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Dengue in Guinea: Clinical Description and Investigation of an Imported Case

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Case Report

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ABSTRACT

Introduction: A neglected tropical disease, we report a case of imported dengue fever in the Republic of Guinea in a student permanently resident in a neighbouring country who was visiting Conakry (Guinea) for professional reasons.

Case Presentation: Symptoms began with the onset of fever, headache, rhinorrhea and arthralgia motivating self-medication at home. He consulted two private clinics and was admitted to a national hospital before being transferred to a second hospital without improvement. The diagnosis of dengue fever was confirmed by RT-PCR 10 days after the onset of symptoms. The patient died of the disease. The active search for febrile cases showed no increase in the number of reports. No epidemiological link was found. The entomological survey was conducted around the confirmed case.

Conclusion: This report highlights the errors and delays in diagnosing a case of dengue fever and highlights the need to set up a robust surveillance system to prevent the potential spread of dengue fever in non-endemic areas. It also focuses on the sequencing of the isolated viral strain, its comparison with the strain circulating in the country of origin and the need for cross-border collaboration in the context of integrated disease surveillance and response and the International Health Regulations.

Keywords: Dengue; Guinea; importation; clinical; investigation; West Africa.

1. INTRODUCTION

Dengue fever is an infectious disease caused by one of the four serotypes of the dengue virus. It is transmitted mainly to humans by the Aedes mosquito (Chen & Vasilakis, 2011). Infections with the dengue virus are largely asymptomatic, with only 20% of cases presenting with a febrile illness accompanied by general symptoms such as joint and muscle pain, rash, nausea and severe headaches (World Health Organization, 2024). While classic dengue is usually self-limiting, a minority may be threatened by serious complications such as dengue haemorrhagic fever or dengue shock syndrome, which can be fatal (Wilder-Smith & Schwartz, 2005).

The spread of dengue is due to a combination of factors: increased urbanization, population growth, migration and international relations, displacement and the difficulties of effective vector control (Gubler, 2004). Climate change could be a factor contributing to the global spread of dengue fever (Hsieh & Chen, 2009). It is a rapidly growing health problem, with 2.5 billion people at risk, mainly in South-East Asia, the Caribbean, Central and South America, and more recently in Africa (Gubler, 2004; Hsieh & Chen, 2009).

In West Africa, circulation of the virus in human populations was first described in the 1960s in Nigeria (Moore et al., 1975). Since then, several African countries have reported sporadic cases or outbreaks associated with this virus. In sub-Saharan Africa, cases of dengue fever are probably under-reported, due to low levels of awareness among healthcare workers and confusion with other common febrile illnesses such as malaria (Amarasinghe et al., 2011).

We report a case of imported dengue fever in the Republic of Guinea in a student permanently resident in a border country who was visiting Conakry (Guinea) for professional reasons.

2. CASE PRESENTATION

The patient was 37 years old, a student permanently resident in a country bordering the Republic of Guinea as part of his training.

On$^{1/08/2023}$, for professional reasons, he left by road (public transport) to arrive in Conakry on 03/08/2023.

Symptoms began on 05/08/2023 with the onset of fever, headaches, rhinorrhoea and arthralgia, prompting self-medication at home from 05 to 09/08/2023 with paracetamol, Artemether-Lumefantrine and Vitamin C. In view of the persistence of the signs, he consulted a^{1st} private clinic on 10/08/2023 where the diagnosis of malaria was accepted and he was subjected to a treatment based on Artemether-Lumefantrine, perfusable paracetamol, 5% glucosed serum and Vitamin B. On the same day, after taking this treatment, he suffered several episodes of blackish vomiting, between which there was a lull. He returned home at around 6pm. On

12/08/2023, he consulted a second private clinic for agitation and obnubilation. An electrocardiogram and brain scan did not reveal any particularities, so he was referred to a 1st national hospital for further treatment. On admission, a diagnosis of severe malaria was made on the basis of a positive Malaria Rapid Diagnostic Test, and treatment with injectable artesunate, chlorpromazine, diazepam, 0.9% saline, cimetidine and ceftriaxone was instituted. On 14/08/2023, in view of the persistence of the disturbance of consciousness, agitation and desaturation, he was transferred to a second national hospital and then admitted to intensive care. The diagnosis of severe malaria was accepted and the patient received oxygen therapy, injectable artesunate, paracetamol, Propofol, Dexamethaxone, Ceftriaxone and Chlorpromazine.

The alert was passed on to the health authorities, who immediately dispatched a team to take samples. The diagnosis of dengue fever was confirmed on 15/08/2023 by the laboratory using RT-PCR. The patient was transferred to the centre for the treatment of diseases with epidemic potential. The course was unfavourable, marked by a progressive deterioration in his clinical condition and death on 21/08/2023.

The active search for febrile cases in health establishments showed no increase in reports. Prevention and control measures have been put in place. Forty-nine contacts were identified and monitored at least once a day for a week. In the search for an epidemiological link, we did not find any cases with which there was an epidemiological link with the confirmed case in Guinea. However, confirmed cases of dengue fever had been reported in the country of origin.

The entomological survey was conducted around the confirmed case. A larval survey carried out in all the stagnant water reservoirs enabled Aedes breeding sites to be identified. By characterising these sites in relation to the presence of the patient and estimating the epidemiological risk indices for dengue fever and other arboviroses, it was possible to assess the risk of transmission of the virus.

3. DISCUSSION

This is a report of an imported case of dengue fever in the Republic of Guinea. The investigation revealed errors and delays in diagnosis (Annex Fig. 1). Dengue fever is often unrecognised and under-diagnosed. The similarity of its symptoms to those of other endemic febrile diseases makes diagnosis even more difficult. It is therefore essential to identify the pathogens responsible for these diseases using specific biological diagnostics. These biological diagnostics require high-quality equipment and trained personnel, which is not always the case in low-income countries (Tinto et al., 2022). Dengue fever can be diagnosed by virus isolation, genome and antigen detection and serological studies. Serology is currently the most widely used method in routine diagnosis. Of course, the clinical, geographical and epidemiological data associated with the patient remain essential considerations when evaluating a laboratory result (Guzmán & Kourí, 2004).

Dengue surveillance and epidemic response involve the confirmation, notification and management of symptomatic cases. Effective surveillance and notification rely on patients‘ and physicians’ knowledge of the disease and a rapid response to confirmed cases (Queensland Parliamentary Counsel Office, 2013). In the West African sub-region, Senegal is a dengue hyperendemic country. Since 2017, epidemics have been observed every year in many regions of the country, marked by the co-circulation of DENV1-3 viruses (Dieng et al., 2022). In Nouakchott, the capital of Mauritania in the Sahara desert, the first laboratory-confirmed dengue epidemic occurred in 2014, revealing DENV-2 (Fourié et al., 2021). The dengue virus circulates in Abidjan outside of an epidemic and imposes the need to increase awareness of dengue as a possible diagnosis in cases of undifferentiated fever (L'Azou et al., 2015). From 1 August to 31 December 2016, a total of 5094 cases of dengue were recorded in health facilities in the city of Ouagadougou (Seogo et al., 2021).

The importation of dengue as a result of globalisation is an emerging threat to global health. However, data on global geographical sources and the potential for importation of dengue worldwide are lacking (Gwee et al., 2021). Due to the global increase in mobility, travel-related diseases are gaining in importance (Wendt et al., 2021). Imports are a necessary condition for the onset of an epidemic, but the size of the epidemic is largely determined by recognition, notification and the public health response (Ritchie et al., 2013). Over a period of 09 years, 492 cases of dengue fever were

diagnosed in travellers returning to Spain from Africa, Latin America and Asia. One imported case of dengue fever was reported in a traveller returning to Japan from Côte d'Ivoire, where there was a dengue fever epidemic (Suzuki et al., 2017). In Senegal in 2017, an imported case of dengue serotype 2 from the Ivory Coast was reported. Phylogenetic analysis based on the complete genome sequence revealed that the isolate was clustered with strains of cosmopolitan genotypes from the epidemic in Burkina Faso in 2016 and those from the ongoing dengue epidemic in Côte d'Ivoire. This suggests a possible spread of strains from the Burkina Faso epidemic to other West African countries, including Côte d'Ivoire and Senegal (Dieng et al., 2022).

Active and entomological searches carried out successfully around the case coming from a neighbouring country (where a dengue epidemic was in progress) did not reveal any additional cases. The absence of additional confirmed cases in Guinea during the period indicates that this isolated case was imported, highlighting the need to strengthen cross-border collaboration in the context of integrated disease surveillance and response and the International Health Regulations.

One of the limitations of this report is the lack of sequencing of the viral strain isolated in Guinea and its comparison with the strain circulating in the country of origin of the case, and also the lack of cross-border collaboration.

4. CONCLUSION

We report an imported case of dengue fever in the Republic of Guinea in a student permanently resident in a border country who was visiting Conakry (Guinea) for professional reasons. This report highlights the errors and delays in diagnosing a case of dengue fever and highlights the need to set up a robust surveillance system to prevent the potential spread of dengue to non-endemic areas. It also focuses on the sequencing of the isolated viral strain, its comparison with the strain circulating in the country of origin and the need for cross-border collaboration in the context of integrated disease surveillance and response and the International Health Regulations.

ETHICAL APPROVAL

The study protocol was approved by the ethics committee of the Faculty of Health Sciences and Technology at Gamal Abdel Nasser University in Conakry.

CONSENT

As per international standards or university standards, patient(s) written consent has been collected and preserved by the author(s).Patient anonymity and confidentiality were respected.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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ANNEX

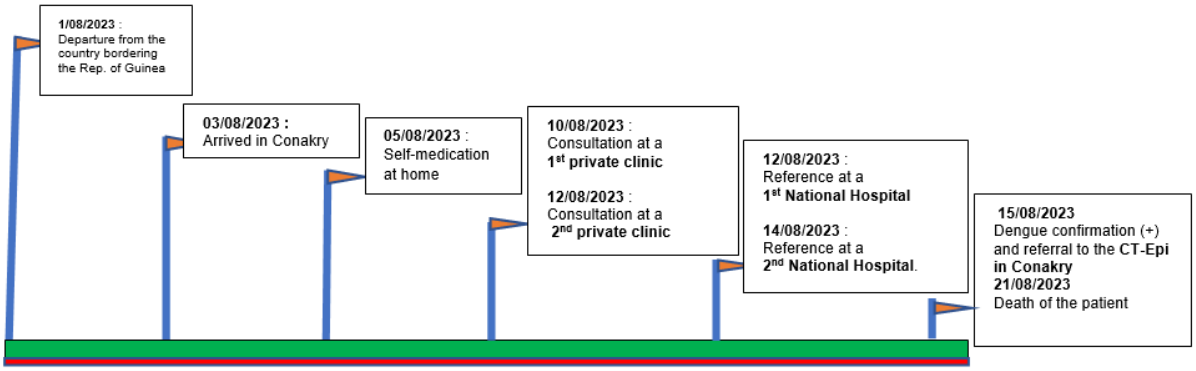

Fig. 1. Itinerary of a confirmed case of dengue fever in Guinea

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