DoD Clinical Guidelines for Post-Smallpox Vaccine Associated Myopericarditis
DHA Immunization Healthcare Division

Vaccine(s) administered in past 30 days

Clinical symptoms: Chest pain, shortness of breath, palpitations, syncope, dry cough, or any suspected cardiopulmonary symptom(s)

Initial Evaluation

History: Characterize symptoms[1]
Past medical history[2]
- Include detailed vaccination hx

Risk factors for cardiac symptoms[3]

Physical Examination[4]
Laboratory[5] (Troponin T, BNP, ESR, usCRP, CK-MB, Viral surveillance)
Diagnostics[6] (Electrocardiogram, Echocardiogram, CXR (PA/Lat), Pulmonary function testing, Imaging studies (Cardiac MRI with t1/t2 mapping))

A. Symptoms only

A. Cardiology Consultation
- Document normal ECG, hsTroponin T, CK, usCRP, other studies as indicated during acute symptoms[5,6]
- Consider non-cardiac etiologies[7]

Therapeutic options[8]: NSAIDs, Colchicine, other Rx
Management & Recovery[9]
- Activity based on exercise tolerance and clinical assessment
- Clinical F/U when asymptomatic with ECG, echocardiogram, and exercise stress test to clear for return to full duty
- For ongoing or persistent symptoms, refer to cardiology (stress test not recommended)

B. Symptoms + objective abnormality[11]

B. Cardiology Consultation
- Differential includes myopericarditis, acute coronary syndrome, and other cardiac etiologies[5,6,7,11]

Special labs and diagnostics[5,6] as indicated

B1. Symptoms with objective ECG abnormality but without positive cardiac enzymes or LV dysfunction[11]

Therapeutic options[8]: NSAIDs, Colchicine, other Rx
Management & Recovery[9]
- No strenuous activity for 6 weeks
- Clinical F/U when asymptomatic with ECG, echocardiogram, exercise stress test to clear for return to full duty; repeat abnormal studies
- For ongoing or persistent symptoms, refer to cardiology (stress test not recommended)

B2. Symptoms with positive cardiac enzymes, depressed LV function, and/or imaging c/w myocarditis[11]

Therapeutic options[8]: NSAIDs based upon EF, other Rx
Management & Recovery[9]
- No strenuous activity for 6 weeks
- 6 week clinical F/U visit, ECG, echocardiogram, exercise stress test as clinically indicated; repeat abnormal studies (including cardiac enzymes)
- Activity as tolerated.
- Deployment restriction for a minimum of 3 months
- Cardiology F/U at 3-6 months[6]

B3. Includes B2 and any of the following: LVEF < 40%, sustained dysrhythmias, and/or hemodynamic instability

- **Early Transfer** to Tertiary Care Center - consider myocardial Biopsy

Therapeutic options & Management: see **Footnotes 8 & 9**[8,9]
- No strenuous activity for 6 weeks
- Close clinical F/U as directed by cardiologists (echocardiogram, ECG, exercise stress test)
- Activity as tolerated & deployment restriction for 3 to 6 months or longer as guided by clinical progress
- Cardiology F/U at 3-6 months for repeat evaluation (reassess deployability)[6]

Refer **all** cases to IHD for clinical case review, entry into DoD Smallpox Vaccine Myopericarditis Registry, filing of VAERS report, and natural history surveillance.[10] With referral include: Patient and provider contact information, Echocardiograms, ECG, cardiac isoenzyme results, imaging results, and copies of pertinent records.

Consultation: Call the Immunization Healthcare Support Center at 877-438-8222 (DSN: 761-4245), Option 1 to request IHD and/or military cardiology clinical consultation.

FOOTNOTES: The following guidance is for reference. Not every suggestion will be applicable to every patient. Recommendations are to be applied as diagnostic and therapeutic needs or questions arise and should be in conjunction with IHD staff consultation.

Footnote 1	**Characterize symptoms, including chest pain type**	Specify symptom location, character, onset, duration, intensity/severity, frequency, accompanying/associated symptoms, and alleviating/aggravating factors. All associated clinical symptoms should be detailed. Categorize patient's chest pain type if present (choose one): 1. Pericarditis chest pain: Chest pain that is typical and made worse by supine position, improved with leaning forward, pleuritic, constant a. Detailed history is critical to case definition of suspect pericarditis – see case definitions, page 5 2. Myocarditis chest pain: angina-like, diffuse; not necessarily positional or pleuritic 3. Atypical chest pain: Pain, pressure, or discomfort in the chest, neck, or arms not clearly exceptional or not otherwise consistent with pain or discomfort of myocardial ischemic origin. **Reference:** Box 10, Surveillance guidelines for smallpox vaccine (vaccinia) adverse reactions. (2006, February 3) *MMWR:Morbidity and Mortality Weekly Report, 55*(RR01);1-16. Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5501a1.htm
Footnote 2	**Assess past medical history**	Detailed review of all systems, with attention to the following disorders: ▪ Lung disease ▪ Gastrointestinal disease ▪ Vascular disease (e.g., stroke, transient ischemic attack, peripheral arterial disease) ▪ Musculoskeletal disorders (e.g., impingement syndrome, thoracic outlet syndrome) ▪ Vaccination history and adverse events (with specific lot number, if available) **Reference:** PMH study guide https://meded.ucsd.edu/clinicalmed/introduction.htm
Footnote 3	**Risk Factors for Cardiac Symptoms**	▪ Personal History of angina, myocardial infarction (MI), congestive heart failure (CHF), percutaneous coronary intervention (e.g., balloon angioplasty, stent, atherectomy), coronary artery bypass graft (CABG), catheterization with stenosis ≥ 50%. ▪ Age, sex, race/ethnicity (ethnicity: Hispanic or Latino, Not Hispanic or Latino; Race: American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, Black or African American, White)) ▪ Diabetes, hypertension, smoking, dyslipidemia, family history of CAD (especially prior to age 55), obesity, physical inactivity, stress, and excessive alcohol consumption. **Reference:** http://www.heart.org/HEARTORG/Conditions/HeartAttack/UnderstandYourRiskstoPreventaHeartAttack/Understand-Your-Risks-to-Prevent-a-Heart-Attack_UCM_002040_Article.jsp
Footnote 4	**Physical Examination**	Perform a focused PE to include: gender and race/ethnicity, vital signs, ht, wt, detailed exam to include vaccination site, cardiac (jugular venous pressure if able), pulmonary, peripheral edema and lymphadenopathy. **Reference:** http://meded.ucsd.edu/clinicalmed/introduction.htm
Footnote 5	**Laboratory studies**	Report normal range as defined by individual hospital laboratory standards. Record units and normal range for laboratory.
Laboratory studies: All patients		
	Complete blood count	CBC at presentation, to include differential, with emphasis on eosinophil and lymphocyte count should be noted.
	Cardiac enzymes	All Creatinine Kinase (CK), CK-MB, and troponin T (TnT) or high sensitivity troponin T, values should be noted. For troponin T values, document 99th percentile cut-off for testing system used as well as name of testing system if available. For hs TnT, follow institutional hs TnT interpretation guidelines. hsTnT is the most accurate method for determining myocardial involvement (pericarditis vs epicarditis).
	Inflammatory markers	All erythrocyte sedimentation rate and C-reactive protein (CRP) (ultrasensitive, if available) values should be noted.
Laboratory studies as clinically indicated:		
	Immune complex screening	All Complement related assay studies (including C3, C4, CH50, C1q & C3D-binding assays) with values should be noted.

	Brain natriuretic peptide	Consider BNP if dyspnea is present.
	Viral surveillance	**Smallpox vaccine related myopericarditis is a diagnosis of exclusion.** No smallpox vaccine related cases have exhibited vaccinia virus etiology to date**.** When considering other etiologies, viral surveillance is indicated.
	Serologies and PCR	Consider ID consultation; Serology/PCR recommended for **coxsackie B (enteroviruses), CMV, Parvovirus B19, HHV-6, HSV-1,** Epstein-Barr, hepatitis A/B/C IgM and IgG titers. For IgM-positive studies, obtain specimens for convalescent titers at 4 week interval. **Reference:** Viral Myocarditis, Curr Opin Rheumatol. 2016 Jul; 28(4): 383–389
	Other Cultures	Consider ID consultation; all viral cultures (nasal wash, urine, feces) for adenovirus, influenza viruses, parvovirus B19 or enteroviruses should be noted.
	Autoimmunity screening	Note all ANA, Anti-DS DNA, ENA, and similar values during the evaluation. Consider additional special studies such as myocardial auto-antibodies. ***Consult Immunization Healthcare Division for current information.***
Footnote 6	**Diagnostics**	
Diagnostics: All patients		
	Electrocardiogram (ECG)	Note date, time, rate, rhythm, the presence of ectopy and abnormalities in waves, intervals and segments. Provide copies of relevant ECGs to patient and incorporate in record. **Typical ECG manifestations:** **Pericarditis:** Acute 1. Diffuse ST segment elevation, particularly leads I,II, III, aVF, aVL, and V5-V6 2. Diffuse PR segment depression 3. PR segment elevation in lead aVR Evolving 1. T-wave changes: notched, biphasic. Or low-voltage inversions. Differentiate from benign Early Repolarization 1. Widespread concave ST elevation, most prominent in the mid- to left precordial leads (V2-5). ST elevation is usually < 2mm in precordial leads and < 0.5mm in the limb leads 2. Notching or slurring at the J-point 3. No reciprocal ST depression (except in aVR). 4. ST changes stable over time (no progression on serial ECG tracings) **Myocarditis:** 1. Diffuse T-wave inversions without ST segment abnormality 2. Incomplete atrioventricular conduction blocks (usually transient) 3. Intraventricular conduction blocks (usually transient) 4. QRS / QT prolongation 5. Sinus tachycardia 6. Ventricular arrhythmias * With inflammation of the adjacent pericardium, ECG features of pericarditis (ST segment abnormalities) can also been seen. **Reference:** 1. Demangone, D. (2006) ECG manifestations: Noncoronary heart disease. *Emergency Medicine Clinics of North America.* (24) pp.113-131. 2. Burns E, Myocarditis. ECG Library at https://litfl.com/myocarditis-ecg-library 3. Burns E, Benign Early Repolarization. ECG Library at https://litfl.com/benign-early-repolarisation-ecg-library

	Chest X-ray	PA and Lateral
Other diagnostics as clinically indicated:		
	Echocardiogram	As the safety of NSAID use in myocarditis may be related to the degree of myocardial compromise (see Footnote 8), an initial echocardiogram (EF) is recommended. If only a range is estimated for ejection fraction (EF), note the midpoint of the range. For pericardial effusions, record estimate of size and/or clinical significance (small effusions may not be diagnostic). Before returning to duty, Service Members who initially present with an acute clinical syndrome consistent with myocarditis should undergo a resting echocardiogram no less than 3 to 6 months after the initial illness. **Reference:** Maron BJ, et. al., Eligibility and Disqualification Recommendations for Competitive Athletes With Cardiovascular Abnormalities: Task Force 3: Hypertrophic Cardiomyopathy, Arrhythmogenic Right Ventricular Cardiomyopathy and Other Cardiomyopathies, and Myocarditis. *J Am Coll Cardiol*. 2015 Dec 1;66(21):2362-2371
	Pulmonary functions	With DLCO if indicated; diffusion capacity corrected for hemoglobin is a sensitive measure of pulmonary interstitial disease and increased risk for hypoxia with activity.
	Stress test	Indicate whether an exercise tolerance, stress-echocardiogram, or nuclear/pharmacological stress test was performed during the hospital stay and the result of the testing, if performed. Clinical correlation is recommended in the cases of a negative stress test result. Before returning to duty, Service Members who initially present with an acute clinical syndrome consistent with myocarditis should undergo an exercise ECG no less than 3 to 6 months after the initial illness. **Reference:** Maron BJ, et. al., Eligibility and Disqualification Recommendations for Competitive Athletes With Cardiovascular Abnormalities: Task Force 3: Hypertrophic Cardiomyopathy, Arrhythmogenic Right Ventricular Cardiomyopathy and Other Cardiomyopathies, and Myocarditis. J Am Coll Cardiol. 2015 Dec 1;66(21):2362-2371
	Cardiac catheterization/CTA	Not routinely recommended, but may be considered in select cases where there exists a realistic question of acute coronary syndrome clinically and the troponin elevation and ECG ST-elevations and other clinical indications suggest an infarct pattern. If vessel occlusion is identified, note the anatomical region affected and the degree of stenosis present.
	Holter & Event Monitor	Before returning to duty, Service Members who initially present with an acute clinical syndrome consistent with myocarditis should undergo a 24-hour Holter monitoring no less than 3 to 6 months after the initial illness. **Reference:** Maron BJ, et. al., Eligibility and Disqualification Recommendations for Competitive Athletes With Cardiovascular Abnormalities: Task Force 3: Hypertrophic Cardiomyopathy, Arrhythmogenic Right Ventricular Cardiomyopathy and Other Cardiomyopathies, and Myocarditis. J Am Coll Cardiol. 2015 Dec 1;66(21):2362-2371
	Imaging	Chest pain with elevated cardiac enzymes (TnT) may be caused by a variety of conditions including NSTEMI, myocarditis, Takotsubo cardiomyopathy, PE, renal disease, vigorous exercise, nonspecific cardiac demand from acute illness, as well as a false + TnT. If there is question as to the etiology of the individual's symptoms, Cardiac MRI (CMR) with t1/t2 mapping is the test of choice. It possesses minimal risk and most accurately classifies the diagnosis and prognosis. Therefore, if logistically feasible at patient presentation, CMR is recommended. If abnormal, then repeat at 6 week evaluation. If abnormal initially and at 6 week evaluation or if patient continues to be symptomatic, perform CMR at 3-6 months to assess for clearance for return to duty and deployment. See Footnote #9. **Reference:** Aquara GD, et. al., Prognostic Value of Repeating Cardiac Magnetic Resonance in Patients With Acute Myocarditis. J Am Coll Cardiol. 2019 Nov 19;74(20):2439-48
	Myocardial Biopsy	Consider myocardial biopsy if heart failure is severe or worsening.
Footnote 7	**Differential Diagnosis**	Consider viral myocarditis, acute coronary syndrome (myocardial infarction), NSTEMI, Takotsubo cardiomyopathy, aortic dissection, pneumothorax, pulmonary embolism, musculoskeletal pain, esophageal disorder (gastroesophageal reflux, esophageal spasm), systemic autoimmune disease.

Footnote 8	Therapeutic options	*Consult Immunization Healthcare Division for current information.*
	Symptoms only (A) OR symptoms with objective findings, but with negative cardiac enzymes and no LV dysfunction (B1)	Non-steroidal anti-inflammatory agents are recommended (when non-cardiac etiologies are ruled out in category A). Colchicine, used with an NSAID, may reduce the risk of recurrence of pericarditis. References: 1. Colchicine in addition to Conventional Therapy for acute pericarditis: Results of the colchicine for acute pericarditis (COPE) trial. Imazio M, et al. *Circulation* 2005; 112:2012-16.) 2. Colchicine for pericarditis: hype or hope? Imazio M, et al., *Eur Heart J* 2009;30:532-539
	Symptoms w/ positive cardiac enzymes or depressed LV function or imaging c/w myocarditis (B2)	As Non-steroidal anti-inflammatory drugs (NSAIDs) may cause sodium and water retention, worsening heart failure, it is recommended that NSAID not be used if cardiac Ejection Fraction is < 40%. Clinical judgement regarding NSAID risks and benefits should be used for EFs between 40% and 49%. NSAIDs are safe and do provide significant symptomatic relief in uncomplicated pericarditis and may be protective, reducing myocardial damage in patients with myopericarditis and preserved LVEF (EF ≥ 50%). Other treatments to be considered in consultation with Cardiology and the IHD to include corticosteroid treatment (after biopsy if possible). Consider biopsy for viral PCR, culture and assessment of inflammation, and other histopathologic forms of deteriorating myocarditis. Consider corticosteroids with evidence of eosinophilic inflammation and clinical deterioration. **Reference:** Jan Berg, Non-steroidal anti-inflammatory drug use in acute myopericarditis: 12-month clinical follow-up. *Open Heart* 2019;6:e000990
	Progressive symptoms (LVEF < 40%, sustained dysrhythmias, hemodynamic instability) (B3)	▪ Conventional heart failure treatments (e.g., ACE inhibitors, nitrates, diuretics, select beta-blockers such as carvedilol or metoprolol succinate) ▪ Strongly consider early referral for myocardial biopsy to guide optimal treatment. ▪ Consider corticosteroids (preferably after biopsy) if no evidence of active infection and/or with evidence of eosinophils in inflammatory infiltrate. ▪ Consider Vaccinia Immune Globulin (VIG)/IVIG only with expert consultant case review via Immunization Healthcare Division.
Footnote 9	**Management and Recovery**	Whenever possible, standardized follow up should be coordinated with the Immunization Healthcare Division. **Reference** (Deployment Restriction): Maron BJ, et. al., Eligibility and Disqualification Recommendations for Competitive Athletes With Cardiovascular Abnormalities: Task Force 3: Hypertrophic Cardiomyopathy, Arrhythmogenic Right Ventricular Cardiomyopathy and Other Cardiomyopathies, and Myocarditis. J Am Coll Cardiol. 2015 Dec 1;66(21):2362-2371
	Symptoms only (A) OR Symptoms with objective findings, but without positive cardiac enzymes or LV dysfunction (B1)	▪ Light physical activity at own pace until asymptomatic (A) ▪ No strenuous activity until asymptomatic (B1) ▪ Follow up when asymptomatic or in 4 weeks (A) to 6 weeks (B1) **Asymptomatic at follow-up** ▪ Repeat any previously abnormal studies ▪ Long-term follow-up will be completed by Immunization Healthcare Division **Symptomatic and/or persistent/abnormal findings at follow-up** ▪ Repeat any previously abnormal studies ▪ Clinical evaluation to include stress test (unless contraindicated) ▪ Repeat CMR if had previous enhancements or if symptomatic. Repeat at 12-18 months as indicated ▪ Consult cardiology for further recommendations ▪ Long-term follow-up will be completed by Immunization Healthcare Division

	Symptoms with positive cardiac enzymes or mild depressed LV function or imaging c/w myocarditis (B2) OR Progressive symptoms (LVEF < 40%, sustained dysrhythmias, hemodynamic instability) (B3)	▪ No strenuous activity for 6 weeks ▪ Clinical evaluation at 6 weeks ▪ Deployment restriction for 3-6 months depending upon whether: **Asymptomatic at follow-up** ▪ Repeat any previously abnormal studies at 6 weeks and 3 months ▪ Stress test at 6 weeks to assess exercise tolerance for rehabilitation; repeat at 3 months to assess exercise tolerance prior to clearance for deployment ▪ Long-term follow-up will be completed by the Immunization Healthcare Division **Symptomatic and/or persistent/abnormal findings at 6 weeks and 3 month follow-up** ▪ Clinical evaluation to include enzymes (TnT or hsTnT), usCRP, ECG, ECHO, 24 hour Holter Monitor, stress test (unless contraindicated) ▪ Repeat CMR if had previous enhancements or if symptomatic. ▪ Repeat clinical evaluation at 3-6 months to include repeat ECHO, stress test, 24 hour Holter monitor and CMR to assess for clearance for deployment. ▪ If normal and asymptomatic, clear for deployment ▪ If normal and symptomatic, consult cardiology ▪ If abnormal studies with continued symptoms, not cleared for deployment, consult Cardiology ▪ Continue cardiology follow-up at 6 -12 month intervals until asymptomatic ▪ Long-term follow-up will be completed by Immunization Healthcare Division
	Return to Duty Criteria	**Category A or B1:** **Service Members with pericarditis should be on restricted duties, including deployment, during the acute phase. SMs can return to full duty/deployment status when:** ▪ There is complete absence of evidence for active disease, including effusion by echocardiography, ▪ When serum markers of inflammation have normalized. **For pericarditis associated with evidence of myocardial involvement, eligibility should also be based on the course of myocarditis (B2 or B3).** **Category B2 or B3:** **Service Members may return to full duty and be deployment-eligible within 3 to 6 months if all of the following criteria are met:** ▪ Ventricular systolic function has returned to the normal range. ▪ Serum markers of myocardial injury, inflammation, and heart failure have normalized. ▪ Clinically relevant arrhythmias such as frequent or complex repetitive forms of ventricular or supraventricular ectopic activity are absent on Holter monitor and graded exercise ECG.
Footnote 10	**Disability Assessment**	The majority of patients have recovered within 1 year. The natural history of this condition remains unknown. Careful functional assessment post-acute phase has not yielded definitive objective parameters. The long-term natural history of this condition (e.g., late onset arrhythmias, cardiomyopathy, recurrent myocarditis) has not been well defined. Development of new cardiac complications within 5 years following an episode of hypersensitivity myocarditis associated with immunization should be reported to the Immunization Healthcare Division clinical case management registry.

Footnote 11	**Case Definitions for Myocarditis and Pericarditis** *MMWR:Morbidity and Mortality Weekly Report* 2003;52:492-6, http://www.cdc.gov/mmwr/PDF/wk/mm5221.pdf *MMWR:Morbidity and Mortality Weekly Report,* 2006;55(RR01);1-16. http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5501a1.htm		
	Objective abnormalities		
Myo-carditis	**Suspect** (1) Symptoms (dyspnea, palpitations, or chest pain) (2) ECG abnormalities beyond normal variants, not documented previously (ST/T abnormality, paroxysmal supraventricular tachycardia, ventricular tachycardia, atrioventricular block, frequent atrial or ventricular ectopy) OR Focal or diffuse depressed LV function of uncertain age by an imaging study (3) Absence of evidence of any other likely cause	**Probable** (1) Meets symptom criteria for suspected myocarditis (2) In addition, meets one of the following: Elevated levels of cardiac enzymes (Creatine Kinase-MB fraction, Troponin T or Troponin I), OR new onset of depressed LV function by imaging, OR abnormal imaging consistent with myocarditis (MRI with gadolinium, gallium-67 scanning, anti-myosin antibody scanning)	**Confirmed** Histopathologic evidence of myocarditis by endomyocardial biopsy or on autopsy.
Peri-carditis	**Suspect** (1) Typical chest pain (made worse by supine position, improved with leaning forward, pleuritic, constant) (2) No evidence for alternative cause of such pain	**Probable** (1) Meets criteria for suspected pericarditis (2) Has one or more of the following: Pericardial rub on auscultation OR ECG with diffuse ST-segment elevations or PR depressions not previously documented OR echocardiogram revealing an abnormal pericardial effusion	**Confirmed** Histopathologic evidence of pericardial inflammation in pericardial tissue from surgery or autopsy

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DHA Immunization Healthcare Division
Web: https://health.mil/vaccines
24/7 Immunization Healthcare Support Center
(877-438-8222 or DSN 761-4245, Option 1)

APPENDIX A

DHA-IHD Myopericarditis Algorithm Change Summary:

1. Included Cardiac MRI (CMR) in initial work up if feasible and "if there is question as to etiology…"
2. Preferentially assess TnT (remove TnI) or hsTnT if feasible
3. Reduced non-deployable status from 6 mos to 3 mos (if asymptomatic) for MPC Category B2
4. Revised non-deployable status for MPC Category B3 to read to "deployment restriction for 3 to 6 months or longer as guided by clinical progress"
5. Recommend Colchicine for categories A (when non-cardiac etiologies ruled out) and B1
6. Recommend NSAID for categories B2 and B3 based upon ejection fraction.
    a. NSAIDs are safe and do provide significant symptomatic relief in uncomplicated pericarditis and may be protective, reducing myocardial damage in patients with myopericarditis and preserved LVEF (EF ≥ 50%).
    b. NSAID not be used if cardiac Ejection Fraction is < 40%.
    c. Use clinical judgement regarding NSAID risks and benefits for EFs between 40% and 49%.
7. Changed Failure parameter from EF <45% to EF <40%
8. Decreased number of viruses tested for (serology) for R/O of infectious myopericarditis
9. Included early repolarization criteria in ECG guidance
10. Updated Myocarditis diagnostic ECG changes
11. Added 24 hr holter monitor to return to duty/deployment criteria
12. Removed activity limitation of a specific duration for category A (restricted until asymptomatic)
13. Added Return to Duty criteria summary

APPENDIX B

References:

1. Maron BJ, et. al., Eligibility and Disqualification Recommendations for Competitive Athletes With Cardiovascular Abnormalities: Task Force 3: Hypertrophic Cardiomyopathy, Arrhythmogenic Right Ventricular Cardiomyopathy and Other Cardiomyopathies, and Myocarditis. J Am Coll Cardiol. 2015 Dec 1;66(21):2362-2371
2. Adler Y, et. al., 2015 ESC Guidelines for the diagnosis and management of pericardial diseases. The Task Force for the Diagnosis and Management of Pericardial Diseases of the European Society of Cardiology (ESC). European Heart Journal (2015) 36, 2921–2964
3. Pelliccia A, et. al., Recommendations for participation in competitive sport and leisure-time physical activity in individuals with cardiomyopathies, myocarditis and pericarditis. European Journal of Cardiovascular Prevention and Rehabilitation 2006; 13(6):876-885
4. Aquara GD, et. al., Prognostic Value of Repeating Cardiac Magnetic Resonance in Patients With Acute Myocarditis. J Am Coll Cardiol. 2019 Nov 19;74(20):2439-48
5. Colchicine in addition to Conventional Therapy for acute pericarditis: Results of the colchicine for acute pericarditis (COPE) trial. Imazio M, et al. Circulation 2005; 112:2012-16.)
6. Colchicine for pericarditis: hype or hope? Imazio M, et al., Eur Heart J 2009;30:532-539
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8. Algalarrondo V, et. al., Indications of Anti-Inflammatory Drugs in Cardiac Diseases. Anti-inflammatory & Anti-Allergy Agents in Medicinal Chemistry 2013; 12(1):3-13