

Short reports

HIV, MALARIA AND PNEUMONIA IN A TORRES STRAIT ISLANDER MALE — A CASE REPORT

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Abstract

This report presents the case of a middle-aged Torres Strait Islander male with HIV who contracted *Plasmodium vivax* malaria in Papua New Guinea. His presentation included clinical and radiological features of pneumonia and he required inpatient treatment for 13 days. This study reviews the literature concerning co-infection with HIV and malaria, which is an uncommon combination in Australia, discusses the public health risks posed by patients with malaria in the Torres Strait, given the presence of a known vector, and suggests strategies to reduce the disease burden posed by malaria in this patient and other Torres Strait Islanders travelling to Papua New Guinea under the terms of the Torres Strait Treaty. *Commun Dis Intell* 2010;34(4):448–449.

Case history

A 57-year-old Torres Strait Islander male presented to the primary health centre on a remote island in the Torres Strait with a week-long history of fevers, myalgia and a cough productive of green sputum. He had recently returned from 3 weeks in Daru in Western Province, Papua New Guinea (PNG). The patient's past medical history was significant in that he was HIV positive on antiretroviral therapy (lamivudine, zidovudine and azatanavir); though 6 months earlier he had an undetectable viral load and a CD4 count of $0.5 \times 10^9/L$ indicating a reasonable level of immune function. The previous year he had required hospital admission for severe community acquired pneumonia.

On presentation he was hypoxic and in septic shock with rigors. He was also noted to have an infected ulcer on his left lower leg with associated left inguinal lymphadenopathy. An initial immunochromatographic test for pan-malarial antigens was positive.

The patient was transferred to Thursday Island Hospital where upon arrival he was commenced on artemether/lumefantrine combination therapy as well as intravenous ceftriaxone and gentamicin. A chest x-ray confirmed the diagnosis of pneumonia; malaria films on day two revealed *P. vivax* malaria with an initial parasite count of $23,000/\mu L$ and numerous trophozoites and occasional schizonts

present. After excluding glucose-6-phosphate dehydrogenase deficiency, primaquine was commenced; artemether/lumefantrine was ceased after 6 doses as per the Torres Strait Malaria Protocol (S. Parish, 2009¹). Blood and sputum cultures (including for acid-fast bacilli) were negative, as was serology for dengue and melioidosis. While an inpatient the patient's white cell count reached a nadir of 3.2 (with a neutrophil count of 0.69) and platelets of 74. Repeat malaria parasite screens showed reduced trophozoite load by day two of admission and complete clearance on days four and seven. The patient showed dramatic clinical improvement over the first few days of his admission and was discharged on day thirteen.

Discussion

While in many parts of the developing world the coexistence of HIV and malaria is unfortunately common, these infections are rarely seen together in Australia, where the burden of disease for each is relatively small.^{2,3} The interaction between HIV infection and malaria has been extensively studied, with current knowledge suggesting that each infection may potentiate the other, mainly via effects on T-cell activation and immunity. More specifically, HIV has been shown to increase the infection rate, parasite density and severity of clinical illness of malaria, with an inversely proportional relationship between CD4 count and incidence of severe malaria, and decreases the response to malaria treatment.⁴ Conversely, malaria increases HIV viral load and transmission and contributes to the development of anaemia.⁵ Research from sub-Saharan Africa indicates that HIV-infected patients living in or travelling to malarious areas benefit from chemoprophylaxis with cotrimoxazole, which has been shown to be effective in reducing the burden of disease due to malaria and HIV-associated opportunistic infections, although it should be noted that malaria infections in the African cohorts studied were due almost exclusively to *P. falciparum*.⁶ Another important area of research concerns the chemotherapeutic interactions between drugs used for the treatment of HIV and malaria, with some antimalarial agents exerting a weak antiretroviral effect, and certain antiretrovirals demonstrating malarial parasite growth inhibition.⁷

In the Torres Strait, the number of cases of HIV is limited to a few individuals, and the majority of patients with malaria are from PNG, with a small number of cases in Torres Strait Islanders who acquire the disease in PNG. There have however been documented cases of locally-acquired malaria, including 2 cases of *P. vivax* on Badu Island in 1997 and one of *P. falciparum* on Darnley Island in 2001.^{8,9} Australia has a potential malaria vector in the form of *Anopheles farauti sensu lato*, which exists in the Torres Strait and represents the most significant threat with respect to local transmission of disease. During investigation of the Darnley case in 2001 several female *An. farauti s.l.* were trapped. In these previously reported cases the sources of the infections were unknown; none of the 3 individuals affected had travelled to PNG. The possible explanations for these cases include transport of an infected mosquito from PNG in one of the many boats that travel between PNG and the Torres Strait Islands (so-called 'baggage malaria'), or travel to the Torres Strait by an asymptomatic PNG national with parasitaemia. In this case it is most likely that the patient acquired malaria in PNG, given the average incubation period for clinical *P. vivax* infection (12–17 days) and the patient's travel history.

Public health significance

From a communicable disease perspective, this case is significant in several respects. Firstly, the concurrent infection with HIV and malaria in this patient incurred an increased risk of morbidity due to both diseases as discussed above. Secondly, the potential for local spread of *P. vivax* on the patient's home island represented a small but significant risk to the local community, given the historical presence of a known vector on the island and the fact that the patient likely had an increased parasite load due to HIV infection. Thirdly, the particular living arrangements of this patient, namely sharing a house with approximately 15 other individuals, lend themselves to vector-borne disease transmission. Finally, it is interesting that this patient almost certainly contracted both HIV and malaria on separate visits to PNG under the terms of the Torres Strait Treaty. This treaty allows free travel for traditional purposes, without passports or visas, within the Treaty zone for residents of the Torres Strait Islands and the inhabitants of 13 coastal village communities in PNG.¹⁰ This unique arrangement represents a potential route for the spread of communicable diseases south to the Australian mainland. There exists a strong case for recommending routine use of malaria chemoprophylaxis for Torres Strait Islanders travelling to PNG, and additional cotrimoxazole prophylaxis for those with HIV infection. The efficacy of cotrimoxazole specifically for prophylaxis

against *P. vivax* malaria warrants further investigation, given the relatively high prevalence of *P. vivax* malaria in PNG.¹¹

The patient gave verbal consent for publication of this case report.

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References

1. Parish S, Thursday Island Hospital, Torres Strait and Northern Peninsula Health Service District. *Torres Strait Malaria Protocol*. 2nd edn, updated August 2009. Queensland Health; Thursday Island.
2. Guy RJ, McDonald AM, Bartlett MJ, Murray JC, Giele CM, Davey TM, et al. HIV diagnoses in Australia: diverging epidemics within a low-prevalence country. *Med J Aust* 2007;187(8):437–440.
3. Walker J. Malaria in a changing world: an Australian perspective. *Int J Parasitol* 1998; 28(6):947–953.
4. Hochman S, Kim K. The impact of HIV and malaria coinfection: what is known and suggested venues for further study. *Interdiscip Perspect Infect Dis* 2009;2009:617954.
5. Hewitt K, Steketee R, Mwapasa V, Whitworth J, French N. Interactions between HIV and malaria in non-pregnant adults: evidence and implications. *AIDS* 2006;20(16):1993–2004.
6. Slutsker L, Marston BJ. HIV and malaria: interactions and implications. *Curr Opin Infect Dis* 2007;20(1):3–10.
7. Skinner-Adams TS, McCarthy JS, Gardiner DL, Andrews KT. HIV and malaria co-infection: interactions and consequences of chemotherapy. *Trends Parasitol* 2008; 24(6):264–271.
8. Merritt A, Ewald D, van den Hurk AF, Stephen S Jr, Langrell J. Malaria acquired in the Torres Strait. *Commun Dis Intell* 1998;22(1):1–2
9. Harley D, Garstone G, Montgomery B, Ritchie S. Locally-acquired *Plasmodium falciparum* malaria on Darnley Island in the Torres Strait. *Commun Dis Intell* 2001;25(3):151–153.
10. Australian Government Department of Foreign Affairs. Treaty between Australia and the Independent State of Papua New Guinea concerning Sovereignty and Maritime Boundaries in the area between the two Countries, including the area known as Torres Strait, and Related Matters. Canberra: Australian Government Publishing Service; 1985, No 4.
11. Muller I, Bockarie M, Alpers M, Smith T. The epidemiology of malaria in Papua New Guinea. *Trends Parasitol* 2003;19(6):253–259.