Is it time to review the need for serial blood films in the diagnosis of malaria?

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1. Introduction

- With an annual incidence of 1700 cases of imported malaria within the UK, it is one of our most commonly imported infections [1].
- Microscopy of thick and thin blood films is the gold standard in malaria diagnosis. In addition, rapid diagnostic tests (RDT's) are also now routinely used throughout developed and developing countries. UK guidelines still recommend the need for three serial films [2].
- The rationale for three films is longstanding; cyclical parasitaemia could be missed with low levels of infection and the preparation and examination of blood films is highly user dependent with significant inter-user variation [3, 4]. The preparation and review of three separate films is, however, time consuming and comes with cost implications.

2. Aim

- To review whether patients with malaria were diagnosed on first or subsequent films and whether clinical predictors such as fever, thrombocytopenia, malaria prophylaxis and endemic country could guide the need for three serial films.

3. Methods

- Retrospective review of our blood result database was undertaken on all adult patients with a positive malaria diagnosis presenting to our teaching hospital within NHS Lothian from January 1, 2014 to August 1, 2018.
- We reviewed whether the diagnosis of malaria was made on first or subsequent blood films.

4. Results

Case inclusion:

Total number of malaria positive patients Jan 2014-Aug 2018: **69**

- **1** false positive RDT
- **6** positive RDT's (with negative serial films) all recently treated

Total number of patients included in analysis: **61**

Case characteristics:

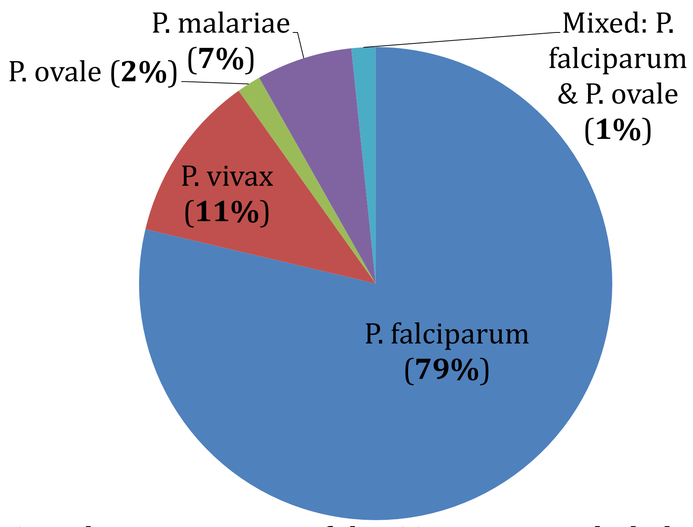

Figure 1: Malaria speciation of the 61 patients included.

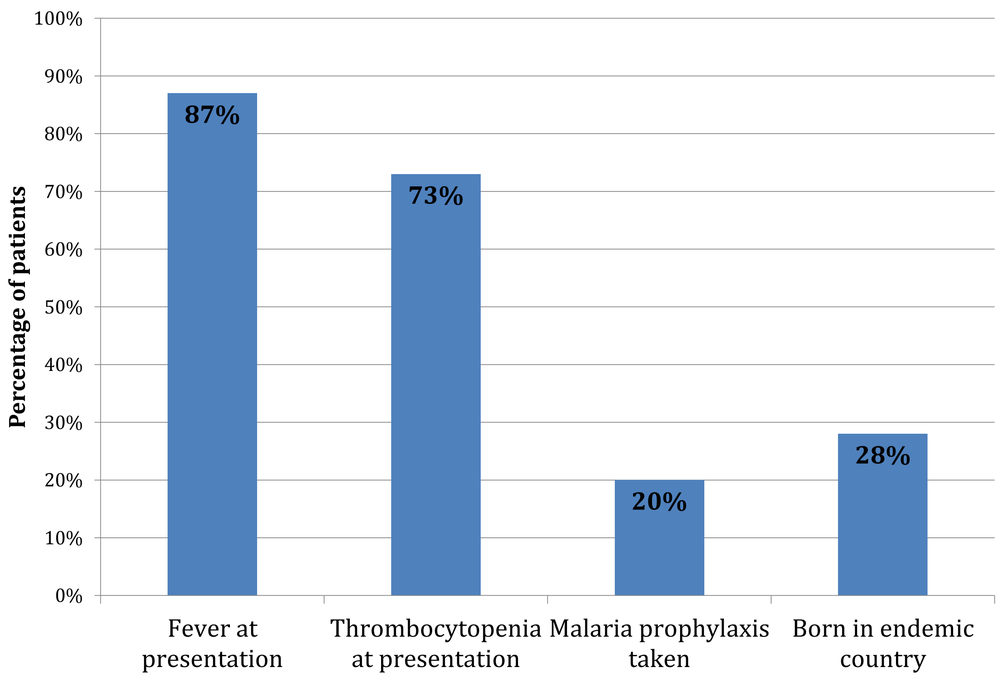

Figure 2: Percentage of patients with proposed clinical predictors.

Malaria Diagnostics:

- In 59 out of 61 cases (97%), malaria diagnosis was made on first blood film. All cases of P. falciparum were diagnosed on first film.
- In two cases (3%), as outlined below, malaria was diagnosed after initial negative film and initial negative RDT.

Case 1: Plasmodium Vivax
Febrile, normal platelets, no prophylaxis and was born in an endemic country.
Diagnosed on third serial film with P. vivax.

Case 2: Plasmodium Vivax
Febrile, thrombocytopenic, had taken malarial prophylaxis and was a UK born traveller.
Diagnosed on fourth serial film with P. vivax.

5. Discussion

- In our setting, nearly all patients were diagnosed with malaria on their initial set of tests. Reassuringly all cases of P. falciparum were diagnosed on first film, although P. vivax is a well recognised cause of severe and potentially fatal disease in some cases [5]. Two P. vivax diagnoses from our data set would have been missed should we only have examined one blood film. Although atypical, one of these diagnoses was made on fourth film.

- Using our data set, we propose, patients with our negative clinical predictors (those who did not spend their early childhood growing up in an endemic area, are apyrexial, have a normal platelet count and have not taken malarial prophylaxis), who have one negative blood film and RDT, could avoid the need for three serial blood films. This is demonstrated in our proposed diagnostic algorithm in Figure 3. This would therefore reduce unnecessary investigation provided appropriate safety netting and patient review was instigated.

- We acknowledge the limitations of our study, particularly with regards to sample size and the limitations associated with retrospective data collection. We also acknowledge the confines of microscopy in a non-endemic setting as well as the varied sensitivity of differing types of RDT. Larger, prospective studies are needed into malaria diagnostics.

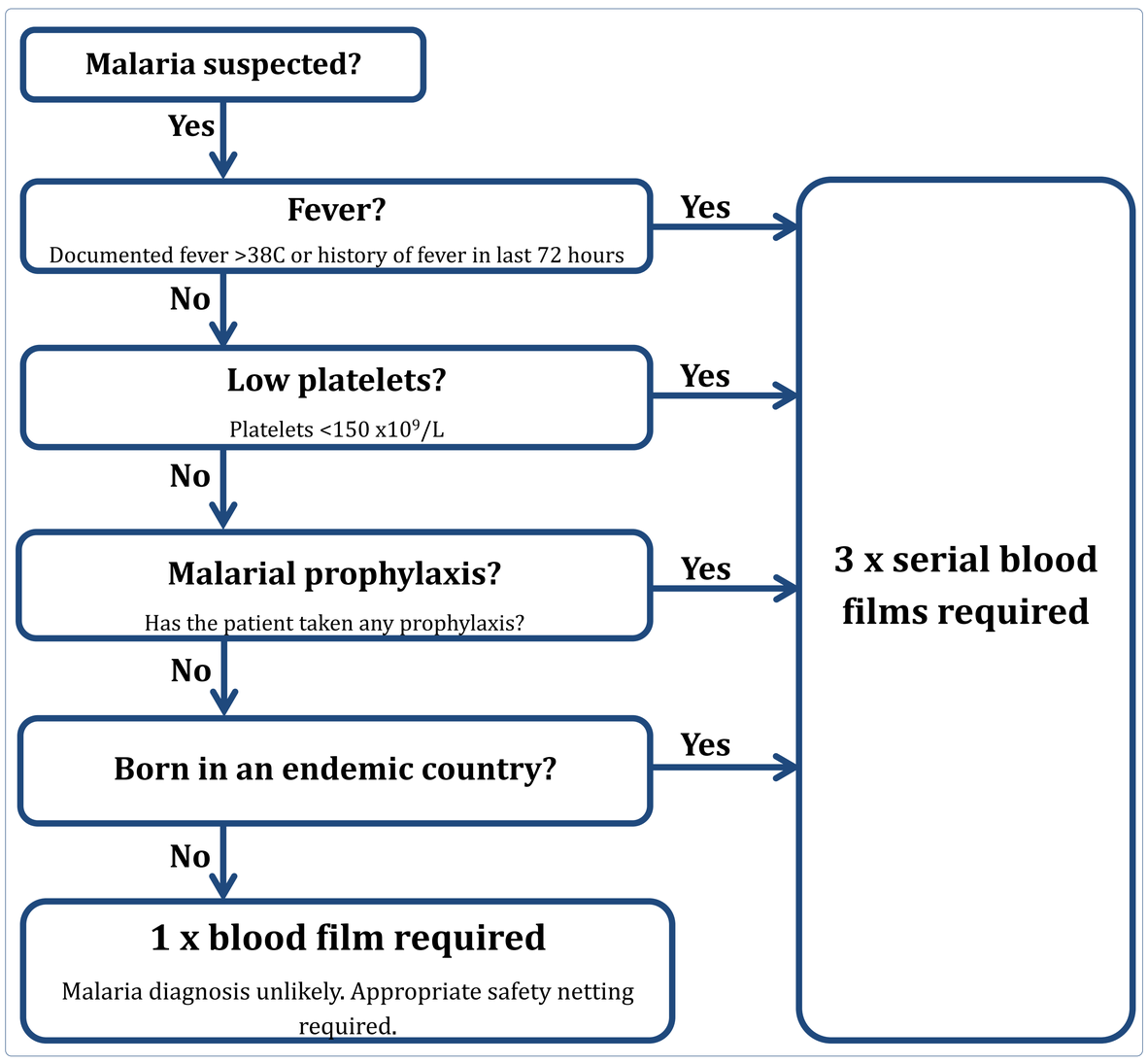

Figure 3: Proposed algorithm for diagnosis of malaria.

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