

EPIDEMIOLOGY OF IMPORTED *PLASMODIUM FALCIPARUM* INFECTIONS IN RETURNING TRAVELLERS TO CALGARY, 2007-2012

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INTRODUCTION

Malaria, an infectious disease transmitted by the anopheles mosquitoes, contributes to the significant morbidity and mortality in the tropics - it is responsible for over three million annual deaths¹. With the increase in intercontinental travelling and immigration, there has been a notable rise in the number of malaria cases in industrialized countries². The most prevalent imported malaria cases are caused by *Plasmodium falciparum* species, which is also responsible for the most virulent and lethal malaria infections in humans¹. Calgary is the fourth largest Canadian city to have the highest number of immigrants, who consisted 30% of the total city population in 2010³. On average, sixty to hundred malaria cases are reported annually in Calgary as determined by the local diagnostic laboratory³. However, little is known about the epidemiology of the patients, such as travel history, type of prophylaxis taken and the causative *Plasmodium* species. Therefore, the aim of this retrospective study was to determine whether returning travellers to Calgary are vectors of drug-resistant strains of malaria and thus a critical sentinel of emerging resistance in other parts of the world.

METHODS

The study group comprised of patients who were positive for *P. falciparum* malaria between 2007 and 2012 with travel history to endemic countries. The following information was collected: pre-travel advice, reason for travel, countries with malaria visited, types of prophylaxis taken and treatment. The data were entered and stored on the Microsoft Access database. From this, the following epidemiological data were collected: gender, age, geometric mean parasitemia and parasite clearance rate. The data were calculated using SPSS, Microsoft Excel and Parasite Clearance Estimator tool by WWARN.

RESULTS

Between 2007 and 2012, a total of 209 cases were laboratory-confirmed in Calgary. The 58.6% of the cases were caused by *P. falciparum* with 119 reported cases where 68.9% were seen in males. The mean age of *P. falciparum* infected males was 32.5±14.1 and females, 26.5±15.0. The parasite clearance rate of eligible patients ranged from 0.0269 to 0.578 (n=31). The highest GMP of 0.878 was observed in 2007. A majority of

travellers received pre-travel advice (61.3%), but 38.7% of infected patients had not taken prophylaxis. Almost a half of the patients (47.5%) were VFR travellers. Most *P. falciparum* infected patients had travelled to at least one country in Africa.

DISCUSSION AND CONCLUSIONS

During the 2007 and 2012 period, there was a moderate increase in the number of *P. falciparum* cases, with alternating increases and decreases each year. A linear regression performed by SPSS showed that there is a non-significant (p=0.149) but a moderately increasing trend (r=0.514) in the number of *P. falciparum* cases over the six years. Based on the results, the majority of patients infected with *P. falciparum* were, therefore: males aged 30-39, travelled to Africa to VFR, did not seek pre-travel advice, did not take prophylaxis and had an average parasite clearance rate of 0.116±0.101. One limitation of this study is the estimation of parasite clearance rate, in which the tool developed by WWARN had very specific requirements and reducing the number of eligible patients to 31.

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