

## **SHORT COMMUNICATION**

### **Treatment of Chloroquine-Resistant *Plasmodium vivax* Malaria in India**

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#### **ABSTRACT**

**Background:** Treatment failure in *P. vivax* Malaria is a major dilemma that faces health care workers. True drug resistance is one of the causes after ruling out compliance and drug quality issues. The other two causes are re-infection during the treatment period or the release of hypnozoites from the liver. **Objectives:** To find out what antimalarials can be prescribed in India for treating Chloroquine-resistant *P. vivax* Malaria. **Methods:** By reviewing documents prepared by the National Center for Vector-Borne Diseases Control (NCVBDC) and doing a PUBMED search for articles that deal with Chloroquine-resistant *P. vivax* Malaria treatment. **Results:** It was found that a fixed-dose combination of oral Artemether and Lumefantrine can be given for Chloroquine-resistant *P. vivax* Malaria. **Conclusions:** There is a lack of awareness among health care providers on how to treat Chloroquine-resistant *P. vivax* Malaria. This paper addresses this concern.

**Keywords:** Malaria, Drug resistance, *Plasmodium vivax*, Artemether, Lumefantrine

#### **Introduction**

Treating Malaria depends on the species of Plasmodium causing it. <sup>[1]</sup> At present, treating Malaria due to *P. vivax* is carried out by the administration of 3 days Chloroquine and 14 days Primaquine. The role of Primaquine is to kill the hypnozoites.

A dilemma that faces the health worker is what should be done if a patient, despite full compliance with treatment and no history of vomiting or diarrhea, does not respond parasitologically. If it is a case of *P. vivax* Malaria, the treatment failure could be due to either true drug resistance, due to re-infection with a new strain of *P. vivax* during the treatment period, or due to the release of hypnozoites from the liver. <sup>[2]</sup> It is difficult for the health care provider to differentiate between these three possibilities in the field. This paper aims to provide a practical solution as to what he/she can do when faced with such a dilemma.

#### **Methods:**

The documents of the NCVBDC were analyzed to see if there were any guidelines on treating Chloroquine-resistant *P. vivax* Malaria. Also, a PUBMED search was made for articles on treating Chloroquine-resistant *P. vivax* Malaria.

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## Results

The National Drug Policy on Malaria 2013 dealt only with treating Artemisinin-resistant *P. falciparum* Malaria. It did not cover the treating of Chloroquine-resistant *P. vivax* Malaria.<sup>[3]</sup>

According to the Guidelines for Diagnosis and Treatment of Malaria published in 2014, there was no description for the treating of Chloroquine-resistant *P. vivax* Malaria. It was only given that drug-resistant *P. vivax* Malaria is rare in India.<sup>[4]</sup>

The operational document on Malaria Elimination in India published in 2016 also does not deal with the treating of Chloroquine-resistant *P. vivax* Malaria. It covers only the treating of Artemisinin-resistant *P. falciparum* Malaria.<sup>[5]</sup>

One of the PUBMED articles described the Artemether-Lumefantrine combination which is suitable for both adults and children and that is effective in treating *P. vivax* Malaria which is Chloroquine-resistant.<sup>[6]</sup>

Artemether-Lumefantrine to be prescribed as per body weight:

05 kilograms to 14 kilograms	20 mg Artemether plus Lumefantrine 120 mg
15 kilograms to 24 kilograms	40 mg Artemether plus Lumefantrine 240 mg
25 kilograms to 34 kilograms	60 mg Artemether plus Lumefantrine 360 mg
35 kilograms & above	80 mg Artemether plus Lumefantrine 480 mg

Artemether-Lumefantrine is not to be given to children weighing less than 5 kilograms.

These are available as Artemether 20 mg plus 120 mg Lumefantrine and 40 mg Artemether plus 240 mg Lumefantrine dispersible tablets for Children. For Adults, Artemether 80 mg plus 480 mg Lumefantrine tablets/capsules are available.

A total of 6 doses to be administered: The first dose at the time of diagnosis

	Second dose after a gap of 8 hours
Third dose after 24 hours	Fourth dose after 36 hours
Fifth dose after 48 hours	Sixth dose after 60 hours

In addition, it is important to give the 14-day course of Primaquine at 0.25 milligrams per kg body wt per day to treat the hypnozoites.

## Discussion

The Government of India, in 2016, adopted a framework for Malaria Elimination in India covering the period 2016 – 2030.<sup>[7]</sup> This was based on WHO's Global Technical Strategy for Malaria, covering the same period, adopted in 2015 and updated in 2021.<sup>[8]</sup>

The aim is to reach zero Malaria cases by 2027 and then wait for three years before WHO can grant Malaria-free status certification. It is already the beginning of 2022 and India is about to reach the halfway mark of the period from 2016 to 2027. The Annual Parasite Incidence (API) has also come down significantly (it was 0.32 during 2018).<sup>[9]</sup>

As the API continues to decrease, it is likely that those Malaria cases which will continue to persist in the community would be the drug-resistant cases of Malaria.

### Conclusions:

If a patient (whether child or adult) has developed drug resistance to Chloroquine, he/she can be given Artemether and Lumefantrine at the doses recommended above.

**Conflict of Interest:** There is no conflict of interest.

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