Clinical characteristics of mpox infection in individuals who received a first dose of modified vaccinia Ankara immunisation

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ABSTRACT

Introduction A key part of the response to the mpox (monkeypox) epidemic has been the vaccination campaign targeted at gay, bisexual and other men who have sex with men (GBM), including people living with HIV (PLWH).

Methods We undertook a single-site, retrospective analysis of individuals who received a single dose of modified vaccinia Ankara (MVA-BN) prior to the onset of mpox symptoms. Demographics, clinical characteristics and patient management were analysed.

Results Of 10 068 individuals who received a first dose of the MVA-BN vaccination, 15 (0.15%) developed mpox subsequently. All individuals identified were GBM with 12/15 (80%) on Pre-exposure prophylaxis (PrEP) and 3/15 (20%) PLWH. Median time from MVA-BN inoculum to mpox symptoms was 4 days (IQR 3–9), systemic symptoms and supportive medical treatment required were common (11/15 patients, 73%) and all had localising skin lesions. One individual required hospitalisation.

Conclusions Although clinical presentation was similar to unvaccinated cohorts, we observed low numbers of mpox cases following a first dose of MVA-BN vaccination. Larger, multicentric studies are needed to further evaluate vaccination failure and immunity duration.

INTRODUCTION

The current global monkeypox (mpox) epidemic caused over 79 000 confirmed infections across 110 countries,[1] disproportionately affecting gay, bisexual and other men who have sex with men (GBM) and people living with HIV (PLWH).[2] Mpox vaccination campaigns have been held back by supply issues in several countries, with policymakers prioritising the offer of an initial single-dose vaccination on the basis of previous evidence from immunological data[3] and thus maximising the partial immunisation of a wider number of individuals. Vaccine failure seems infrequent,[4] and we report clinical features of confirmed mpox infections among individuals who previously received one vaccine dose.

METHODS

Clinical characteristics, demographic data, comorbidities and subsequent management of all individuals with mpox infection who received a single dose of modified vaccinia Ankara (MVA-BN) at least 1 day prior to the onset of mpox-associated symptoms were collected from electronic patient records. The period between 20 June 2022 (starting date of the mpox vaccination campaign within our Trust) and 31 October 2022 (to allow for a minimum of 4 weeks of postvaccination follow-up) was considered for this report. All patients attended for an initial consultation at sexual health clinics part of Chelsea and Westminster Hospital NHS Foundation Trust, in London (UK). Information on overall mpox infections and vaccination doses administered within our department was extrapolated using our internal GUMBase sexual health dashboard.

All mpox cases were confirmed with laboratory-detected infection, using an in-house pan-orthopoxvirus RT-PCR assay with clade-specific PCR of positive results.

RESULTS

In the study period considered, 10 068 individuals received a single, subcutaneous MVA-BN dose. Overall, 556 individuals have been diagnosed with mpox, of which 15/556 (2.7%) had received MVA-BN at least 1 day prior to the onset of mpox symptoms. Mpox symptoms developed with a median time of 4 days (IQR 3–9) from MVA-BN administration, with 5/15 (33%) individuals developing symptoms >7 days post MVA-BN administration (on days 8, 9, 9, 14 and 30, respectively).

All individuals were GBM, with a median age of 37 years (IQR 32–42 years); 5/15 were UK-born (33%); and 11/15 (73%) were of white ethnicity. While 12/15 (80%) individuals were HIV negative on PrEP, 3/15 (20%) were PLWH. Of these, two were on effective antiretroviral therapy, had a recent undetectable viral load and their last CD4 cell count recorded was above 500/mmc. Immunovirological data for the other person were not available, although they reported to be on antiretroviral therapy.

All individuals presented with mpox-associated symptoms and skin lesions (data on clinical features are summarised in table 1). While no-one presented with immunosuppression, 3/15 (20%) had other anamnestic comorbidities (urticaria, eczema and depression) and 11/15 (73%) individuals required further medical management following the mpox diagnosis (9 received analgesics, 6 antibiotic treatment for secondary bacterial superinfections, 4 were empirically treated with an antiherpetic agent

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Table 1 Clinical findings in individuals who were diagnosed with mpox after having received the first dose of MVA

	n (%)
Median days between MVA-BN and symptom onset (IQR)	4 (3–9)
Median days between symptom onset and last sexual encounter (IQR)	4 (3–6)
Sex partners in the 3 months prempox testing	
1	1/13 (8)
7	9/13 (69)
>6	3/13 (23)
Systemic symptoms	11/15 (73)
No prodromal symptoms	6/15 (40)
Fatigue/lethargy	9/15 (60)
Fever/chills	8/15 (53)
Myalgia	4/15 (27)
Sore throat	4/15 (27)
Localised symptoms	15/15 (100)
Number of skin lesions at peak	
1–10	11/15 (73)
11–25	1/15 (7)
26–99	2/15 (13)
>100	1/15 (7)
Skin lesions distribution	
Genital (penis and/or pubic and/or scrotal)	6/15 (40)
Anal	9/15 (60)
Face/scalp	6/15 (40)
Torso	6/15 (40)
Limbs	10/15 (67)
≥3 anatomical sites involved	8/15 (53)
Mucosal involvement (oral and/or rectal)	4/15 (27)
Lymphadenopathy	9/15 (60)
Sexual health coinfections	5/15 (33)
HSV PCR test positive	0/11 (0)
Syphilis PCR test positive	0/9 (0)
Chlamydia trachomatis NAAT test positive	5/15 (33)
Neisseria gonorrhoeae NAAT test positive	1/15 (7)

HSV, herpes simplex virus; mpox, monkeypox; MVA-BN, single dose of modified vaccinia Ankara; NAAT, Nucleic Acid Amplification Test.

and 3 were administered laxatives). One individual required hospitalisation to manage proctitis associated with severe pain and received treatment with oral Tecovirimat.

CONCLUSIONS

Our data show no clinical differences between the reported clinical findings in those developing mpox without prior immunisation[5] and those diagnosed following a single MVA-BN dose. We observed similar rates of prodromal symptoms, low number of skin lesions, anogenital skin distribution of lesions and the frequent need for further medical management of mpox complications.

We observed low numbers of mpox breakouts following MVA-BN immunisation with a single dose (15/10 068, 0.15%), even when we accounted for the start of symptoms, rather than the mpox PCR confirmation date. Figures were similar to those described in large cohort studies.[4 6]

Considering the short median time interval between inoculum and initial symptoms reported, we can infer that most individuals reported in our cohort may have been incubating mpox at the time of vaccination or developed the illness in absence of not yet sufficient neutralised antibodies, rather than having experienced vaccine failure. However, one person developed mpox symptoms 30 days after vaccination.

Preliminary data from 32 jurisdictions in the USA showed that unvaccinated individuals were 14 times more likely to contract mpox than those vaccinated.[4] In our caseload, for each individual diagnosed with mpox after a single dose of MVA-BN, there were 37 diagnosed without previous vaccine exposure in the same time frame.

The retrospective nature of our data collection, the small number of patients from a single sexual health department, the potential underestimation of postvaccination mpox cases due to individuals who may have been diagnosed with mpox in other healthcare facilities, and conversely, having not disclosed previous mpox vaccination at other sites before being diagnosed at our clinics represent the main limitations to our report. Multicentric studies are needed to effectively analyse vaccination failure rates and duration of the immune response, although we hope our report can be useful to add further evidence backing vaccination efficacy, to inform public health policymakers and to support those providing counselling to individuals at risk.

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Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants but informed consent was not sought as we are presenting clinical data from routine clinical activity and we are not presenting patient-identifiable data.

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