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Monkeypox vaccines in pregnancy: lessons must be learned from COVID-19

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An outbreak of monkeypox has recently occurred in several continents outside of Africa.[1] Case numbers are currently more than 2000, but the source and mode of transmission of the virus remain unclear, with multiple transmission events occurring in people who have not travelled to a country where the virus is endemic.[1]

The monkeypox virus is part of the orthopoxvirus family and was first identified in monkeys in 1958.[1] Its main host is rodents and it can be transmitted from animals to humans. The incubation period is 6–13 days. Sporadic human-to-human transmission by close direct contact and droplet exposure has been reported and sexual transmission might also be possible, but if this spread is through sexual transmission routes (eg, semen or vaginal fluids), or via direct skin-to-skin contact with lesions during sexual activities remains unknown.[2] The current outbreak is due to the west African clade of monkeypox,[3] which has a case fatality ratio of about 1%;[2] the central African (Congo) clade causes more severe disease.

Data on monkeypox infection in pregnancy are very limited. There is a report of a probable, but non-laboratory-confirmed, case of an infected pregnant woman (~24 weeks' gestation) who, 6 weeks later, delivered a premature infant that had a skin rash consistent with monkeypox disease who died 6 weeks later of malnutrition.[4] In the Democratic Republic of Congo, an observational study of 222 symptomatic individuals admitted to hospital with this virus reported that three of four pregnant women experienced fetal demise;[5] the fourth woman delivered a healthy baby at term. The pregnancy losses included two first trimester miscarriages; no testing of pregnancy tissue occurred. The third woman had moderately severe disease at 18 weeks' gestation and had an intrauterine fetal demise. The fetus had features of monkeypox infection and virological, histological, and serological evidence suggested vertical transmission. However, these data are limited and subject to reporting bias. Moreover, the background risk of first trimester miscarriage is 25–30%.[6] The related orthopoxvirus, smallpox, is associated with an increased risk of maternal and perinatal morbidity and mortality, including fetal death, preterm birth, and miscarriage.

The antivirals tecovirimat (approved for the treatment of smallpox) and brincidofovir are available, but there are no data on their effectiveness in treating human monkeypox.[7] Additionally, immunoglobulins might be considered[7] and the efficacy of monoclonal antibody treatment is also under investigation.

MVA-BN is a live non-replicating third-generation vaccine against a variety of orthopoxviruses.[8] Because of the high degree of attenuation, the vaccine virus has very little ability to replicate. Marketed in the EU as Imvanex, it was approved in 2013 for active immunisation against smallpox. The manufacturer (Bavarian Nordic, Germany) has not sought to extend the licence to include monkeypox. However, in the USA, where MVA-BN is marketed as JYNNEOS, it is approved by the Food and Drug Administration for vaccination against both smallpox and monkeypox.[9] The MVA-BN vaccine is 85% effective in protecting against monkeypox.[10]

Currently, no vaccine against monkeypox is approved for use in pregnancy. Because MVA-BN is a non-replicating vaccine, there is no theoretical reason for concern about its use in pregnancy.[1] Animal studies did not find any adverse fetal effects. Data are available for its use in fewer than 300 pregnant women and no increase in adverse outcomes was noted.[11] The general advice currently is that MVA-BN should be avoided during pregnancy unless the possible benefits in terms of preventing monkeypox outweigh any potential unknown risk of the vaccine.[11]

MVA-BN is considered safe in breastfeeding.[10] Whether MVA-BN passes into breastmilk remains unknown, but this is unlikely because the vaccine virus does not replicate effectively in humans. Any breastfeeding woman with substantial exposure to the virus should be offered vaccination, after consideration of the risks of monkeypox infection to her and her baby.

In this current outbreak, the advice is to vaccinate contacts of confirmed cases, including health-care workers. Administration of the vaccine up to 14 days post-exposure might not prevent disease but might reduce the severity of symptoms. The vaccine is also offered as pre-exposure prophylaxis to health-care

workers most likely to encounter suspected monkeypox cases. Both groups can include pregnant women. The lessons learned during the COVID-19 pandemic are again highlighted. Pregnant women must not be excluded from early studies of vaccines and other therapies, so that they benefit early and provide the data needed to establish the safety and effectiveness of such vaccines and therapeutics. A recent Policy Commission report emphasised that the exclusion of pregnant women from COVID-19 vaccine trials led to needless deaths of pregnant women and babies during the pandemic.[12] The Commission recommended that pregnant women should be offered the opportunity to take part in all clinical trials of medicines that could be used in pregnancy, unless there are specific safety concerns.[12]

Given that the number of exposed pregnant women, and the number of pregnant women willing to accept the monkeypox vaccine, is likely to be small, we propose a prospective international registry of pregnant women and other high-risk populations, so that the acquisition of data required for assessing safety and effectiveness can be expedited.

EM is President of the Royal College of Obstetricians and Gynaecologists (RCOG). PO is Vice President of the RCOG and co-chair of the RCOG Vaccine Committee. TD is Vice President of the RCOG. We declare no competing interests.

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