



Severe malaria: saving more lives with injectable artesunate

Fatal within
24–48 hours¹

An estimated
8 million cases each year¹

An estimated
655,000 fatalities in 2010¹

86% were children under the age of 5¹

Despite current treatment, many do not survive²

Young children and pregnant women are particularly vulnerable to severe malaria. Those suffering are frequently on the brink of coma and multi-organ failure by the time they arrive at a clinic.³ Treatment must be rapid and suitable for administration to unconscious patients.

Intravenous quinine has been used to treat severe malaria for decades;⁴ however, the margin between efficacious doses and toxic doses is narrow,³ making its administration complex, lengthy and risky.

Injectable artesunate: A safer, more effective treatment

Injectable artesunate is better tolerated, easier to use and saves more lives than quinine.^{5,6,7,8} It is the fastest acting antimalarial agent available.⁹

To enable global access to this life-saving treatment, MMV partnered with Guilin Pharmaceutical Co. Ltd., providing technical expertise and funding needed to establish quality-assured, cost-effective production. This resulted in crucial WHO prequalification so that Guilin's medicine (Artesun®) can now be purchased with the use of donor funds and delivered to clinics where it is urgently needed.

Making the switch and saving lives

In the two largest randomized controlled trials conducted in patients with severe malaria, parenteral artesunate treatment reduced deaths by 34.7% (in the Asian SEAQUAMAT trial⁵ and by 22.5% (in the African AQUAMAT trial⁶ compared with parenteral quinine. As a result, updated WHO guidelines now recommend artesunate delivered intravenously as the preferred first-line treatment for severe malaria.¹⁰

Since prequalification in 2010, over 12 million vials of injectable artesunate have been delivered, saving an estimated 80,000–90,000 additional young lives compared to treatment with quinine.

Improving access and education

MMV is working with Clinton Health Access Initiative (CHAI) in six Nigerian states, and with Swiss Tropical and Public Health Institute in Democratic Republic of the Congo to expedite a national switch to this life-saving medicine. In December 2012, UNITAID awarded US \$34 million to an MMV-led consortium, comprising CHAI and Malaria Consortium, to support the increase in uptake and use of injectable artesunate. This project is aiming to scale-up the reach of injectable artesunate to seven other Nigerian states and five African countries.

Injectable artesunate saved Saudat's life

On 27 August 2012, 3-year old Saudat was admitted to Murtala Mohammed Specialist Hospital (in Kano State, Nigeria), unconscious, with convulsions and a temperature of 38.9°C. She had severe malaria. Her life was at risk.

Injectable artesunate (Artesun® 60mg) was administered immediately, and then regularly for a period of 48 hrs. Two days later, Saudat regained consciousness and was put on a regimen of Coartem® (artemether-lumefantrine), an oral artemisinin combination therapy (ACT), to cure her. Injectable artesunate had helped reduce the severity of malaria and saved her life.

Based on Saudat's positive response to treatment, and on similar cases, the paediatrics department at the busiest referral hospital in Kano, Nigeria, has switched from intravenous quinine to injectable artesunate to treat all cases of severe malaria.

Furthermore, the Hospital Management Board has started to procure this life-saving medicine for other hospitals in Kano State for the treatment of severe malaria patients. Facilitating these policy changes is one of the goals of the collaboration between MMV and CHAI in Nigeria.



Defeating Malaria Together

MMV 
Medicines for Malaria Venture



Dr Binta Jibir Wudi, Head of Paediatrics at Murtala Mohammed Specialist Hospital (MMSH), Kano State, Nigeria, explains the benefits of injectable artesunate and how Kano State is addressing the challenges of implementation.

Q The burden of severe malaria in Nigeria is one of the highest in the world. What progress has been made at MMSH to improve its treatment?

We recently learnt of the benefits of using injectable artesunate in place of quinine for the treatment of severe malaria and decided to try it. We were really impressed; its performance was excellent.

In August last year, 30% of our out-patient cases had severe malaria. We used injectable artesunate for all the cases and found it to be very effective and easy to administer. Given the large number of patients and the fact that we were also short staffed, it made a big difference that the treatment was much less onerous. A little girl, Saudat, made a complete recovery. This helped us decide to switch from quinine to injectable artesunate for all admitted cases of severe malaria. The Kano State Hospital Management Board is now also procuring the medicine for other hospitals in the State.

Q What advantages have you found in using injectable artesunate vs quinine to treat severe malaria?

First of all, children who might be comatose due to the effects of malaria recover much quicker. Before, if we had a child who was anaemic with severe malaria, we would need

to perform a blood transfusion to treat the anaemia first, as quinine can exacerbate symptoms of malaria, like anaemia, haemolysis, haemoglobinuria (black water fever) and hypoglycaemia. The issue with quinine is that there is a very narrow treatment window. You really have to get the dose right – too little and the parasite will take over, too much can lead to complications. In the worst case, if quinine is administered too quickly, it can have an effect on the heart and patients can die.

Artesunate is much easier to use. The injection is intravenous or intramuscular and it takes 1–2 minutes to administer, whereas quinine takes 4 hours. Also, the treatment window is larger with injectable artesunate, so we have fewer complications.

In addition, we have found that injectable artesunate is more cost-effective overall. Although the cost of the vials is higher, when you take into account the costs of intravenous fluids needed for quinine, the time of the health-care workers and the duration of the patient's stay, injectable artesunate is actually cheaper.

Q What challenges did you face in switching from quinine to injectable artesunate?

The first challenge was training people to use a new treatment. Injectable artesunate needs to be reconstituted by adding sodium bicarbonate and then diluting with saline. The other potential challenge is wastage, especially in low-body-weight children. Once a vial has been opened, it must be used immediately or discarded. It cannot be reused. Ideally, we need a paediatric formulation smaller than the current 60 mg packs.¹¹

Q What's the benefit of working with MMV and partners in making the switch?

MMV and CHAI organized the training for health-care workers to use injectable artesunate correctly. They provided us with posters that clearly show how injectable artesunate can be used. That was very helpful. ■

Possible side effects¹²

Like all medicines, Artesun® can cause side effects, but not everybody gets them. Some of these may be difficult to detect, and may be similar to effects of the disease itself.

Common side effects include:

Dizziness, feeling sick, vomiting, light-headedness, headache, sleeplessness, hearing problems, flu-like effects (including fever, tiredness, bone and muscle pain), cough, altered taste, abdominal pain, diarrhoea, rash and pain at injection site.

Uncommon side effects (reported between 1 in 1000 and 1 in 100 patients treated): Anaemia, neutropenia, reduction in platelets and allergic reactions.

Rare side effects (reported in less than 1 in 1000 patients): Hepatitis and pancreatitis.

Very rare side effects (reported in less than 1 in 10,000 patients): Severe reduction in red blood cells, tingling sensation and nerve pain.

Frequency not known:

Anaemia, including delayed-onset anaemia, has been reported after treatment.

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