

Concentrations of artemether/lumefantrine in hair: a potential tool to retrospectively determine drug concentrations following malaria treatment

Jenny Schnyder¹, Reinier Van Hest¹, Hanna De Jong¹, Ron Mathot¹, Martin Grobusch

¹ Amsterdam UMC

Introduction

According to international guidelines, the first treatment choice for acute uncomplicated *Plasmodium falciparum* malaria is artemether/lumefantrine (AL), which leads to parasite clearance in >95% of patients. However, in 4-5% of cases, recrudescence (clinical recurrence due to treatment failure) may occur in the weeks after treatment. Possible causes of recrudescence include resistance of the *P. falciparum* parasite to AL or sub-therapeutic drug levels due to non-adherence or reduced absorption. The cause of recrudescence is often difficult to pinpoint retrospectively, as blood samplings are currently advised at two and four weeks after start of treatment when AL levels are undetectable, even when they were therapeutic during the first days to week(s). An alternative method could be to retrospectively measure drug levels by hair analysis in patients with recrudescence.

Objective

We hypothesise that artemether and lumefantrine penetrate the hair matrix and can be correlated with blood concentrations. If this turns out to be the case, hair analysis could be applied as a novel method to retrospectively assess the adequacy of drug levels and discriminate between resistance when recrudescence occurs.

Methods

The study is designed as a single centre, experimental study, evaluating a possible correlation between A/L plasma concentrations (measured at day 0-2, and day 7) and hair concentrations (measured at day 30, 60 and 90) in healthy volunteers taking an AL treatment course (Figure 1).

Results

An explorative analysis is currently ongoing, assessing if artemether and lumefantrine can be detected and quantified in hair samples by liquid chromatography with tandem mass spectrometry.