High Lateral STEMI in a young adult with South African flag sign; A complication of COVID-19 or the vaccination?

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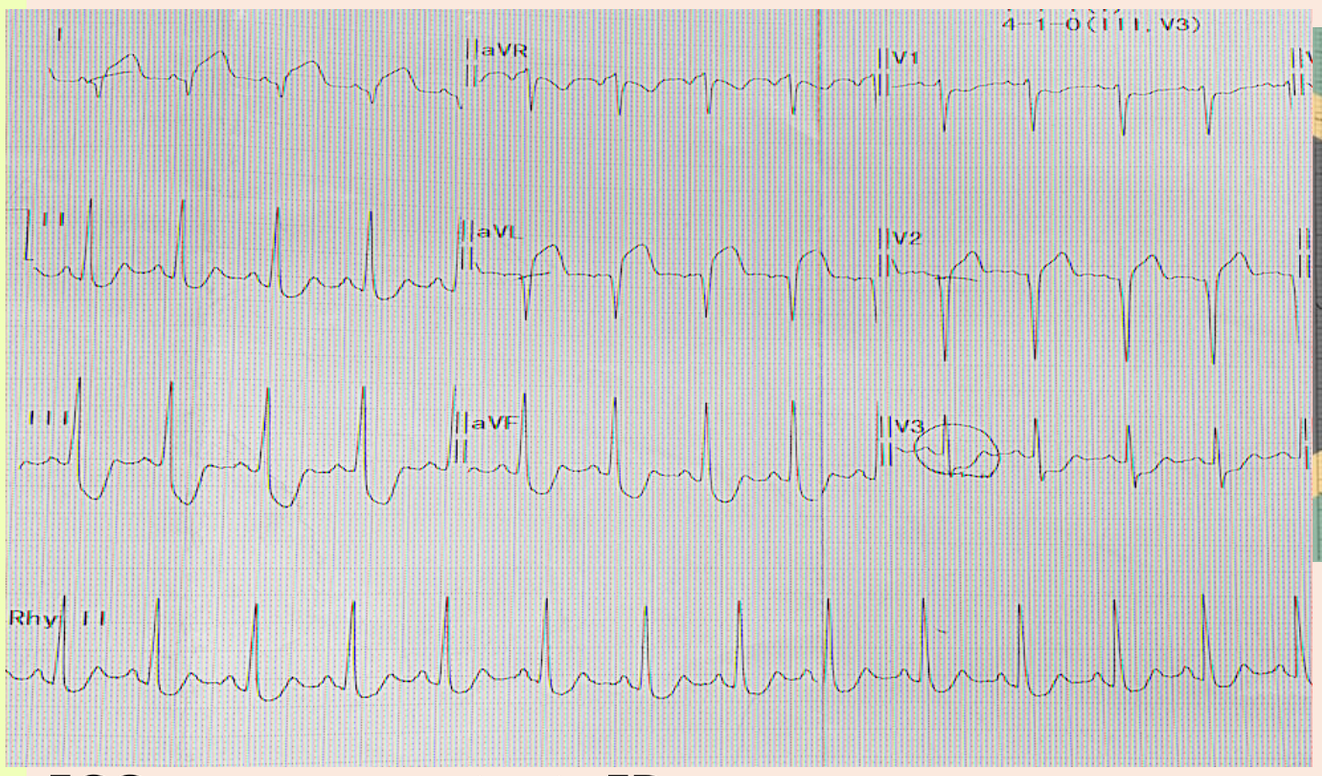
Introduction

Myocarditis is a common complication associated with COVID-19 infection that may manifest as a spectrum of asymptomatic patients with ECG abnormalities or symptomatic patients with myocardial injury, arrhythmia, heart failure or sudden death. However, mRNA COVID vaccine associated myocarditis has been reported despite its infrequent nature and incidence.

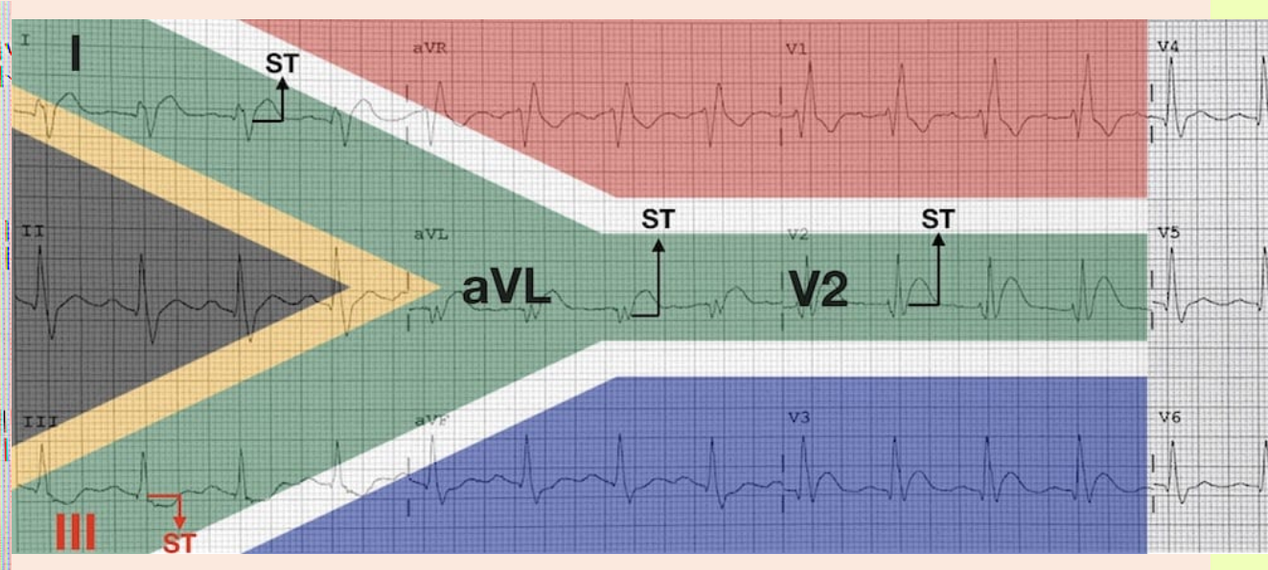
Case report

A healthy 19 years old male with history of COVID Pneumonia at Day 16 since diagnosis presented with typical chest pain; centrally located and heaviness in nature lasted for 15 minutes 3 hours post second dose of Pfizer-Biotech vaccine. His pain score initially was 5, then later resolved to 1 upon presentation to emergency department.

ECG showed South African Flag Sign; ST Elevation over lead I, aVL, V2 and ST depression at lead II, III, aVF initially at private clinic. Serial ECGs at emergency department showed similar persistent ST elevation at lead I,aVL,V2 with Q waves and ST depression II,III, aVF, V3-V4. Troponin I was elevated at 730 (N=10-16) and CRP 1.38. Formal echocardiogram revealed hypo-kinetic wall motion seen at basal anterior septal to mid antero-septal, septal wall, anterior wall and apical lateral with ejection fraction of 40-45%.



ECG upon presentation in ED



South African Flag Sign ECG; STE at lead I,aVL,V2 and STD at inferior lead III
https://litfl.com/high-lateral-stemi-ecg-library/

Discussion

Myocardial injury in COVID-19 be attributed by plaque rupture, cytokine storm, hypoxic injury, coronary vasospam, microthrombi or direct endothelial injury. [1] Despite that, ST elevation in COVID-19 may not equate to occlusive coronary artery thrombosis but represent stress cardiomyopathy or myocarditis. Type 2 myocardial infarction is often the probable diagnosis due to hemodynamic or respiratory compromise rendering reperfusion therapy as not the first line treatment modality. [2] Treating the primary cause would likely ameliorate the cardiac abnormalities findings. Vaccine related myocarditis is likely associated with younger group of male patients, occur usually after second dose of mRNA vaccination with median onset of 3 days and at incidence of 4.8 cases per 1 million. Molecular mimicry of self antigen, dysregulated immune response to mRNA and cytokine expression are postulated mechanisms in vaccine induced myocardial injury [3]

Conclusion

Acute onset of chest pain in this patient likely represent an ongoing COVID-19 infection with myocardial injury complication. STEMI does not always equate to occlusive coronary arteries amongst COVID-19 patients but a representation of stress cardiomyopathy or myocarditis. However, vaccine related myocarditis remains to be a suspicion despite low in incidence but develop much later after vaccination.

Declaration of conflict for authors

None

References

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3 Bozkurt, B., Kamat, I., & Hotez, P. J. (2021). Myocarditis with COVID-19 mRNA vaccines. *Circulation*, *144*(6), 471-484.