aqua marina', 'micromeria' can be prescribed.[17-26]

As the process involves falling of WBCs, drugs like 'baptisia', 'acid mur', 'chloramphenicol', 'eucalyptus', 'tetracycline', 'toxoplasmosis' can be prescribed. In mother tinctures, '*Embelica officinalis*', '*Terminalia batterica*' and '*Terminalia chebula*' can be prescribed.[17-26]

In case of altered liver that is confirmed through LFT, drugs like 'ferrum ars', 'ferrum iod', 'myrica' and 'managnum sulph' and '*Yucca filamentosa*' can be prescribed.[17-26]

Among bowel nosodes, 'coccal co' can be prescribed as it will reduce infection. 'Morgan co' can be prescribed to reduce the acute congestion in the body.[23,28]

Among bach flower remedies, 'mimulus' and 'rescue remedy' can be given to reduce fear of dengue.[26]

It is to be noted that this is an 'acute miasm' where the total intervention period is only one week. Along with rehydration management at home, all these set of drugs have to be considered. The homoeopath has to decide the preferred drug from each category. Here, the 'similimum' or the single remedy approaches will not work.[17-26]

We do not know the immunity level of each individual. In order to ensure that the body produces enough IgM antibodies to fight dengue, all the members of the Homoeopathic fraternity needs to adhere to the treatment protocol.[10-26]

CONCLUSION

As all drugs in homoeopathy have a group of mental as well as physical symptoms. Homoeopathy is and will be effective against all viral diseases in general as it takes care of not only the mental/psychological issues but also the internal inflammation as well. However, it should be also seen that along with constitutional/deep acting/polychrest homoeopathic medicines, specific medicines that cover all aspects of dengue are also required to deal with the cases.

It should be ensured that nutrition, counselling, rehydration and all psychic health modalities like life style modification, diet and stress reduction are adhered in each case. In fact, the detailed Materia Medica of homoeopathy has drugs for each of the phenomenon or complications that occur in the body during acute dengue fever. Hence, as a part of treatment for dengue, the supportive therapy like rehydration and temperature control is to be prioritized in each case.

To get optimal results, the homoeopathic fraternity should be ready to cover the dengue cases among masses as there is no other therapeutic system that can cover the masses effectively both therapeutically and economically.

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