



Myocarditis - United Kingdom of Great Britain and Northern Ireland

16 May 2023

Situation at a glance

On 5 April 2023, the National IHR Focal Point for the United Kingdom informed WHO of an increase in severe myocarditis in neonates and infants associated with enterovirus infection in Wales compared with 2021. Between June 2022 and March 2023, 15 neonates and young infants presented with a picture consistent with neonatal sepsis in Wales and Southwest England. Enterovirus Polymerase Chain Reaction (PCR) testing of nine cases confirmed the presence of either coxsackie B3 or coxsackie B4. As of 20 April 2023, three patients were hospitalized, four patients were being managed as outpatients and two had died.

Although enterovirus infections are common in neonates and young infants, the reported increase in myocarditis with severe outcomes in neonates and infants associated with enterovirus infection is unusual.

Description of the situation

On 5 April 2023, the National IHR Focal Point for the United Kingdom informed WHO of an increase in severe myocarditis in neonates and infants associated with enterovirus infection in Wales compared with 2021.

Between June 2022 and March 2023, a total of 15 neonates and young infants, aged up to 28 days, presented with a picture consistent with neonatal sepsis from two regions of the United Kingdom: South Wales (10 cases) and Southwest England (five cases). Eight cases were treated in intensive care, and one case died before transfer to tertiary care. Further details on the remaining six cases which were identified through retrospective and prospective case finding are pending. In all cases alive at presentation, myocarditis was a presenting feature. The peak incidence of cases was in November 2022 (five cases), with sporadic cases in other months.

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Enterovirus PCR testing of the nine cases that presented at the hospital (with either throat swab, nose swab, nasopharyngeal aspirate or cerebrospinal fluid samples) confirmed the presence of an enterovirus, subtyping to either coxsackie B3 or coxsackie B4. Critical care support including intubation, ventilation and circulatory support was given to the eight patients who went to intensive care.

As of 20 April 2023, three patients were hospitalized, four patients were being managed as outpatients and two had died.

Reported increase in severe myocarditis in neonates and infants associated with enterovirus infection is unusual. In the same hospital (covering the South Wales region) over the previous six years, only one other similar case has been identified.

Epidemiology of Myocarditis (acute infective)

Myocarditis is an inflammation of the heart muscle (myocardium). The most common cause of myocarditis is a viral infection (e.g., Enteroviruses), but it can also be caused by a bacterial infection, a reaction to a drug, or an autoimmune disease. Myocarditis symptoms include acute and persistent chest pain, shortness of breath, and heart palpitations (racing or pounding heartbeat).

Enteroviruses can cause a number of infectious illnesses and are responsible for annual epidemics. These are usually mild but have been found to affect neonates differently, and often more severely, than older children. There are multiple transmission routes, particularly in the neonatal period. The reported incident represents an increase in both the number and severity of enterovirus (coxsackieviruses) infections in infants under the age of one month. There is increased morbidity and mortality associated with the current incident.

Public health response

On 28 February 2023, pediatricians in the South Wales region were alerted about the recent cases, with advice to consider myocarditis in infants and neonates presenting with shock.

A nationwide Incident Management Team (IMT) was set up and is reviewing the evidence from all English Regions and United Kingdom countries to determine the next steps for the response.

Epidemiological investigations are ongoing.

Following the IMT meeting on 28 April 2023, the United Kingdom authorities have raised awareness of the enterovirus cluster among healthcare practitioners and to test for enteroviruses in suspected cases. Hospital laboratories have been reminded to submit positive enterovirus samples to the national reference laboratory for viral characterization and typing. Clinicians and hospital laboratories have been asked to report suspected cases of neonatal enterovirus myocarditis identified since 1 June 2022 to the United Kingdom Health Security Agency.

Public Health Wales published a [written statement on 3 May 2023](#) regarding this event to further notify the public and healthcare practitioners.

WHO risk assessment

According to the United Kingdom Health Security Agency, a review of past data from the previous six years from the same tertiary care centre in Wales has identified only one similar case in 2021 (which may or may not be linked to the current incident) and no further cases which match this clinical picture.

Preliminary investigations from the national United Kingdom IMT have not identified any other clusters in any other region beyond those in South Wales and Southwest England in the United Kingdom in the past 12 months.

Based on the limited information available at this point, WHO assesses the public health risk as low. However, asymptomatic carriage and shedding of infectious virus is a feature of enterovirus infection and there was little evidence in this case series of maternal infection prior to or during delivery. As enterovirus infection is often not among the notifiable diseases in Member States, additional cases of severe, neonatal enterovirus infections might have gone undiagnosed and/or unreported elsewhere.

WHO advice

Non-polio enteroviruses are common and distributed worldwide. Although infections often are asymptomatic, others present with mild to moderate respiratory tract infections. Symptoms include fever, runny nose and body weakness. These viruses are also associated with occasional outbreaks in which an unusually high proportion of patients develop clinical disease, sometimes with serious and fatal consequences – in this instance myocarditis. Clinicians seeing infants and neonates presenting with shock may consider a diagnosis of myocarditis and consider testing for enteroviruses.

No specific antiviral therapy is available, and treatment focuses on prevention of complications. As there is no vaccine for this virus, control measures during outbreaks are focused on classical hygiene measures including frequent handwashing and disinfection of soiled clothing and surfaces. In certain situations, it may be advisable to close child-care facilities and schools to reduce the intensity of transmission.

WHO does not recommend any travel and/or trade restrictions to the United Kingdom based on the information available for this event.

Further information

- World Health Organization, Health topics, Enterovirus 71, available at <https://www.who.int/teams/health-product-policy-and-standards/standards-and-specifications/vaccine-standardization/enterovirus-71>
- UK Health Security Agency, Enterovirus: summary of strain characterisation available at: <https://www.gov.uk/government/publications/enterovirus-strain-characterisation/enterovirus-summary-of-strain-characterisation> [accessed 20 April 2023]
- Ng KF, Gibb J, Struik S Neonatal Enteroviral Myocarditis Consortium, et al. Remember the heart: neonatal myocarditis Archives of Disease in Childhood 2023;108:417-419. Available at: <http://dx.doi.org/10.1136/archdischild-2023-325316>

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