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Efficacy of Ayurvedic medications over contemporary management in Dengue

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ABSTRACT

Dengue is a fast emerging pandemic prone viral disease in many parts of the world. This mosquito borne viral infection, having a prevalence up to 50-100 million annually among 100 endemic countries, putting almost half of the world's population. The typical features of this fever includes sudden onset of fever, frontal headache, retro orbital pain, back pain, myalgia and transient macular rashes in first day. In a small number of cases, the disease develops into the life threatening dengue hemorrhagic fever, resulting in bleeding, low levels of blood platelets and plasma leakage or into dengue shock syndrome, where dangerously low blood pressure occurs. In Ayurvedic perspective, Acharya Charaka has explained *Abhishangaja Jwara*, one among the *Agantuja Jwara*, in which *Bhutas* are told to be one of the cause. Acharya Madhavakara has mentioned *Vishama Jwara* is having *Bhuthanubandha*. *Agantuja Jwara* is mostly *Dhatu Ashraya*. Hence *Koshtasrita Dosh Chikitsa* alone cannot give success. In the case of dengue, *Rasa* and *Rakta Dhatu* are mainly affected. Also the signs and symptoms are more or less similar to these *Dhatu Vikara*. Hence the aim of the treatment is to restore the *Prakrita Karma* of these *Dhatu*.

Key words: Dengue, Agantuja Jwara, Abhishangaja Jwara.

INTRODUCTION

Dengue is a mosquito-borne viral infection. The virus responsible for causing dengue is called dengue virus (DENV). There are four types of DENV serotypes (DENV1, DENV2, DENV3 and DENV4). Dengue virus is transmitted by female mosquitoes mainly of the species *Aedes aegypti* and to a lesser extent, *Ae. albopictus*. These mosquitoes are also the vectors of *Chikungunya*, yellow fever and Zika viruses. Dengue is

common in tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas. The global incidence of dengue has grown dramatically in recent decades. About half of the world's population is now at risk with an estimation of 390 million infections each year. In India from 2017-2018, there has been a decline in dengue cases and deaths from 188401 to 89974 and 325 to 144 respectively. There is no specific treatment for dengue/severe dengue. Early detection of disease progression associated with severe dengue, and access to proper medical care lowers fatality rates of severe dengue to below 1%. In complicated conditions there may be chance of occurrence of Dengue hemorrhagic fever and Dengue shock syndrome.

Acharya Charaka introduces *Jwara* as a disease entity causing *Dehe Indriya Mana Santapa* and as *Sarvaroga Agraja*. In Ayurvedic perspectives, Dengue comes under the category of *Abhishangaja Jwara*, predominantly *Pittaja* in pathological ground. The complications represent *Raktaja* and *Sannipataja Jwara*.

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According to *Ayurveda*, due to the *Nidana Sevana*, *Dosha* get vitiated. These *Dosha* after reaching *Amashaya* combines with *Ama* and causes obstruction to nearby *Srotas* (*Rasavaha Srotas*). As a result of this obstruction, *Shotha* is manifested in *Antharika Amashaya Kalas*. While the disease progress, the *Pitta* will cause *Paka* to this *Shotha*. Hence the basic treatments should be both *Shophahara* (*Prathisara Chikitsa*) and *Pitta Shamana* (*Nirvapana Chikitsa*). While coming to dengue fever it can be considered as *Agantuja Abhishangaja Jwara*, where the *Roga Bija* is from outside. Here along with the basic line of treatment, the physician should need to employ other symptomatic remedies (antipyretic, rehydration, hemostasis etc.) also according to the condition of the patient.

Pathogenesis^[1]

Dengue may be caused by any of the dengue viral serotypes. Generally, infection with one serotype confers future protective immunity against that particular serotype but not against other serotypes. Furthermore, when infected for a second time with a different serotype, a more severe infection may occur. This is due to a phenomenon referred to as antibody dependent enhancement, where antibodies against the first serotype enhance infection with the second serotype. However, as only 2%-4% of individuals with a secondary dengue infection develop severe disease, antibody dependent enhancement alone cannot wholly explain this process. At present, reasons as to why only some individuals develop symptomatic infection are not known, but active research is being pursued by several groups to clarify such mechanisms.

After the bite of an infected mosquito, the dengue virus enters the body and replicates within cells of the mono-nuclear phagocyte lineage (macrophages, monocytes, and Bcells). Additionally, infection of mast cells, dendritic cells, and endothelial cells are known to occur. The incubation period of dengue infections is 7-10 days. A viraemic phase follows where the patient becomes febrile and infective. Thereafter, the patient may either recover or progress to the leakage phase, leading to DHF and/or dengue shock syndrome. Peak

plasma viraemia correlates with the severity of dengue infections. Differences in antibody, cytokine, and T-cell responses are seen among patients with uncomplicated dengue fever or DHF/dengue shock syndrome.

Clinical Features

Dengue fever

Dengue fever may occur either during primary or secondary infections. The onset is sudden with high fever, severe headache (especially in the retro-orbital area), arthralgia, myalgia, anorexia, abdominal discomfort and sometimes a macular papular rash. The fever may be biphasic and tends to last for 2-7 days.^[2] Flushing, a characteristic feature is commonly observed on the face, neck, and chest. Coryza may also be a prominent symptom especially in infants.^[3] Younger children tend to present with coryza, diarrhoea, rash and seizure and less commonly with vomiting, headache and abdominal pain.^[4] Although, haemorrhagic manifestations are uncommon in dengue fever, petechiae/pupura, gastrointestinal bleeding, epistaxis, and gingival bleeding have been observed in some individuals.^[2] A positive tourniquet test has been reported in many individuals with dengue fever possibly due to reduced capillary fragility.^[5] Recovery from dengue fever is usually uneventful, but may be prolonged especially in adults.^[6]

Dengue haemorrhagic fever

DHF usually follows secondary dengue infections, but may sometimes follow primary infections, especially in infants. In such infants, maternally acquired dengue antibodies are presumed to enhance primary infections.^[7] Such a phenomenon has not been described in human infections other than dengue.

DHF is characterised by^[8]

General

- High fever, intermittent.
- Severe headache (especially retro-orbital).
- Flushing.

- Myalgia and arthralgia.
- Vomiting.
- Anorexia.
- Acute abdominal pain.

Bleeding manifestations

- Epistaxis.
- Bleeding from gums.
- Petechiae and ecchymoses.
- Haematemesis and melena.
- Spotting or menorrhagia in females.

Features of plasma leakage

- Circulatory disturbances (low blood pressure, tachycardia, narrow pulse pressure, and poor capillary refill time).
- Periserositis (pleural effusions, ascites sometimes pericarditis).

Complications

- Encephalopathy and encephalitis.
- Liver failure.
- Myocarditis.
- Disseminated intravascular coagulation leading to a massive bleeding.

The WHO case definition of DHF

A patient with the following four criteria:

1. Acute sudden onset of high fever for 2-7 days.
2. Haemorrhagic manifestations with at least a positive tourniquet test.
3. Platelet count $<100 \times 10^9/L$
4. Haemoconcentration (rising packed cell volume. 20%) or other evidence of plasma leakage for example, ascites, pleural effusions, low level of serum protein/albumin.

For purposes of description DHF is divided into three phases - namely: febrile, leakage and convalescent phases. Furthermore, according to severity DHF is divided into four grades.

Grade I : No shock; only positive tourniquet test.

Grade II : No shock; has spontaneous bleeding other than a positive tourniquet test.

Grade III : Shock.

Grade IV : Profound shock with unmeasurable blood pressure or/and pulse.

Management

Management of dengue infections is mainly symptomatic, as there are no specific drugs effective against the dengue virus. Proper maintenance of fluid balance is a cornerstone in management (table 1). Early identification of the leakage phase with prompt resuscitation helps to reduce complications and improve outcome. Mortality rates have been low in patients admitted early to hospital before the onset of shock.^[9]

Dengue fever

- Temperature control: Paracetamol (60 mg/kg/day), tepid sponging
- Light diet
- Monitor for progression to DHF by monitoring platelet count and packed cell volume

Grade I and II DHF

- Intravenous fluids: Hartmann's solution, 5% dextrose in normal saline.
- Electrolytes: Monitor electrolytes in those with altered level of consciousness.
- Temperature control: Paracetamol (60 mg/kg/day), tepid sponging.
- Monitor: Vital signs, urine output, and level of consciousness, packed cell volume, and platelet counts, liver enzymes.
- Observe: Haemorrhagic manifestations (petechiae signs of gastrointestinal tract bleeding).
- Stop fluids: When patient recovers from the leakage phase.

Grade III and IV DHF and dengue shock syndrome

- Intravenous fluids: Crystalloids (Hartmann's solution, 5% dextrose in normal saline) and colloids. (dextran 40, fresh frozen plasma, or gelafundin) several intravenous boluses may be needed.
- Monitor: Vital signs, urine output, level of consciousness, packed cell volume, and platelet counts every 10–15 minutes.
- Give oxygen
- If significant bleeding occurs give platelet. (depends on the amount of bleeding)
- Correct electrolyte and metabolic abnormalities

According to Ayurveda Dengue can be understood at the levels

According to *Susrutha Samhita*, *Agantuka Karana* or *Parahetu* leads to *Vishama Jwara*. *Dalhana* explained *Parahetu* as *Bhutabhishanga*. *Bhuta* stands for "Antargate Shareere Upadrava Kaarino Janthu Visheshha". *Vyadhikshamatva* plays a major role here. Individuals who are exposing to this pathogen may not get disease if his/her immunity is at good.

The concept of epidemics is very well defined and established in Ayurveda. *Charaka Samhita* had mentioned epidemic conditions under the heading of 'Janapadodwamsa'. Numerous methods of prevention and controls of epidemics, measures for environmental sanitation finds an important place in Ayurveda. It has also been mentioned that the natural course of disease and its treatment may vary according to the period, geographical extent, ecoclimatic conditions, psychosomatic constitution of an individual and so on.

Dandaka Jwara

Description of dengue as *Dandaka Jwara* is found in the *Parishishta* chapter of *Madhava Nidana*. It has been described that a particular species of mosquito is the basic cause of spread of fever called *Dandaka Jwara*. This fever mostly subsides within a week;

however, it is more dangerous for the children and old people.^[10]

Nidana

Main cause of *Dandak Jwara* is toga virus which spread in body through *Aedes Aegypti* mosquito.

Premonitory symptoms (Purvarupa)

Angmarda (bodyache), *Klama* (tiredness without exertion), *Aruchi* (anorexia), *Avsaada* (depression).

Symptoms

Severe breaking pain in bone and joints. High temperature of 103° to 105° F. may occur which gets subside and may relapse again within three to four days (Saddle back fever). On 8th day, it subsides on its own. Severe pains in bones, difficulty in walking, slow pulse, excessive weakness, loss of appetite are common symptoms. During fever, pulse is not proportionately as fast as it should be with fever. Symptoms of common cold (*Pratishyaya*) cough and throat pain are also common symptoms of *Dandaka Jwara* which becomes endemic due to virulence of *Kapha* and *Vata Dosha*.^[11]

Management according to Ayurveda

According to Ayurveda, *Samprapti Vighatana* is considered as *Chikitsa*. Hence *Ama Pachana* (removes the *Shopha* occurred due to *Ama* at *Srotomukha*) and *Pitta Shamana Chikitsa* are considered as the basic treatment in *Nija Jwara*. While coming to dengue fever, it can be considered as *Agantuja Abhishangaja Jwara*, where the *Roga Bija* is from outside. *Agantuja Jwaras* are *Dhatu Ashraya*. Here along with the basic line of treatment, the physician should need to employ other symptomatic remedies (antipyretic, rehydration, hemostasis etc.) also according to the condition of the patient. Drugs which improve the Quality of Life (QOL) and vector control measures are also beneficial in the management of Dengue.^[12]

A) Symptoms modifier - The agents that alleviate symptoms are categorized under symptom modifier. Some of the oftenly used medicines for *Parsvasula, Jwara, Sandhi Vedana* and *Jirna Jwara* are *Dashamula*

Kwatha,^[13] *Patoladi Kwatha*,^[14] *Maharasnadi Kwatha*^[15] and *Arogya Vardini Gutika*^[16] respectively.

B) General health promoting agents - The agents that improve Quality of Life (QOL), provides strength or resistance against the disease and facilitate early recovery are classified under General Health Promoters. - *Aswagandha*, *Amalaki*, *Guduchi*, *Yastimadhu*.

1. *Balya* (Tonic)

2. *Rasayana* (Immunomodulator)

Madhava Nidana (*Madhukosha* commentary) has explained about *Satata Jwara* where *Doshas* get *Ashraya* in *Rakta* predominantly. The *Kashaya*^[17] prepared out of *Patola*, *Sariva*, *Musta*, *Patha* and *Katukarohini* is specifically told for this condition .

SN	Dravya	Guna
1.	<i>Patola</i>	<i>Shoolagni</i> and <i>Jwara Nashini</i> (Sho.Ni). <i>Tridosha Jwara</i> , <i>Dipana Pachana</i> and <i>Krimigna</i> (Kai.Ni). <i>Raktapithahara</i> (Ra.Ni).
2.	<i>Sariva</i>	<i>Vishama Jwara Nashini</i> , <i>Shiro Arthigni</i> (Sho.Ni). <i>Rakthapithahara</i> and <i>Jwarahara</i> (Dha.Ni).
3.	<i>Mustha</i>	<i>Agroushadi</i> for <i>Jwara</i> (Ash.Hri Su). <i>Pithajwaragna</i> , <i>Athisaragna</i> and <i>Krimivinashini</i> (Dha.Ni). <i>Aruchinashana</i> (Kai.Ni).
4.	<i>Patha</i>	<i>Vishagni</i> , <i>Chardhinuth</i> , <i>Tridoshajith</i> , <i>Athisara Shoolagni</i> (Dha.Ni).
5.	<i>Katukarohini</i>	<i>Vishamajwara Nashini</i> (Dha.Ni). <i>Asradoshajith</i> (Ra.ni).

▪ Fumigation done with *Aparajitha Dhupana*^[18] *Dravyas* can be adopted as a prophylactic measure. The drugs include *Pura*, *Sarja*, *Agaru*, *Devdaru*, *Nimba*, *Arka*, *Vacha* and *Dhyama*. A study conducted in this *Yoga* revealed its anti microbial property.

▪ *Drakshadi Phanta*^[19] explained in *Ashtanga Hridaya Jwara Chikitsaadhyaya* contains ingredients *Draksha*, *Madhooka*, *Madhuka*, *Lodhra*, *Kashmarya*, *Sarivaa*, *Musta*, *Amalaka*, *Hribera*, *Padmakesara*, *Padma*, *Mrinala*, *Chandana*, *Ushira*, *Nilotpala*, *Parushaka*, *Jati Kusuma*, *Madhu*, *Sita* and *Laja*.

It is indicated in *Jwara*, *Madatyata*, *Chardi*, *Murcha*, *Daha*, *Shrama*, *Bhrama*, *Urdwga Rakta Pitta*, *Pipasa* and *Kamala*.

Drugs *Madhuka*, *Madhu* and *Laja* are told under *Shonithasthapana Dashemaniya*.

Sariva, *Draksha*, *Parushaka* and *Amalaka* - *Jwarahara Dashemaniya*.

Ashtaguna Manda^[20]

Ingredients

SN	Sanskrit name	Botanical name	Quantity (In ratio)
1.	<i>Dhanyaka</i>	<i>Coriandrm sativum</i>	1
2.	<i>Nagara</i>	<i>Zingiber officinalis</i>	1
3.	<i>Maricha</i>	<i>Piper nigrum</i>	1
4.	<i>Pippali</i>	<i>Piper longum</i>	1
5.	<i>Mudga</i>	<i>Phaseolus aureus</i>	1
6.	<i>Tandula</i>	<i>Oryza sativum</i>	1
7.	<i>Taila bhrshtha Hingu</i>	<i>Ferula northax</i>	1
8.	<i>Saindhava</i>	Rock salt	1
9.	Water	-	14

Ingredients and Quantity

All the ingredients except *Tandula* and *Mudga* are dried and powdered and kept aside. Then properly cleaned *Tandula* and *Mudga* are taken together and add 14 times of water and heat. Heating is continued till the contents are properly cooked. Then the entire content is decanted to obtain the liquid portion known as the *Manda* which is added with the

remaining powdered ingredients and is served. *Siddhi Lakshna* is the completely cooked rice and *Mudga*.

Dosage: 25-50ml

Shelf life: *Sadhyasevana*. Best to be used freshly prepared

Pharmacological Action

1. *Deepana*: Improves digestion, can be given in *Ama* condition and also can prevent the formation of *Ama*.
2. *Pranada*: Improves strength by normalising the electrolyte imbalance produced after the *Panchakarma* therapy, through *Samsarjana Karma*.
3. *Basti shodana*: Cleanses and detoxifies kidney and bladder.
4. *Raktavardhana*: *Dhatu Parinama* happens by the *Jataragni Deepana*.
5. *Sarvadoshagna*: Balances all the three *Dosas*.
6. *Jwarahara*

Shadanga Paneeya^[21]

Ingredients

SN	Sanskrit name	Botanical name	Quantity
1.	<i>Ghana(Musta)</i>	<i>Cyperus rotundus</i>	1
2.	<i>Rakta Chandana</i>	<i>Santalum album</i>	1
3.	<i>Shunti</i>	<i>Zingiber officianlis</i>	1
4.	<i>Ambu(hrivera)</i>	<i>Coleus forscolin</i>	1
5.	<i>Parpata</i>	<i>Fumaria indica</i>	1
6.	<i>Ushira</i>	<i>Vetiveria zizanioides</i>	1

Method of preparation

One *Karsha* (12gms) of these drugs boiled with one *Prastha* (768ml) of water and reduced to half and can be used or drinking.

Indications: *Pachana* (digestive), *Trit Jwarapaham* (cures thirst and fever).

CONCLUSION

Understanding of dengue fever through Ayurveda due to *Agantu Karana* (virus infestation) and irregular nature of fever it can be co-related with *Agantuja Vishama Jwara* described in Ayurvedic classics. *Sannipathaja Jwara Lakshanas* are very much similar to DHF symptoms such as Hemoptysis, burning sensation, vomiting, giddiness, delirium, boils, thirst etc. *Agantuja Jwara* is *Dhatu Ashraya*. Hence *Brimhana Chikitsa (Dhatu Poshana)* is to be employed when *Koshta* is in *Nirama Avastha* also symptomatic managements are advised if necessary. In DHF we have to adopt *Raktapithahara Chikitsa*. Role of immunity is very much important in this condition as the *Ojo Guna* is opposite to *Visha Guna*. If a person is having good immunity, there will be less chance of severity.

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