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Case Report **Open Access**

Triple viral burden: A case of Monkeypox with HIV and Hepatitis B coinfection, clinical insights from a District Hospital

Dennis Brempong[1*], Charles Donkor Baah[2] and Godwin Awere Damoah[3]

[1]Medical Doctor, Department of Surgery, Our Lady of Grace Hospital, Breman Asikuma - Central Region, Ghana. E-mail: dbrempong3@gmail.com

[2]Physician Specialist, Department of Internal Medicine, Our Lady of Grace Hospital, Breman Asikuma - Central Region, Ghana. E-mail: charlesbaah69@gmail.com

[3]Medical Doctor, Department of Internal Medicine, Our Lady of Grace Hospital, Breman Asikuma - Central Region, Ghana. E-mail: godwinaweredamoah@gmail.com

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Abstract

Monkeypox (Mpox) is an emerging zoonotic infection of global concern. While Mpox-HIV co-infection is recognized, concurrent Hepatitis B Virus (HBV) infection is rare. The coexistence of these three viruses poses major diagnostic and management challenges in resource-limited settings. We describe a 45-year-old man who presented with a two-week history of generalized pruritic vesiculopustular rash, malaise, and anorexia. He was known to be living with HIV but had defaulted on antiretroviral therapy. Examination revealed widespread vesiculopustular lesions involving the face, trunk, and extremities. Laboratory testing confirmed Mpox by polymerase chain reaction, with concurrent HIV and HBV co-infection. Liver function tests indicated mild hepatic dysfunction, and wound cultures showed mixed bacterial growth. A final diagnosis of Mpox with secondary bacterial infection in a patient with HIV and HBV co-infection was made. The patient received culture-guided antibiotics, antiseptic wound care, and supportive management, and antiretroviral therapy was reintroduced. Although he initially improved, he died two weeks after discharge. This case highlights the complexity and poor prognosis of Mpox-HIV-HBV triple infection and underscores the need for routine viral screening and strengthened follow-up care in resource-constrained settings.

Keywords: *Monkeypox, HIV co-infection, Hepatitis B virus, Triple viral infection, Immunocompromised patient, Resource-limited settings*

1. Introduction

Monkeypox (Mpox) is an emerging zoonotic viral disease caused by the monkeypox virus, a member of the Orthopoxvirus genus closely related to the variola virus, the causative agent of smallpox (Sklenovská and Van Ranst, 2018). Historically endemic in Central and West Africa, recent outbreaks in non-endemic regions have

* *Corresponding author: Dennis Brempong, Medical Doctor, Department of Surgery, Our Lady of Grace Hospital, Breman Asikuma - Central Region, Ghana. E-mail: dbrempong3@gmail.com*

elevated its global public health importance. Although Mpox is typically self-limiting, severe disease can occur among vulnerable populations, including children, pregnant women, and immunocompromised individuals (Bunge *et al.*, 2022). HIV infection, which remains highly prevalent in sub-Saharan Africa, is a major cause of immunosuppression and may alter the clinical course of Mpox. Coinfection with HIV, HBV, and Mpox represents a complex clinical scenario with significant implications for disease severity, management, and prognosis. These viruses share overlapping transmission routes—sexual, parenteral, and perinatal—and frequently cluster among high-risk populations, including Men who have Sex with Men (MSM) and individuals with multiple sexual partners. In persons with HIV and HBV coinfection, HIV-related immunosuppression accelerates HBV replication and progression to chronic liver disease (Sun *et al.*, 2024). This interplay compounds vulnerability to systemic viral infections such as Mpox, resulting in more severe or atypical disease courses. Coinfection in such individuals has been associated with atypical presentations, prolonged illness, and poorer outcomes compared to immunocompetent patient (Kampf, 2022; Ogoina *et al.*, 2019). Additionally, chronic Hepatitis B Virus (HBV) infection common in Ghana, poses an added risk of hepatic complications and potential drug–drug interactions with antiretroviral therapy (Thornhill *et al.*, 2022).

Reports of Mpox with concurrent HIV and HBV infection are rare, and most published data originate from tertiary centers in urban settings (Thornhill *et al.*, 2022). Evidence from district hospitals and other resource-limited environments remains scarce. Documenting such cases is essential to better understand the clinical spectrum, highlight diagnostic and therapeutic challenges, and inform preparedness strategies for emerging viral infections.

We report the case of a 45-year-old man with confirmed Mpox, HIV, and HBV coinfection managed at a district hospital in Ghana. This case underscores the logistical challenges of managing comorbid chronic viral infections in resource-constrained settings.

2. Case summary

A 45-year-old man presented with a two-week history of a generalized pruritic vesiculopustular rash, malaise, and anorexia. The eruption began on the face and gradually spread to the trunk and extremities. There was no reported contact with individuals exhibiting similar lesions. The lesions initially appeared as vesicles and pustules, which later ruptured, discharging purulent material and forming crusts—prompting hospital evaluation.

3. Clinical findings

On examination, the patient was febrile and anicteric, with widespread crusted lesions at varying stages of healing involving the face, trunk, and limbs. Vital signs were as follows: blood pressure 136/79 mmHg, heart rate 122 beats per minute, respiratory rate 22 cycles per minute, temperature 38.6 °C, and oxygen saturation 97% on room air. Random blood glucose was 6.1 mmol/L. Other systemic examinations were unremarkable.

He was a known person living with HIV who had defaulted Antiretroviral Therapy (ART) for several months prior to presentation. Based on clinical findings, a provisional diagnosis of Impetigo, with differentials of Mpox, chickenpox, and drug eruption, was made. Empirical therapy was initiated with intravenous clindamycin (300 mg every six hours), ceftriaxone (2 g once daily), and paracetamol (1 g three times daily). Laboratory testing later confirmed *Monkeypox virus* infection.

Investigations:

- **HIV testing:** Reactive (OraQuick – reactive; SD Bioline – reactive)
- **HBsAg:** Reactive
- **Hepatitis C:** Negative
- **Blood film for malaria parasites:** No parasites seen
- **Wound culture:** Mixed growth of *Staphylococcus aureus* and *Escherichia coli*, both sensitive to meropenem
- **Full blood count:**
  - **WBC:** $10.12 \times 10^9/\mu L$ (2.5-8.5)

- **Neutrophils:** 6.94 × 10^9/μL (2.0-7.5)
- **Hemoglobin:** 14.0 g/dL (13.0-18.0)
- **Platelets:** 267 × 10^9/μL (150-450)

- **Liver function tests:**
  - **Albumin:** 24.8 g/L (35-52)
  - **ALP:** 490.1 U/L (42-207)
  - **GGT:** 587.6 U/L (9-36)
  - **ALT:** 58.0 U/L (10-50)
  - **AST:** 71.1 U/L (5-34)
  - **Total bilirubin:** 9.68 μmol/L (3.4-25.7)
  - **Direct bilirubin:** 5.5 μmol/L (0.0-10.0)
  - **Indirect bilirubin:** 4.18 μmol/L
- **Renal function tests:** Within normal limits.

Based on available clinical, laboratory, and confirmatory results from the national public health reference laboratory, a final diagnosis of Mpox with secondary bacterial skin infection in a patient with HIV and hepatitis B co-infection was established.

4. Management and clinical course

Empirical broad-spectrum antibiotics were initiated and later modified to intravenous meropenem following culture and sensitivity results. The patient received twice-daily antiseptic baths with diluted Savlon and local wound care with povidone-iodine cleansing and topical BC56 cream. Antiretroviral therapy (tenofovir, lamivudine, and dolutegravir) was reintroduced. Supportive management included intravenous fluids for rehydration, analgesia, and nutritional support.

Despite persistent fever during the first week, consistent with ongoing bacterial skin infection, the patient's condition gradually improved with targeted antimicrobial therapy and supportive care. After nearly two weeks of hospitalization, he was discharged clinically stable with instructions for follow-up within one week.

However, he failed to return for review. Two weeks post-discharge, the hospital's ART team received confirmation that he had died at home. Information regarding the circumstances of death was limited, but it was reported that financial constraints prevented him from returning to the hospital.

5. Challenges in case management

- Comprehensive laboratory assessment—including full HBV serologic profiling, HBV DNA quantification, HIV viral load, and CD4 cell count—could not be performed due to lack of diagnostic capacity.
- Abdominal ultrasonography was also not feasible because of extensive abdominal skin lesions.
- Samples for Mpox confirmation had to be transported to the national reference laboratory in Accra, as neither the district nor the regional hospital had Mpox testing capability.

6. Discussion

This case highlights the clinical and operational challenges associated with managing a rare triple viral infection—Mpox, HIV, and hepatitis B—in a district-level hospital within a resource-limited setting. The coexistence of these infections presented significant management challenges, compounded by inadequate laboratory capacity. While Mpox–HIV coinfection has been increasingly reported, the addition of chronic Hepatitis B Virus (HBV) infection adds both clinical complexity and rarity to the presentation.

The combined effects of immunosuppression from poorly controlled HIV infection and hepatic dysfunction from chronic HBV infection likely influenced disease severity, treatment response, and overall prognosis. HIV-

associated immunosuppression is a major determinant of Mpox severity. Several studies have demonstrated that Mpox infection in individuals with uncontrolled HIV, particularly those with CD4+ counts below 200 cells/μL, is associated with disseminated disease, prolonged viral shedding, secondary bacterial infections, and higher mortality rates (Ogoina *et al.*, 2019; Thornhill *et al.*, 2022). Conversely, patients on effective Antiretroviral Therapy (ART) often experience milder disease courses comparable to HIV-negative individuals. Effective ART therefore remains the cornerstone of Mpox management among people living with HIV, supplemented by Mpox-specific antivirals such as tecovirimat in severe or complicated cases (Proietti *et al.*, 2022).

HIV-induced immune suppression compromises the cellular immune responses crucial for controlling Orthopoxvirus replication. The resultant depletion of CD4+ T-lymphocytes leads to delayed lesion resolution, prolonged viral replication, and an increased risk of bacterial superinfection and death (Perez-Hernandez *et al.*, 2024). In our patient, the prolonged ART interruption likely precipitated profound immunosuppression, predisposing him to disseminated Mpox with secondary bacterial infection. The absence of CD4 count and viral load data limits precise assessment of his immune status, but it is plausible that he had advanced HIV disease. Immune Reconstitution Inflammatory Syndrome (IRIS) following ART re-initiation could also have contributed to hepatic dysfunction or systemic deterioration after discharge (Perez-Hernandez *et al.*, 2024).

Coinfection with HBV further exacerbates clinical outcomes through immune-mediated hepatic injury and systemic inflammation. In HIV–HBV coinfected individuals, HIV accelerates HBV replication and reduces spontaneous clearance, resulting in higher HBV DNA levels, faster progression to fibrosis, and increased risk of hepatocellular carcinoma (Barth *et al.*, 2010). Antiretroviral regimens containing tenofovir and lamivudine or emtricitabine suppress both HIV and HBV replication. However, treatment interruption can trigger HBV reactivation and severe hepatic flares (Clinical management and infection prevention and control for mpox, 2025). During acute systemic infections such as Mpox, hepatic dysfunction may be further aggravated by systemic inflammation, drug-induced liver injury, or metabolic stress. The combined burden of viral replication and systemic inflammation in this patient likely contributed to his clinical deterioration post discharge.

In the absence of specific antivirals for Mpox in low-resource settings, management relies primarily on supportive therapy, wound care, and targeted antibiotics for bacterial coinfections (Proietti *et al.*, 2022). Notably, microbiology-guided antibiotic selection was implemented in this case—significant in a district hospital context where empirical therapy is often the default. Nevertheless, systemic challenges persist. The unavailability of key investigations, including CD4 count, viral loads, and comprehensive HBV profiling, constrained disease monitoring and prognostication. The lack of adequate follow-up capacity likely contributed to the unfavorable post-discharge outcome. The patient's death two weeks after discharge emphasizes the importance of continuity of care and socioeconomic support in improving long-term survival among immunocompromised individuals.

In Ghana and similar sub-Saharan African settings, the convergence of chronic viral infections such as HIV and HBV with emerging pathogens like Mpox presents growing clinical and public health concerns. Delayed presentation, treatment interruptions, and diagnostic constraints hinder optimal case management. This case demonstrates both the potential and limitations of district hospitals in managing complex viral coinfections and underscores the urgent need to strengthen diagnostic networks, referral systems, and post-discharge monitoring frameworks.

From a public health perspective, the coexistence of Mpox, HIV, and HBV underscores the need for integrated infection screening, vaccination, and follow-up strategies. Individuals diagnosed with one of these infections should be routinely screened for the others. Preventive measures such as HBV vaccination, Mpox vaccination (where available), and sustained ART adherence should be prioritized. Strengthening these preventive, diagnostic, and follow-up systems—particularly at district and regional hospital levels—is essential to reducing morbidity and mortality from complex viral coinfections in resource-limited settings.

7. Conclusion

This case highlights the clinical and operational challenges of managing complex viral co-infections such as Mpox, HIV, and hepatitis B in resource-limited settings. Although initial improvement was achieved through

timely diagnosis, microbiology-guided therapy, and supportive care, the patient's subsequent death underscores the fragility of these gains in the absence of sustained diagnostic capacity, continuity of care, and adequate social support. Strengthening district-level hospitals through improved diagnostic infrastructure, uninterrupted ART provision, integrated viral co-infection screening, robust post-discharge follow-up, and social support systems is essential to improving outcomes and preventing similar avoidable deaths.

Conflict of interest

The authors declare no conflicts of interest related to this case report. No financial, personal, or institutional relationships influenced the preparation or submission of this manuscript.

Authors' contributions

Dennis Brempong: Conception of the work, Literature search, drafting of manuscript. Charles Donkor Baah: Overall supervision of patient management, conception of idea, review of manuscript. Godwin Awere Damoah: Contributed to drafting and review of manuscript

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