

In brief

Chest pain or dyspnoea following COVID-19 vaccination

4 May 2022

Summary

- Chest pain, fever, dyspnoea and palpitation are the most commonly-reported symptoms after COVID-19 vaccine-associated myocarditis and pericarditis.
- Myocarditis and pericarditis occur more frequently in younger males, and following the second vaccination dose. Mean symptom onset is within one week of vaccination and cases are usually mild and resolve quickly.
- mRNA COVID-19 vaccines are associated with a higher risk of myocarditis or pericarditis compared to non-mRNA vaccines.
- Following COVID-19 vaccine-associated myocarditis or pericarditis, the Australian Government recommends:
 - mRNA COVID-19 vaccines may be given to people investigated for pericarditis who have normal ECG, troponin and inflammatory markers, and who have been symptom free for at least six weeks
 - future doses should be informed by age and sex for people with pericarditis and abnormal investigation results
 - deferring further mRNA vaccine doses for people with myocarditis – Vaxzevria may be considered after recovery from symptoms.

Evidence

Peer-reviewed literature

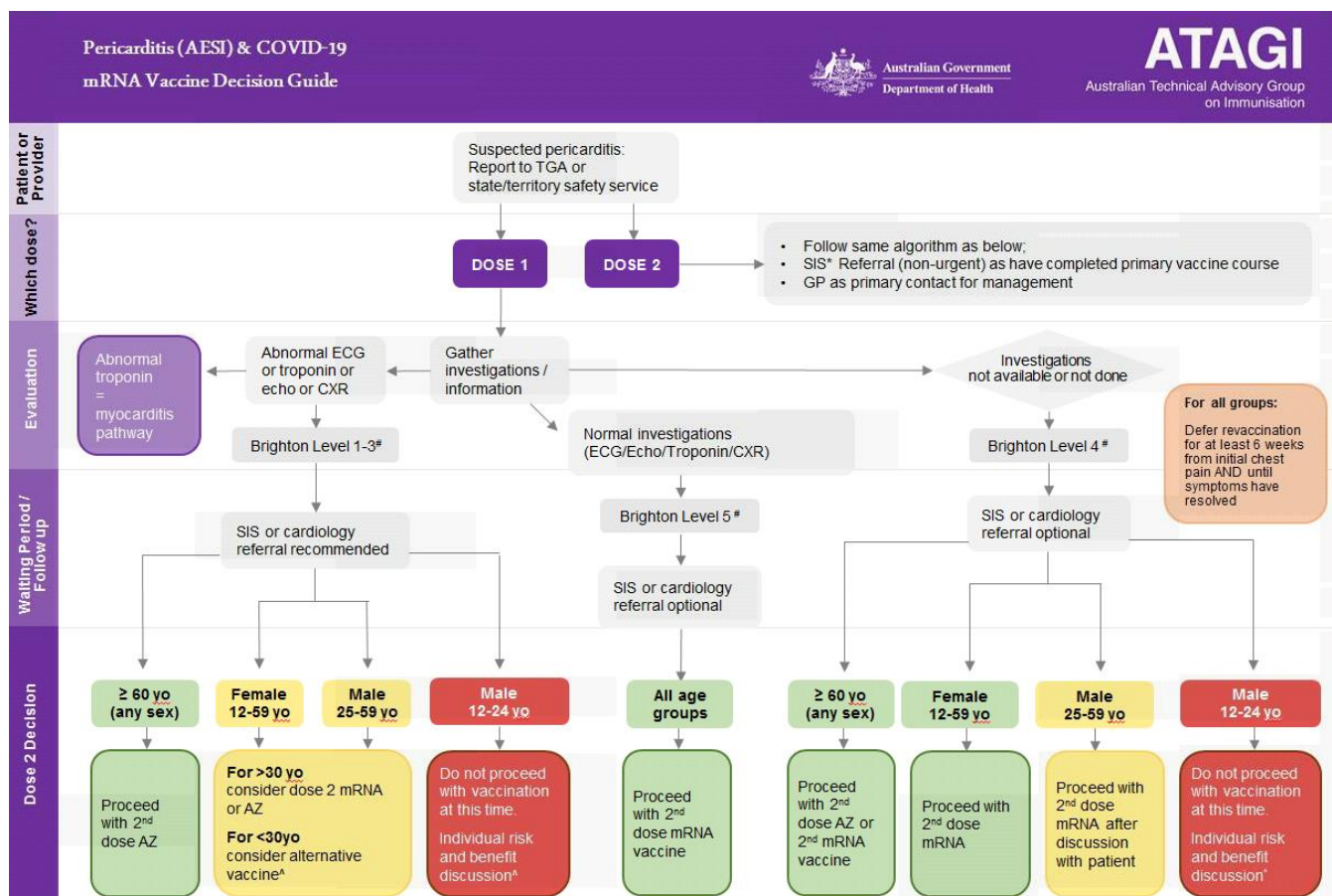
- Six systematic reviews, one narrative review and two observational studies on cardiac complications after COVID-19 vaccination reported:
 - chest pain, fever, dyspnoea and palpitation as the [most common symptoms](#)
 - [mean symptom onset](#) within one week of vaccination
 - myocarditis occurred more frequently following the [second vaccination dose](#)
 - majority of patients were [young males](#) (73.4–92.7%)
 - [mRNA vaccines are associated with a higher risk of developing myocarditis or pericarditis compared with viral vector vaccines](#).¹⁻⁹
- One [systematic review and meta-analysis](#) reported that the incidence of myopericarditis did not differ significantly between people who received COVID-19 vaccines and those who received non-COVID-19 vaccines.⁹
- Cases of [myocarditis and pericarditis following vaccination are mostly mild](#) and resolve within a few days to a few weeks.^{1, 2, 7, 10}

- The pooled incidence of myocarditis and pericarditis extrapolated is 0.001% and 0.0004%, respectively.¹
- Cases of myocarditis following non-mRNA COVID-19 vaccines do not appear to be at an increased incidence compared to background incidence rates.^{3, 7}
- There is limited evidence on the incidence of myocarditis following a third or fourth booster vaccination dose.¹⁰
- Treatment for myocarditis and pericarditis after COVID-19 vaccination may include immunosuppressants and anti-inflammatories (e.g. colchicine, NSAIDs and steroids), rest, supportive treatment and pain management.^{1-3, 7, 8, 10}
- Follow-up should be ongoing and monitor long-term outcomes and cardiac function.^{7, 10}
Management may include limiting strenuous physical activity and competitive sports until after symptoms resolve.⁸

Grey literature

- Australian Government guidance on myocarditis and pericarditis after mRNA COVID-19 vaccines reports that reactions are most common in males under 30 years of age and after the second vaccine dose. Cases are mild and resolve quickly. Vaxzevria (AstraZeneca) is not associated with this increase in risk after vaccination.¹¹
- Future vaccine dose recommendations vary depending on investigation results:
 - Further mRNA COVID-19 vaccine doses may be given to people investigated for pericarditis who have normal ECG, troponin and inflammatory markers, and who have been symptom-free for at least six weeks.
 - For people with pericarditis and abnormal investigation results, future doses should be informed by age and sex (see Figure 1).
 - People with confirmed myocarditis from an mRNA vaccine should defer further mRNA doses. If they are 18 years or older, Vaxzevria may be considered after recovery from symptoms.¹¹
- The Australian Technical Advisory Group on Immunisation (ATAGI) recommends the benefits of COVID-19 vaccination outweigh the risk of vaccine-associated myocarditis or pericarditis.¹²
- According to the Australian Therapeutic Goods Association, myocarditis is reported in 1 to 2 in every 100,000 people who receive Comirnaty (Pfizer) and Spikevax (Moderna). However, it is more common after the second dose in boys aged 12 to 17 years (12 cases per 100,000 Comirnaty doses and 20 cases per 100,000 Spikevax doses) and men under 30 (8 cases per 100,000 Comirnaty doses and 18 cases per 100,000 Spikevax doses).¹³
- The United States Centers for Disease Control and Prevention has estimated the incidence of COVID-19 vaccine-associated myocarditis as 0.48 cases per 100,000 overall, and 1.2 cases per 100,000 among those aged 18–29 years.¹⁴
- If a patient develops myocarditis after the first or second dose of an mRNA vaccine, the Centers for Disease Control and Prevention recommends any subsequent dose be delayed until after symptoms resolve.¹⁴

Figure 1: ATAGI approach to revaccination in people with pericarditis attributed to an mRNA COVID-19 vaccine



Background

COVID-19 vaccines are reported to be associated with the development of myocarditis and pericarditis, particularly in younger males. Vaccine-associated myocarditis and pericarditis may present as chest pain or dyspnoea within one week after the second vaccination dose.^{1, 10, 15} The underlying cause has not been established.¹

Appendix

PubMed, Google, and Google Scholar were searched on 25 March 2022 and 13 April 2022. The search terms used are outlined below. The Critical Intelligence Unit maintains a living evidence table on [COVID-19 vaccines](#).

PubMed search terms

("chest pain"[MeSH Terms] OR "chest pain"[Title/Abstract] OR "dyspnea"[MeSH Terms] OR "dyspnea*"[Title/Abstract] OR "dyspnoea"[Title/Abstract]) AND ("covid 19"[Title/Abstract] OR "covid 19"[MeSH Terms] OR "sars cov 2"[Title/Abstract] OR "sars cov 2"[MeSH Terms] OR "severe acute respiratory syndrome coronavirus 2"[Title/Abstract] OR "ncov"[Title/Abstract] OR "2019 ncov"[Title/Abstract]) AND ("vaccin*"[Title/Abstract] OR "immuniz*"[Title/Abstract] OR "vaccination"[MeSH Terms] OR "covid 19 vaccines"[MeSH Terms]) AND (english[Filter])

Google and Google Scholar search terms

Searches were conducted using terms related to COVID-19 vaccination, myocarditis and pericarditis.

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