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A primer for primary care professionals

Myocarditis and Pericarditis After Covid-19 Vaccination

Myocarditis and pericarditis after mRNA Covid-19 vaccination are rare events. Estimates of incidence vary internationally and may be as high as 1 in 3000 in adolescent males receiving their second mRNA dose. As more young people receive their vaccinations, a more precise estimate will be possible. This document was developed to support primary care clinicians encountering patients with possible myocarditis or pericarditis after Covid-19 vaccination.

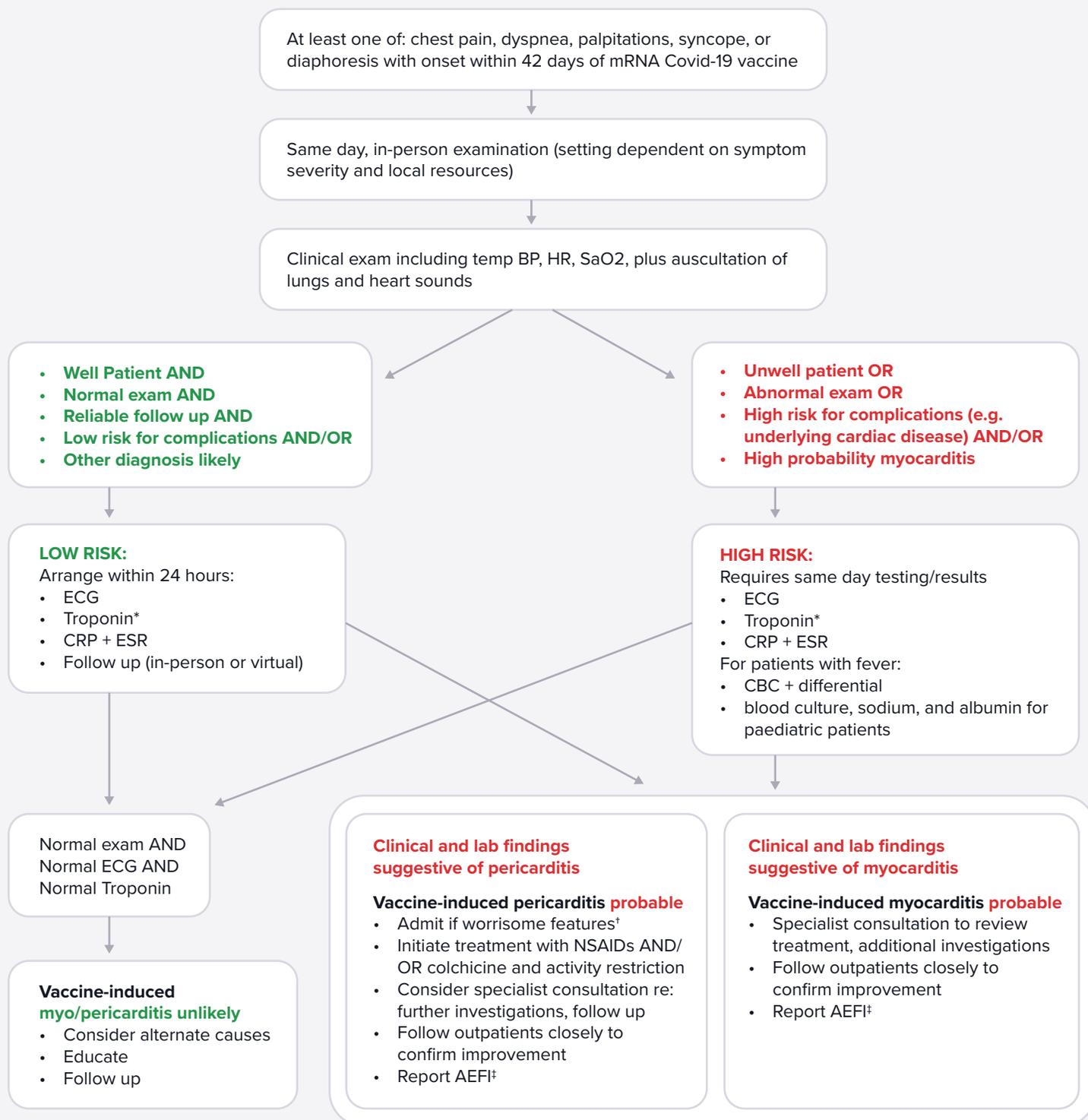
Other resources are available for counselling patients and guardians about Covid-19 vaccination. Examples from the British Columbia Centre for Disease Control (BC CDC) and Sick Kids are included in the list of sources. Canada's National Advisory Committee on Immunizations (NACI) continues to strongly recommend that a complete series with an mRNA vaccine should be offered to all eligible individuals 12 years of age and older because it protects against SARS-CoV-2 infection and transmission and symptomatic Covid-19 disease, including severe illness, hospitalization and death.

Available information indicates that cases of myocarditis and pericarditis after mRNA Covid-19 vaccines usually occur within a week, and are more common after the second dose, in males, and in people under 30. Most cases resolve with conservative treatment.

Many primary care clinicians will encounter possible cases of myocarditis post-vaccination over the next few months. **Every case should be reported as an Adverse Event Following Immunization (AEFI):** <https://www.canada.ca/en/public-health/services/immunization/reporting-adverse-events-following-immunization.html>

Acknowledging that much is uncertain about these conditions, we have created an algorithm and answers to frequently asked questions to guide assessment and management in outpatient primary care practices.

Proposed Primary Care Algorithm



* In Ontario, troponin is only available through hospital laboratories

[†] Worrisome features in non-traumatic pericarditis: fever > 38°C; subacute symptom onset; large pericardial effusion; cardiac tamponade; immunocompromised patient; possible myocarditis; oral anticoagulant use.

[‡] <https://www.canada.ca/en/public-health/services/immunization/reporting-adverse-events-following-immunization/form.html>

Frequently Asked Questions

Management in outpatient primary care clinics of possible post-vaccination myocarditis and pericarditis

What are the cardinal symptoms and signs?

The Brighton Collaboration's Draft Myocarditis and Pericarditis Case Definitions provide a diagnostic framework (accessible at <https://brightoncollaboration.us/myocarditis-case-definition-update/>).

Typical pericarditis presents with pain that is sharp, pleuritic and acute in onset. Pain may improve with sitting up and leaning forward and may radiate to the trapezius. A pericardial rub may be auscultated. Patients with myocarditis may present with cardiac symptoms, including acute onset chest pain, exertional dyspnea, palpitations or diaphoresis. They may present with non-specific symptoms including fatigue, gastrointestinal symptoms, syncope, edema, or cough.

If systemic symptoms are present (e.g. fever, myalgias), multisystem inflammatory syndrome (MIS) should be considered as an alternate diagnosis, even if post-vaccine. If MIS is suspected, patients should be assessed in the emergency department (or equivalent) and be tested for Covid-19.

Which patients should be sent straight to the emergency department?

Any patient with symptoms that interfere with daily activities or abnormal vital signs requires emergent assessment and access to rapid testing through an emergency department or equivalent setting.

Which patients might be safely worked up in a primary care or outpatient setting?

Timely (i.e., same day) physical examination (i.e., vital signs including oxygen saturation (SpO₂) and auscultation of lungs and heart) is required to identify patients requiring emergent testing. Urgent specialist consultation is recommended if risk factors are present such as fever, intolerance to non-steroidal anti-inflammatory drugs (NSAIDs), immunocompromised conditions, and pericarditis in context of anticoagulant therapy. Outpatient work-up may be appropriate if there is a more probable alternative diagnosis and/or symptoms/test abnormalities are mild with minimal impact on function and not worsening over time **and** when close follow-up is available.

What is the recommended work-up for patients who can be safely investigated as outpatients?

Patients being investigated as an outpatient require an ECG, troponin, and inflammatory markers (CRP and ESR) along with any investigations relevant for the differential diagnosis (including Covid-19 testing for some patients). Normal ECG and troponin help rule out myocarditis or pericarditis. In Ontario, troponin testing is only available through hospital laboratories.

In pericarditis, progressive ECG changes may occur. PR segment depression with diffuse ST-segment elevation is a specific finding. Patients may present with sinus tachycardia. Importantly, atypical and non-diagnostic ECG changes may be present in up to 40% of patients. Consider specialist consultation if abnormal ECG findings are detected.

Non-specific ST-segment and T-wave changes may be detected on ECG in myocarditis. Myopericarditis is usually accompanied by diffuse ST-segment elevation. Paroxysmal or sustained atrial or ventricular arrhythmias, and AV nodal or intraventricular conduction changes may occur. Specialist consultation is recommended to inform additional investigations, management, and follow-up if myocarditis is suspected.

Is it ever appropriate to manage vaccine-related myocarditis and pericarditis solely in primary care?

Close follow-up by primary care along with careful instructions for re-assessment may be appropriate for some individuals with probable pericarditis. Individuals with mild symptoms relieved by NSAIDs, who have normal ECG and troponin levels, and who are not at risk of serious outcomes may not require specialist consultation. Given uncertainties about post-vaccine cardiac adverse events, it is reasonable to consult with a specialist (virtually, or in-person).

The management, timing and type of additional investigations, and follow-up of some patients should be reviewed with a specialist (virtually, or in-person). This includes: patients with probable myocarditis or myopericarditis; patients with abnormal ECG findings or troponin levels; and patients with risk factors for serious outcomes.

Mild cases may be treated with oral NSAIDs for symptomatic relief. Possible regimens include:

For adults:

- Ibuprofen 600 - 800 mg q8h x 7 - 10 days with gastroprotection as indicated
- For adults with pericarditis, adjunctive colchicine may reduce the risk of recurrent relapsing pericarditis
 - Colchicine 0.5 mg PO BID x 3 months

For children:

- Ibuprofen 10 mg/kg/dose (max 600 mg/dose) x 1 week, then
 - Ibuprofen 7.5 mg/kg/dose (max 400 mg/dose) x 1 week, then
 - Ibuprofen 5 mg/kg/dose (max 200 mg/dose) x 1 week
- Colchicine may be considered on a case-by-case basis, per specialist advice

What consultation or referral options are available when you are uncertain?

If you encounter a patient with possible Covid-19 vaccine-related myocarditis or pericarditis, you can review next steps with on-call specialists in internal medicine, cardiology, or paediatrics.

What is the follow-up for patients who have this condition?

To date, the majority of reported cases of myocarditis and pericarditis after Covid-19 vaccination have been mild. Most patients have experienced symptom resolution, with improvement in the first 24-to-48 hours after initiation of therapy. Patients may be referred to cardiology to consider future investigations and follow-up. For questions about subsequent vaccine doses, patients may be referred to a "Special Immunization Clinic" (<https://cirnetwork.ca/sic-network-patient-referrals/>).

→ Access our “Myocarditis and Pericarditis After Covid-19 Vaccines” document for patients and guardians at: https://uwaterloo.ca/pharmacy/sites/ca.pharmacy/files/uploads/files/myocarditis_and_pericarditis_after_covid-19_vaccines.pdf

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