Guidance

Myocarditis and pericarditis after COVID-19 vaccination: guidance for healthcare professionals

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Contents

This publication is available at https://www.gov.uk/government/publications/myocarditis-and-pericarditis-after-covid-19-vaccination/myocarditis-and-pericarditis-after-covid-19-vaccination-guidance-for-healthcare-professionals

The UK Health Security Agency (UKHSA), in partnership with the Royal College of General Practitioners (RCGP) (https://www.rcgp.org.uk/) and the Royal College of Emergency Medicine (RCEM) (https://rcem.ac.uk/), has produced this clinical guidance to support the detection and management of clinical cases of myocarditis and pericarditis associated with coronavirus (COVID-19) vaccination.

It is a living document and will be reviewed and updated as further data becomes available.

Background

Background to myocarditis and pericarditis after COVID-19 vaccination and guidelines:

- this is a rare condition following vaccination (see the Medicines and Healthcare products Regulatory Agency's (MHRA) weekly summary (https://www.gov.uk/government/publications/coronavirus-covid-19-vaccine-adverse-reactions/coronavirus-vaccine-summary-of-yellow-card-reporting) for the latest data)
- most patients who develop symptoms do so within a week of vaccination
- most patients who develop symptoms have usually been vaccinated with a mRNA vaccine (Pfizer or Moderna)
- myocarditis and pericarditis following vaccination is usually mild or stable and most patients typically recover fully without medical treatment
- myocarditis – a very small number of those with this condition have been admitted to hospital. In 2 studies from the US [footnote 1] [footnote 2], significant left ventricular (LV) fibrosis has been described in a high percentage of those children admitted to hospital, with a small percentage of these having non-sustained ventricular tachycardia (VT)
  - no long-term follow-up data is available yet on hospitalised patients
  - diagnosis of myocarditis and pericarditis should follow published international guidelines
  - the majority of cases appear to be mild and self-limiting; any acutely ill or unstable patients should be referred to hospital directly
  - the long-term consequences of this condition secondary to vaccination are yet unknown, so any screening recommendations need to be balanced against the frequency and severity of the disease with the aim to prevent complications, in particular of myocarditis (arrhythmias, long term myocardial damage or heart failure)

Epidemiology

Myocarditis and pericarditis are both inflammatory conditions of the heart. The incidence of myocarditis is difficult to ascertain as most cases are mild and are often not well investigated. In one study from the UK (https://www.ahajournals.org/doi/10.1161/circ.140.suppl_1.11463), it was estimated that between 1998 and 2017, there were 36.5 per 100,000 NHS admissions with myocarditis, with the numbers increasing each year since 2004. In 2017, it was estimated that there were about 2,000 hospital admissions for myocarditis.

Overall, two-thirds of myocarditis cases were in men (https://www.mdpi.com/2077-0383/10/4/603), and men were significantly younger (median age 33) compared to women. The most common type of myocarditis is an acute lymphocytic myocarditis, often caused by viral infection.

Pericarditis is a more benign condition and responds to treatment with anti-inflammatory medical treatment. In most cases, it has no long-term sequelae if treated promptly, but it can reoccur.

Post-COVID-19 vaccination

Reports of myocarditis and pericarditis (https://www.gov.uk/government/publications/coronavirus-covid-19-vaccine-adverse-reactions/coronavirus-vaccine-summary-of-yellow-card-reporting) following vaccination with COVID-19 vaccines have been received by the MHRA.

As of 17 November 2021, there have been 432 reports of myocarditis and 332 reports of pericarditis following the use of the Pfizer vaccine. There have been 101 reports of myocarditis and 57 reports of pericarditis following the use of the Moderna vaccine. Some cases have been reported following the use of the AstraZeneca vaccine, but given the extensive use of AstraZeneca in the UK, these are thought to reflect the expected background incidence rate of myocarditis and pericarditis conditions.

As of 17 November 2021, the overall reporting rate across all age groups for myocarditis following vaccination with the Pfizer vaccine is 10 per million doses; for pericarditis, it's 7 per million doses. For Moderna, the overall reporting rate for myocarditis is 36 per million doses; for pericarditis, it's 21 per million doses.

In those aged under 18 years, the reported rate for heart inflammation (myocarditis and pericarditis) is 10 per million doses (first dose or unknown dose) of the Pfizer vaccine. The Pfizer COVID-19 vaccine is recommended for use in this age group.

Recommendations in paediatric patients in the context of recent COVID-19 vaccination (within 10 days)

Presentation

If the patient is acutely unwell or unstable, has concerning features or if you have clinical concern, then they should be discussed with the emergency department (ED) or medical team and referred to hospital for further investigation.

Suspected cases should be examined by a doctor or nurse practitioner.

Concerning features that may require further investigation:

- significant chest pain (new onset and unexplained) – it can be difficult for children to localise chest pain
- tachycardia or tachypnoea
- dyspnoea (new onset and unexplained)
- palpitations (new onset and unexplained)
- dizziness or syncope (new onset and unexplained)
- general clinical concern

Where appropriate the patient should be seen face to face and this assessment should include their vital signs.

Dependent upon the assessment and findings, clinical judgement should be used to determine if myocarditis or pericarditis remains a potential diagnosis of concern.

Where concern or doubt remains or there are findings that suggest an emergency assessment is required, then a discussion should take place with local paediatric services as to the most appropriate place and time for a further assessment to be made.

Clinicians should ensure they communicate with the young person or their family or carers that the condition is very rare, usually mild, often self-remitting and that long-term consequences are yet unknown.

If patients have mild symptoms, they do not require a referral to secondary care at this point.

Investigations

Hospital investigations should follow local myocarditis or pericarditis guidelines with the involvement of the regional paediatric cardiology team.

If there is a suspicion of myocarditis or pericarditis, initial investigations should be:

- 12 lead electrocardiogram (ECG)
- inflammatory blood markers (C-reactive protein (CRP), full blood count (FBC) and erythrocyte sedimentation rate (ESR))
- Troponin

If abnormal ECG or Troponin, discuss with the paediatric cardiology team for further management plan, including cardiac imaging (echocardiogram, cardiac magnetic resonance imaging (MRI)) and rhythm monitoring (24h Holter, stress ECG).

Further investigations and follow-up should be led by the regional paediatric cardiology team.

Recommendations in young people under 40 years of age in the context of recent COVID-19 vaccination (within 10 days)

Presentation

If the patient is acutely unwell or unstable, has concerning features or if you have clinical concern, then they should be discussed with the ED or medical team, and referred to hospital for further investigation.

Where appropriate the patient should be seen face to face and the assessment should include their vital signs.

Suspected cases should be examined by a doctor or nurse practitioner.

Concerning features that may require a referral for further investigation:

- significant chest pain (new onset and unexplained)
- tachycardia or tachypnoea
- dyspnoea (new onset and unexplained)
- palpitations (new onset and unexplained)
- dizziness or syncope (new onset and unexplained)
- general clinical concern

If patients have mild symptoms, they do not require a referral to secondary care at this point.

Dependent upon the assessment and findings, clinical judgement should be used to determine if myocarditis or pericarditis remains a potential diagnosis of concern.

Investigations in secondary care

If there is a suspicion of myocarditis or pericarditis, the initial investigations should be:

- 12 lead ECG
- inflammatory blood markers (CRP, FBC and ESR)
- Troponin

If abnormal ECG or troponin, discuss with the cardiology team for further management plan, which might include cardiac imaging (Echocardiogram, cardiac MRI) and rhythm monitoring (24h Holter, stress ECG).

Further investigations and follow-up should be led by the regional cardiology team.

Further follow-up

Patients that did not require referral to hospital on initial presentation or have normal initial investigations do not require further follow-up.

All patients that did not require referral to hospital in initial presentation should be:

- given the following 'safety netting' advice: 'if symptoms persist or worsen within 5 days, then they should return to their GP for review'
- referred for further investigation if, when seen later, have concerning features including general clinical concern

Patients requiring outpatient follow-up should be referred to cardiology and an assessment undertaken within 4 weeks.

Appendix: membership of the Expert Working Panel

Professor Guido Pieles (Chair) – Consultant Paediatric and Adult Congenital Cardiologist, Congenital Heart Unit, Bristol Heart Institute and University College London.

Professor Amedeo Chiribiri – Cardiovascular Imaging and Consultant Cardiologist, Guy's and St Thomas' NHS Foundation Trust.

Dr Paul Clift – Consultant Cardiologist, University Hospitals Birmingham.

Professor Adam Finn – Professor of Paediatrics, University of Bristol and Member of the Joint Committee on Vaccination and Immunisation (JCVI).

Dr Mark Hamilton – Consultant Cardiac Radiologist, Bristol Heart Institute and Bristol Royal Hospital for Children.

Dr Katherine Henderson – Consultant Emergency Medicine, President of the Royal College of Emergency Medicine.

Dr Maria Ilina – Consultant Paediatric Cardiologist, Royal Hospital for Children, Glasgow.

Dr Tevfik Ismail – Consultant Cardiologist, Guy's and St Thomas' NHS Foundation Trust.

Dr Jonathan Leach – General Practitioner, NHS England Medical Director for COVID-19 Vaccination and Joint Honorary Secretary of the Royal College of General Practitioners.

Dr Conor McCann – Consultant Cardiologist, Belfast Trust.

Dr Rubin Minhas – General Practitioner.

Dr Eva Sammut – Academic Clinical Lecturer and Cardiology Registrar, University Hospitals Bristol and Weston NHS Foundation Trust.

Dr Nicholas Sargant – Consultant Paediatric Emergency Medicine, University Hospitals Bristol and Weston NHS Foundation Trust.

Dr Simon Stockley – General Practitioner and Senior Medical Lead, National COVID-19 Vaccination Programme and Royal College of General Practitioners.

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1. Association of myocarditis with BNT162b2 messenger RNA COVID-19 vaccine in a case series of children (https://jamanetwork.com/journals/jamacardiology/fullarticle/2783052), Journal of the American Medical Association (JAMA) Cardiology.
2. COVID-19 vaccination – associated myocarditis in adolescents (https://publications.aap.org/pediatrics/article/148/5/e2021053427/181357/COVID-19-Vaccination-Associated-Myocarditis-in?autologincheck=redirected), American Academy of Pediatrics.