

Investigation of suspected Mpox cases and differentiation from varicella in Cinkansé, Burkina Faso, August 2024

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ABSTRACT

Introduction: Monkeypox (Mpox) is an emerging viral zoonosis. On 16 August 2024, the Cinkansé border medical centre reported two (02) suspected cases of Mpox. Faced with this situation, an investigation was carried out around these cases from 16 to 20 August 2024 to confirm the cases and implement prevention and control measures. **Method:** This was an outbreak investigation that utilised a case series covering the period from 21 July 2024 to 20 August 2024. A suspect case was considered to be any person living in or having stayed in Cinkansé and presenting with: a cutaneous, vesicular or vesiculo-pustular rash, adenopathy with fever > 38°C between 21 July 2024 and 20 August 2024. An investigation form was used to collect socio-demographic, clinical and biological data in fourteen health facilities. Interviews, a literature review and a community case search were carried out. The data were analysed using Microsoft Excel 2010. **Results:** Two suspected cases, all male, with no epidemiological link, were identified. In all (100%) cases, the clinical symptoms consisted of fever and a polymorphous rash with no adenopathy and no involvement of the palms or soles. Seven specimens were collected from the two suspected cases, and the results were negative for Mpox. Among the health workers interviewed, 88.13% (52/59) were familiar with the definition of Mpox cases. These definitions were displayed in 71.42% (10/14) of the health facilities visited. The availability of inputs and management guidelines facilitated the implementation of effective response measures against these two cases. **Conclusion:** The investigation ruled out the hypothesis of Mpox. Based on the appearance of the lesions, the diagnosis of varicella was clinically accepted. Given the emergence of cases of Mpox in the sub-region, epidemiological surveillance needs to be stepped up at entry points, and reference laboratories need to be provided with sufficient reagents.

KEYWORDS: Investigation, Mpox, Border crossing

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Introduction

Monkeypox or Mpox is an emerging viral zoonosis that occurs mainly in certain countries of Central and West Africa [1,2]. This eruptive, febrile disease is an attenuated form of human smallpox, chickenpox or measles, with less severe symptoms and a lower mortality rate. [3,4]. Transmission is zoonotic and then human-to-human via biological fluids.

First identified in 1970 in the Democratic Republic of Congo in a pediatric patient, Mpox was reported a few years later in other Central and West African countries [2,3]. In these two African regions, small localized epidemic outbreaks have regularly occurred in recent years notably in 2016 in the Central African Republic and in 2018 in Nigeria [2,5].

In July 2022, the World Health Organisation (WHO) declared the Mpox epidemic a global health emergency, following its rapid spread to more than 75 non-endemic countries. [6,7]. The epidemiological bulletin from the Centres for Disease Control and Prevention (CDC) in Africa reported a total of 14,245 cases on 28 July 2024, including 2,740 confirmed cases and 11,505 suspected cases, with 456 deaths, giving a case-fatality rate of 3.2%. The cases came mainly from the Democratic Republic of Congo (13,791 cases, 450 deaths), Congo Brazzaville (146 cases, 1 death), Cameroon (35 cases, 2 deaths) and South Africa (22 cases, 3 deaths) [8]. As of 30 July 2024, the Republic of Côte d'Ivoire had notified two confirmed cases. [9]. On Wednesday, 14 August 2024, the Director-General of the WHO declared Mpox a public health emergency of international concern (PHEIC) [10].

On 16 August 2024, the Cinkansé border medical centre in Burkina Faso reported two (02) suspected cases of Mpox. Faced with this situation, an investigation was carried out around these cases from 16 to 20 August 2024 to confirm the cases and put in place prevention and control measures.

Methods

Study design and period of study

This was an outbreak investigation that utilized a case series, conducted from 21 July 2024 to 20 August 2024. Data collection took place from 16 to 20 August 2024.

Study setting and populations

Our investigation was conducted in the health area of the Cinkansé medical centre in the Ouargaye health district, Centre-Est region, Burkina Faso. Cinkansé is a village on the border between Burkina Faso and the Republic of Togo. The village has more than 21,523 inhabitants according to projections from the 2019 general population and housing census (RGPH) [11]. The climate in the Cinkansé area is tropical, with Sudano-Sahelian vegetation. Hunting is carried out on a small-scale and clandestine basis in the surrounding forests, and wild animal meat is sold illegally. The survey covered the human populations living in the health area of the Cinkansé medical centre.

Data collection sources, tools and techniques

Our sources of information were patients and those accompanying them, health diaries, and consultation and hospitalisation registers. Data were collected using an investigation form and a descriptive list drawn up for this purpose. Interviews and document reviews were the main techniques used. The document review was carried out at the Cinkansé medical center and in thirteen other public and private health centres in the surrounding area, selected at random. In addition to the literature review, a search for cases in the community was carried out. We visited the residences of the suspected cases and their neighbours.

Data analysis

The data was analyzed using Microsoft Excel 2010. This analysis took into account the time-place and person approach.

Operational definitions

Our case definitions are taken from the Burkina Faso Mpox memory aids, designed according to World Health Organization guidelines [12].

Suspected case of Mpox: A suspected case was considered to be any person residing or having stayed in Cinkansé and presenting: a cutaneous, vesicular or vesiculo-pustular rash, adenopathies with fever $> 38^{\circ}\text{C}$ between 21 July 2024 and 20 August 2024.

Probable case of Mpox: A probable case was considered to be any suspected case who had contact with a confirmed case in the 21 days prior to the onset of symptoms, or any suspected case who, in the 21 days prior to the onset of symptoms, had

travelled to a country where the disease is endemic or a country that has recorded a chain of transmission since the beginning of May 2022 (currently countries in Central and West Africa, Europe and North America); or any suspected case involving the palms of the hands and/or soles of the feet, or the presence of adenopathy.

Confirmed case: A confirmed case was considered to be any probable case in whom infection with the Mpox virus had been confirmed by molecular technique (PCR) in the laboratory.

Contacts: A contact was any person who had direct unprotected physical contact with the injured skin or biological fluids of a probable or confirmed symptomatic case, whatever the circumstances, including in a care setting, or sharing toilet utensils, or contact with textiles (clothing, bath linen, bedding) or crockery any person who has had unprotected contact within 2 meters of a probable or confirmed symptomatic case for at least 3 hours (e.g. close or intimate friend, transport environment, office colleagues, sports club, etc.).

Ethical considerations

We have obtained the approval of the administrative and health authorities for data collection. Respondents were interviewed with their free and informed consent. Individual data was processed and analyzed in complete anonymity. Confidentiality was respected at all stages of the study.

Investigation team

The multidisciplinary investigation team consisted of eleven people: a dermatologist, a general practitioner, two epidemiologists, a senior livestock technician, a water and forestry officer, a biomedical technologist, a nurse, a state health engineering technician, a community-based health worker and a driver.

Results

Clinical description of the case suspects 1 by time, place and person

Suspect case 1, named YM, is a 42-year-old male. He had been living in Cinkansé but had been visiting a gold-panning site in the village of Daidassu, Nkwanta North health district, Volta region, Republic of Ghana, since the beginning of July 2024.

His symptoms began on 11 August 2024 at the gold panning site. It consisted of a fever, followed 48 hours later by a skin rash initially localized to the limbs and trunk, then spreading to the whole body. He reportedly did not seek medical advice and bought street medicines, which he swallowed. As the rash spread to other parts of his body, he decided to return to Cinkansé in Burkina Faso. He arrived in Cinkansé on 16 August 2024 and was taken directly to the Cinkansé medical centre by his two brothers for a consultation.

There was no history of direct contact with a patient or animals, but the patient reported that in Daidassou, in the Republic of Ghana, a person close to him had the same symptoms at the same time. On examination that day, YM complained of asthenia, myalgia, cough and headaches. Our physical examination revealed a polymorphic cutaneous eruption consisting of umbilicated vesicles (with depressed centers) with clear or squinty contents in places, papules, pustules, crusts and excoriations scattered over the entire integument, particularly the face, back, trunk and limbs. In addition to these lesions, there are oozing exulcerations in the bursae. The palms and soles had no lesions. The skin lesions had been evolving for around four days. There was also evidence of enanthema of the oropharyngeal mucosa, and bilateral posterior left cervical and inguinal adenopathies. These adenopathies were two to three millimetres in size, mobile in both planes, asymmetric and painful to palpation.

The census of YM's contacts identified two people who are all these brothers. They were quarantined until biological results were obtained on 18 August 2024.

During his journey from Daidassou in the Republic of Ghana to Cinkansé in Burkina Faso, YM came into contact with 21 people who are difficult to trace. According to him, the contact was not close. They would simply have used the same means of transport. No telephone contact could be made with officials from the Nkwanta North health district (the district in Ghana to which Daidassou belongs) in order to better describe the event.

Clinical description of suspect case 2 by time, place and person

Suspect case 2, whom we will call YS, is 16 years old, male and a shepherd. He began showing symptoms on 11 August 2024 in Yargatenga, commune of Yargatenga, health area of the Ouargaye district. The symptoms initially consisted of fever, followed by a gradual onset of a vesicular rash two to three days later. He consulted the health center in Yargatenga for the first time on 12 August 2024, i.e. one day after the onset of symptoms, when the diagnosis of varicella was suggested. YS was temporarily living in Yargatenga with his parents in a host family. They are said to be internally displaced persons from the village of Bougla, from the health area of the closed Zoaga's health centre in the same commune.

There was no history of direct contact with a patient or animals. However, the patient stated that his three brothers had experienced the same symptoms at the same time as he had, but that they were fleeting and resolved spontaneously. They therefore did not seek medical attention.

When the clinical picture did not improve following the consultation on 12 August 2024, his mother decided to take him to the Cinkansé medical center. We examined him on 17 August 2024 at the Cinkansé medical centre; he was only complaining of fever. We noted a vesicular eruption, with squinting content, spread over the entire integument with the exception of the palms, soles and external genitalia, with sub-mandibular adenopathy (**Photos 1 and 2**). There was no involvement of the oropharyngeal mucosa.

YS's mother was identified as a contact and quarantined until the biological results were obtained on August 18, 2024. Although the clinical signs were suggestive of Mpox, biological confirmation by analysis of the samples taken was essential.

Collection of samples for confirmation

Samples were taken from both suspected cases. YM received an oropharyngeal swab, a pus swab (from two tubes) and a blood sample. YS received an oropharyngeal swab, a pus swab and a blood sample. A total of seven specimens were collected, triple-wrapped and stored in a cool box with ice boxes. Samples were analysed at the Laboratoire National

de Référence des Fièvres Hémorragiques Virales, Centre Muraz, Bobo Dioulasso. The test performed was RT PCR using the CAPITAL TM qPCR Probe Mix amplification kit from BiotechRabbit. The technique used has very good sensitivity and specificity.

Biological confirmation

All seven samples came back negative for Mpox on 18 August 2024. **Table 1** and **Table 2** provide a comparative analysis of individual characteristics between Mpox and varicella. We were unable to identify VZV in the two patients due to a lack of reagents.

Search for additional cases in the community and in neighbouring health facilities

The document review did not find any suspected cases in the consultation registers of the 14 health facilities visited: Cinkansé, Yargatenga, Zembendé, Kaongho, Dagonkom, Kombilga, Cinkansé-Sangha, Vaongho, Zekullah N'Tala, Sougr Nooma, Laafi plus, Laafi la Boumbou, SongTaaba and Sainte Thérèse. Similarly, the active search for cases in the community, carried out on a reasoned basis in sixteen households close to the cases, did not turn up any suspected cases of Mpox.

Assessment of the application of the directives

The Ministry of Health directives relating to Mpox were known and applied by most health workers. During the interview, 88.13% (52/59) of workers in the health facilities visited had a good understanding of case definitions and management measures for Mpox. Mpox case definitions were displayed in 71.42% (10/14) of the health facilities visited.

Assessment of input availability

The inputs found on site corresponded to the list of inputs to be made available according to the directives issued by the Ministry of Health. They included rehydration solution, analgesics and antipyretics (paracetamol), antibiotics (ceftriaxone), plasters, aqueous eosin and compresses. The care teams had sufficient supplies. We did not observe any stock-outs of treatment inputs over a period of one month. When we interviewed suspected cases and those accompanying them, we noted that the care provided complied with the Ministry's instructions in terms of free treatment and the availability of disinfection products.

Public health initiatives implemented during the investigation

The main public health measures implemented were as follows:

Strengthening patient care: The medical management of the two cases was readjusted. The room was disinfected before and after the clinical examination by members of the rapid response team. Protective equipment consisting of surgical masks and hydro-alcoholic gel was distributed to contacts and case handlers.

Contact follow-up: We identified a total of four contacts for the two patients. They were quarantined from 16 to 19 August 2024, one day after the results of the biological samples were negative. Nevertheless, despite the negative results, the contacts were followed up at home, with home visits until the twenty-first day after the start of the infection. None of them showed any symptoms suggestive of Mpox at the end of this period.

Raising awareness: A number of communication activities were carried out to encourage community involvement. These included a briefing on Mpox for health staff in all the public and private CSPSs on the border, as well as community-based health workers. An interactive radio program was also broadcast on 18 August from 10 am to 12 pm on a local radio station. The program reached around 12,000 people.

Strengthening epidemiological surveillance: Epidemiological surveillance was stepped up in all health facilities, at the entry point and at the various crossing points. An exchange meeting with Togo's rapid response team also took place on 17 August 2024.

Discussion

As soon as case 1- YM arrived in Cinkansé, he was taken directly to the Cinkansé medical center by his brothers, even before he had access to the family home. In view of YM's skin symptoms, his relatives suspected Mpox before his arrival at hospital. These brothers worked to reduce the number of contacts for fear of contamination. This illustrates involvement of the community in epidemiological surveillance, which is highly beneficial, especially in a border area. It facilitated rapid notification of the case, the launch of the first response actions and therefore the

limitation of the number of contacts. In border areas, it is imperative to maintain a good level of communication with the population about diseases and events of public health importance, to ensure a good early warning system.

The investigation confirmed the existence of suspected cases of Mpox in Cinkansé. Mpox was a prime suspect, given that the WHO had recently declared Mpox to be a public health emergency of international concern, requiring enhanced epidemiological surveillance in all African countries, especially at border entry points. Also, Cinkansé is a very busy land entry point. It borders Togo and Ghana, both of which had reported confirmed cases of Mpox.

YM, had a recent travel history to a neighbouring country (Ghana) that had reported confirmed cases of Mpox [9] which supported our hypothesis of Mpox. For YS, there were no reports of travel or contact with animals. No link was found between the two suspected cases.

During our investigation, the priority was to confirm or rule out Mpox in order to implement rapid treatment and isolate patients to control the spread of the disease. However, clinically, there were similarities between Mpox and other conditions such as chickenpox and measles. The rash was suggestive of Mpox, but the absence of adenopathy and the healthy nature of the palms and soles were non-suggestive for Mpox. In some series, lymphadenopathy is one of the most constant clinical signs in cases of Mpox [6]. For others, confirmed cases of Mpox without adenopathy have been reported. [1]. In this situation, clinical diagnosis is insufficient. It is therefore essential to supplement the clinical diagnosis with biological confirmation.

Our biological results were negative for Mpox. Taking into account the appearance and clinical course of the lesions, we accept the hypothesis of varicella in both cases. In Burkina Faso, varicella is diagnosed clinically. Abhinendra Kumar, India reports that out of 331 samples from suspected Mpox cases, 28 came back positive for varicella [13]. Guilléen-Calvo et al, out of 252 samples from suspected cases of Mpox, 16.2% were positive for varicella [14]. It is therefore accepted that only biological results can make the differential diagnosis

between Mpox and varicella/chickenpox. However, the existence of rare cases of Mpox and varicella co-infection should not be overlooked. [11-14].

The treatment protocol in place since admission, based on analgesics, antibiotics and local care, has been effective. In Burkina Faso, all diseases with epidemic potential are treated free of charge through regular pre-positioning of drugs in health facilities. In our series, the course was marked by a regression of the rash and an improvement in fever in both patients. On the 14th day of symptomatology, the clinical signs improved, leaving indelible hyperchromic scars (**photo 2**). Nevertheless, the two cases and their contacts were monitored for twenty-one days.

The public health measures taken by the investigation team are in line with current Burkina Faso and World Health Organization guidelines. Although the cases are Mpox-negative, in view of the border location of Cinkansé, it is essential to step up epidemiological surveillance at all levels, and to develop and implement effective strategies for communicating with the population in order to combat the factors that contribute to the disease, such as promiscuity, the persistence of certain traditional habits (shaking hands as a greeting), the lack of respect for barrier measures.

Conclusion

The investigation of suspected cases of Mpox went well. At the end of the investigation, the cases were found to be chickenpox and not Mpox, the latter was ruled out based on the biological results. In this context, where monkeypox has been declared as a Public health emergency of international concern (PHEIC), it is important to make confirmatory tests available for both monkeypox and chickenpox, to enable clinicians to make accurate diagnoses. It is therefore essential to strengthen epidemiological surveillance at all levels of the health system, at entry and transit points, and to reinforce cross-border collaboration in the fight against diseases with epidemic potential.

What is already known about the topic

- Mpox is a contagious viral disease
- The signs are similar to those of measles and chickenpox,

- Biological confirmation using PCR is essential.

What this study adds

- In border areas, health stakeholders must be constantly prepared to respond to any public health threat
- Involving community players in surveillance enables early detection of public health events, thereby limiting their spread.

Competing Interest

The authors declare that they have no conflict of interest.

Authors' contributions

MN, ASO, YZ, and AK developed the investigation protocol, collected, analysed and interpreted the data and drafted the manuscript. The other authors contributed to the interpretation of the data and revision of the manuscript. All authors read and approved the latest version of the manuscript.

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Table 1: Comparative analysis of varicella and Mpox signs for YM

Clinical and biological characteristics presented by YM	Features in favor of Mpox	Characteristics in favor of varicella
49 years old	Yes	No
History of travel	Yes	No
History of contagion	Yes	Yes
Fever	Yes	Yes
General signs (headache, asthenia, myalgia, back pain...)	Yes	Little or not frequent
Cough	No	Yes
Oral mucosal damage	Yes	Yes
Vesicular/pustular rash	Yes	Yes
Unaffected palms and soles	No	Yes
Adenopathy	Yes	No
Biological test result	Negative	Unrealized
Rash disappear in 14 days	No	Yes

Table 2: Comparative analysis of varicella and Mpox signs for YS		
Clinical and biological characteristics presented by YS	Features in favor of Mpox	Characteristics in favor of varicella
16 years old	Yes	Yes
No history of travel	No	Yes
History of contact with his three brothers	Yes	Yes
Fever	Yes	Yes
Vesicular/pustular rash	Yes	Yes
Unaffected palms and soles	No	Yes
Adenopathy	Yes	Little or not frequent
Biological test result	Negative	Unrealized
Rash disappear in 14 days	No	Yes



Figure 1: Situation of the YS lesions at D5 after the start of the eruption



Figure 2: Situation of YS lesions at D14 after the start of the eruption