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REVIEW ARTICLE

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Oropouche fever: An emerging arbovirus disease from the Americas with possible oral manifestations

Abstract:

Oropouche fever (OROV fever) is an emerging arbovirus disease caused by Oropouche virus (OROV). The virus was reported to have a limited circulation in Central and South America, but there is a real possibility of international spread in the near future. Considering the current outbreak of OROV fever in the Americas, the Pan American Health Organization/World Health Organization has already published one Epidemiological Alert and two Epidemiological Updates in 2024. From January to early October 2024, 10,275 cases were confirmed in nine American countries, including imported cases in the United States and Canada. Moreover, 30 imported cases were reported for the first time in three European countries. Knowledge about OROV fever is still limited. Like common arbovirus diseases, the main clinical manifestations include fever, headache, arthralgia, myalgia, bleeding and rash. Gingival bleeding has been reported, and oral mucosal lesions may be another possible manifestation. The disease is usually mild and self-limiting, but severe complications, death and vertical transmission can occur. This article reviews OROV fever, addressing possible oral manifestations as well as the potential contribution of the dental community to prompt diagnosis and management.

Keywords: arbovirus infections, dentistry, gingival hemorrhage, oral mucosa, Oropouche fever.

INTRODUCTION

Arboviruses (arthropod-borne viruses) are a large group of zoonotic RNA viruses that circulate between vertebrate hosts (including humans as incidental hosts), and hematophagous arthropod vectors (such as mosquitoes, midges, sandflies and ticks)[1,2]. The most prevalent arbovirus diseases worldwide are dengue fever (nearly 96 million cases per year), chikungunya (nearly 693,000 cases per year), and Zika (nearly 500,000 cases per year)[3].

Statement of clinical significance

Oropouche fever is an emerging arbovirus disease with potential for global spreading, with more than 10,000 confirmed cases in the Americas in 2024. The main clinical manifestations resemble those of common arbovirus diseases. Gingival bleeding has been reported, with oral mucosal lesions as another possible manifestation. The dental community can contribute to prompt diagnosis and management.

Emerging infectious diseases can be defined as newly appearing infections in a population, or previously existing diseases showing fast growth in incidence or geographical range[4]. The emergence of arbovirus diseases' pandemic potential is an increasing global public health concern, since the geographical range of arboviruses is continually rising due to human mobility, urban sprawl, ecological adaptation of vectors due to climate change, and uncontrolled vector population growth[5].

In 2024, we are facing an unprecedented outbreak of Oropouche fever (OROV fever), an emerging

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arbovirus disease from the Americas caused by the Oropouche virus (OROV). From January to early October 2024, a total of 10,275 cases were reported in nine American countries (including imported cases in the United States and Canada), and 30 imported cases were detected for the first time in three European countries[6–8].

In this context, this article reviews OROV fever and the most prevalent arbovirus diseases co-circulating in the same areas and showing similar clinical presentation. This review discusses possible oral manifestations and the potential contribution of the dental community to prompt diagnosis and management of these public health threats.

LITERATURE REVIEW/DISCUSSION

Oropouche virus (OROV)

Oropouche virus (OROV), which causes OROV fever, is an arbovirus of the *Orthobunyavirus* genus in the *Peribunyaviridae* family, mainly transmitted by biting midges of the species *Culicoides paraensis*, as well as by certain mosquito vectors. Since OROV was first detected in 1955 in the community of Vega de Oropouche, Trinidad and Tobago, nearly 500,000 cases have been reported. Still, knowledge about OROV fever remains limited. The virus was reported to have limited circulation in Central and South America, close to forested areas, in a sylvatic cycle with mammals and birds as natural reservoirs. However, an alarming urban cycle of the disease, distant from forests, has also been reported, with humans as vertebrate hosts. This shift in spread is associated with climate change, deforestation, and human and animal mobility, as well as with genetic alterations in the virus[9-15].

The current Oropouche fever outbreak and the risk of international spreading

Considering the current outbreak of OROV fever in the Americas, the Pan American Health Organization/World Health Organization (PAHO/WHO) published an Epidemiological Alert on August 1, 2024, followed by two Epidemiological Updates on September 6 and October 15, 2024[6–8]. A total of 10,275 cases of OROV fever were confirmed in 2024 from epidemiological weeks 1 to 40 in nine countries: Brazil (8,258 cases, including two deaths), Peru (936 cases), Cuba (555 cases), Bolivia (356 cases), the United States (90 imported cases), Colombia (74 cases), Canada (2 imported cases), Ecuador (2 cases), and Guyana (2 cases). In Brazil, the most affected country in the current outbreak, 70% of the 8,258 laboratory-confirmed cases were reported in seven states of the Amazon region, an area considered endemic for OROV fever. However, 15 non-Amazonian Brazilian states also reported autochthonous transmission, some for the first time[8].

Since large human movements across the globe enhance the risk of emerging viruses spreading across international borders, worldwide healthcare professionals must consider OROV fever among the diagnostic possibilities of fever in returning travelers[16]. In August 2024, the US Centers for Disease Control and Prevention (CDC) issued a Health Alert Network (HAN) Health Advisory to notify clinicians and public health authorities about the current OROV fever outbreak in the Americas and the associated risk to travelers[17]. Additionally, from epidemiological weeks 23 to 39 of 2024, PAHO/WHO reported 30 imported cases for the first time in three European countries: Spain (21 cases), Italy (6 cases), and Germany (3 cases). Of these patients, 20 had travelled to Cuba and one to Brazil[8].

The epidemiological natural history of OROV fever indicates that climate and environmental changes impact the spatial dispersion of hosts and vectors. In fact, since ecological, climatic, and demographic changes are a worldwide phenomenon, there is a real possibility that OROV will spread outside the Americas in the near future[12,14]. In this context, a recently published study based in genomic and epidemiological analyses provided a view of the unprecedented evolution and spread of OROV in the current outbreak in Brazil's western Amazon, caused by a novel reassortant OROV lineage, confirming the high epidemic potential of this arbovirus and raising major concerns about the risk of OROV spreading beyond the previously affected regions[18]. Another recent study also suggests that the present re-emergence of OROV fever in Brazil may be associated with a new OROV reassortant, with faster replication, and the ability to evade antibodies of individuals previously infected with the ordinary virus. To be prepared for a potential OROV fever epidemic, this study reinforces the need to monitor OROV strains capable of escaping immunity, as well as develop vaccines against OROV and its reassortants[19].

Clinical overview of the disease

OROV fever is usually mild and self-limiting, typically resolving within one week. Similar to other common arbovirus diseases such as dengue fever, chikungunya, and Zika, the main clinical manifestations of OROV fever are fever, headache, arthralgia, myalgia,

malaise, nausea, vomiting, chills, dizziness, photophobia, retro-orbital pain, bleeding and rash. Rarely, severe complications such as meningitis and encephalitis may occur. The diagnosis is clinical, epidemiological and laboratorial, and symptomatic treatment is offered[6-15]. There are no approved vaccines or specific antiviral medications to prevent OROV infection or to treat OROV fever[12,13,19]. The first deaths due to the disease, which were reported in the current outbreak, occurred in two young Brazilian women, neither with comorbidity[6-8,12,20].

In the current outbreak, there are also concerns over possible vertical (mother-to-child) transmission, since fetal deaths and birth defects such as microcephaly are being investigated[12,21]. In fact, up to epidemiological week 40 of 2024, Brazilian health authorities have confirmed one case of fetal death and one case of congenital anomaly, and another 12 fetal deaths, three spontaneous miscarriages, and three newborns with congenital anomalies are under investigation. Moreover, in Cuba, one case of congenital anomaly was confirmed in September 2024, and another two cases are under investigation[8].

Since most clinical information is derived from case reports or minor outbreaks, the clinical features of OROV fever are poorly described. Furthermore, morbidity and mortality could be underestimated[13].

Possible oral manifestations

Concerning oral manifestations, gingival bleeding has been reported in at least two different OROV fever outbreaks[22,23]. In the 2007–2008 OROV fever outbreak in Manaus (Brazil), 20 of the 128 patients (15%) showed spontaneous hemorrhagic phenomena, including petechiae, epistaxis, and gingival bleeding[22]. Additionally, cases showing hemorrhagic phenomena characterized by epistaxis, gingival bleeding, and menorrhagia were reported in the 2010 OROV fever outbreak in Bagazan (Peru)[23]. It is important to highlight that gingival bleeding is listed as a hemorrhagic symptom of OROV fever in multiple health authorities' official documents[6-8,15,24,25].

Even though, to the best of our knowledge, no reports have specifically described oral mucosal lesions in patients with OROV fever, it is noteworthy that mucosal ulcers are a common finding in viral-related rashes, including arbovirus diseases[26]. In this regard, a cross-sectional study of a Brazilian population showed association between endemic arbovirus diseases and ulcerated oral lesions[27]. Therefore, in addition to the already reported gingival bleeding, there is a possibility that oral mucosal lesions in OROV fever patients could be described in future reports of the disease.

Arbovirus diseases co-circulate and must be detected early

Adding more complexity to the situation, it is noteworthy that co-circulation, co-transmission, and co-infection of arboviruses in urban and surrounding areas has become a major concern for global public health[28].

In this context, Table 1[6-15,21-26,29-31] describes important features of the emerging OROV fever and of dengue fever, chikungunya, and Zika, the most prevalent arbovirus diseases worldwide[3].

According to the WHO Global Arbovirus Initiative, strengthening early detection of arbovirus diseases, a strategic objective to reduce local risk of epidemics, includes priority actions such as the development or updating of tools for training physicians and other health professionals[5].

Table 1. Etiology, transmission, skin rash and oral manifestations of Oropouche fever and the most prevalent arbovirus diseases worldwide.

Arbovirus disease	Etiology	Transmission	Skin rash	Oral manifestations
Dengue fever[26,29-31]	dengue virus (DENV)	Main vector: mosquitoes (*Aedes* spp.). Potential for vertical and blood-borne transmission, but no sexual transmission.	Maculopapular or morbilliform rash ("isles of white on a sea of red") that begins on hands and feet and spreads centripetally.	Aphthous-like ulcers, oropharyngeal erythema, petechiae, gingival bleeding and gingival and lip swelling.
Chikungunya[26,29-31]	chikungunya virus (CHIKV)	Main vector: mosquitoes (*Aedes* spp.). Potential for vertical and blood-borne transmission, but no sexual transmission.	Maculopapular rash on extremities and trunk that can involve the face.	Aphthous-like ulcers and oral mucosal lesions like Koplik spots.
Zika[26,30,31]	Zika virus (ZIKV)	Main vector: mosquitoes (*Aedes* spp.). Potential for vertical, blood-borne and sexual transmission.	Maculopapular rash on the face, extremities, and trunk.	Aphthous-like ulcers.
Oropouche fever[6-15,21-25]	Oropouche virus (OROV)	Main vector: midges (*Culicoides paraensis*). Vertical transmission confirmed in the current outbreak.	Rubella-like rash on the trunk and arms.	Gingival bleeding.

CONCLUSION

OROV fever is an emerging arbovirus disease with potential for global spreading. In 2024, we are facing an unprecedented outbreak of the disease, with more than 10,000 cases in the Americas and, for the first time, imported cases in Europe. The main clinical manifestations are similar to those of other common arbovirus diseases. Gingival bleeding has been reported, and it is possible that oral mucosal lesions will be described in the near future.

The dental community should be aware of the main clinical features and possible oral manifestations of the most common arbovirus diseases, as well as the emerging OROV fever, in order to contribute to prompt diagnosis and management of these public health threats. Finally, researchers and oral care providers must be encouraged to report cases of oral manifestations of OROV fever.

AUTHORS' CONTRIBUTIONS

BAR: conceptualization, writing — original draft, writing — review & editing. GRS: conceptualization, writing — review & editing. SMCG: conceptualization, writing — review & editing. PEAS: conceptualization, writing — review & editing. RVS: conceptualization, writing — original draft, writing — review & editing. MCRH: conceptualization, supervision, writing - original draft, writing — review & editing.

CONFLICT OF INTEREST STATEMENT

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