



## Editorial

# Arboviral diseases and monkeypox - An epidemiological overlapping differential diagnosis?

## Arbovirosis y Viruela del Mono - ¿Un diagnóstico diferencial de solapamiento epidemiológico?

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Over the last decades, the epidemiological importance of different arboviral diseases in the world has been significant, especially in Latin America and South-East Asia<sup>[1]</sup>. Dengue, chikungunya, Zika, yellow fever, but also Venezuelan Equine Encephalitis, Mayaro, and Oropouche, among others, have been significantly important in the case of Latin America<sup>[2,3]</sup>. Multiple dengue epidemics and the recent 2014-2015 epidemics of chikungunya<sup>[4,5]</sup> or 2015-2016 of Zika<sup>[2,4,6,7]</sup> have been a matter of concern. Furthermore, during the COVID-19 pandemic, coinfections with arboviruses and other tropical pathogens have also been relevant<sup>[4-6]</sup>. That is important to consider as a differential diagnosis and the possibility of coinfections.

Now, another reemerging viral zoonotic disease is a cause of concern and declared on July 23, 2022, a Public Health Emergency of International Concern, monkeypox<sup>[7,8]</sup>. By September 15, 2022, monkeypox spread to 96 countries that have not historically reported the disease, for a total of more than 59,000 cases, affecting multiple continents, including Latin America<sup>[9]</sup>. Moreover, monkeypox is creating numerous preoccupations regarding the ways of transmission (e.g. sexually possible)<sup>[10]</sup>, populations affected (e.g. HIV people)<sup>[11,12]</sup>, and especially the shift in the clinical presentation<sup>[13-15]</sup>.

Monkeypox in 2022 is no longer presenting predominantly as a clinical course of fever, chills, and lymphadenopathy with a subsequent rash after 3-5 days of prodrome. Instead, it presents predominantly as a genital rash or ulcers syndrome, similar to other sexually transmitted infections. Nevertheless, the rash may occur with high variation in presentation, from single to multiple lesions, in multiple body areas<sup>[10,13-17]</sup>. Given this situation, it is essential to consider differential diagnoses of exanthematic or eruptive type that explain the clinical presentation and correspond to the local epidemiological situation, including chickenpox, herpes zoster, measles, hands, feet, and mouth (coxsackie virus), herpes simplex, genital herpes, bacterial infections of the skin (impetigo), disseminated gonococcal infection, primary or secondary syphilis, chancroid, lymphogranuloma venereum, granuloma inguinale, molluscum contagiosum, allergic reaction (even including Steven-Johnson syndrome), but also arboviruses, especially Zika, dengue, and chikungunya (Table 1).

Well-known arboviral diseases such as dengue, Zika and chikungunya may develop rash<sup>[2]</sup>, monkeypox, yellow fever and Mayaro. Yellow fever has been reemerging recently, causing cases and outbreaks in Brazil, Peru, and Venezuela<sup>[18]</sup>. Then, in Latin America, especially in Brazil, Colombia, Peru, Venezuela, and Panama, among others, such differential diagnosis should

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### CONFLICTS OF INTEREST

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carefully assess the possible identification of arboviruses as the cause of the rash, considering monkeypox, but also the possibility of coinfections (Table 1). So far, no cases of coinfections between monkeypox and arboviral diseases have been reported. But monkeypox coinfections with HIV, other sexually transmitted infections, especially syphilis, and even SARS-CoV-2/COVID-19<sup>[19]</sup>, have already been registered<sup>[10,12]</sup>.

Given the current reemergence of dengue in some countries of Latin America (e.g. Colombia with 43,123 cases up to August 27, 2022), the ongoing outbreak of monkeypox may yield especially the concern of overlapping and epidemiological interaction between these two conditions. Therefore, physicians in primary care should have a high level of suspicion for both needs, especially for dengue, which may evolve more into a severe disease and fatal outcomes. In the case of monkeypox, such concern is significant among immunosuppressed patients or those with comorbidities. So far, the case fatality rate in 2022 has been estimated at 0.01%<sup>[19]</sup>.

Finally, multiple lessons from the recent past, multiple epidemics of arboviral diseases, and the current COVID-19 pandemic are essential to understanding the epidemiological trend, strategies and containment<sup>[20]</sup>, but also to provide logical clinical reasoning when considering differential diagnoses and even possibilities of coinfection, in this case, between monkeypox and arboviral diseases.

**Table 1. Clinical comparison between arboviral diseases and monkeypox.**

	CHIK	DEN	MA	ZIKA	YELLOW	MONKEY
Fever	+++	++++	++++	+/0 <sup>a</sup>	+++	+++/ <sup>d</sup>
Myalgia/arthritis	++++	+++	+++	++	+	+/0 <sup>d</sup>
Edema in limbs	0	0	0	++	0	0
Maculopapular rash	++	++	++	+++ <sup>b</sup>	0	+++ <sup>e</sup>
Vesiculopapular rash	0	0	0	0	0	+++ <sup>e</sup>
Retro-ocular pain	+	+++	++	++	0	0
Conjunctivitis, non-purulent	+	0	0	+++	0	+/0 <sup>d</sup>
Lymphadenopathies	++	++	+	+	0/+	+++/ <sup>d</sup>
Hepatomegaly	++	0	+	0	+++	0
Leukopenia/ thrombocytopenia	++	++++	++	0/+ <sup>c</sup>	+++	Leukocytosis/ Thrombocytopenia++
Haemorrhages	+	+++	0	0/+ <sup>c</sup>	++++	+/0 <sup>d</sup>
Headache	+	+++	+	+	+++	+/0 <sup>d</sup>
Lumbago	++	+	+	0	+++	0
Asthenia	+	++	+	0	++	+++/ <sup>d</sup>

CHIK, chikungunya; DEN, dengue; MA, mayaro; ZIKA, Zika; YELLOW, yellow fever; MONKEY, Monkeypox.

Bold indicates which of the arboviruses is the highest frequency of the clinical finding.

<sup>a</sup>Depends on the geography and phylogeny of the virus, in some areas, patients do not present fever.

<sup>b</sup>Pruriginous (mild to severe).

<sup>c</sup>In some cases, these findings have been reported.

<sup>d</sup>In the 2022 clinical phenotype, such a finding may not be present.

<sup>e</sup>In these cases, with intense pruritus and pain.

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