Covid 19 and Myocarditis/Vaccinations

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Case Presentation:

- 15 Y/O M, chief complaint of chest pain
- 3 days ago received 2nd dose of mRNA COVID vaccine
- 2 days ago had low grade fevers and headache
- Today awoke with substernal aching pain
- Tachycardic to 110s
- Overall non-toxic appearing

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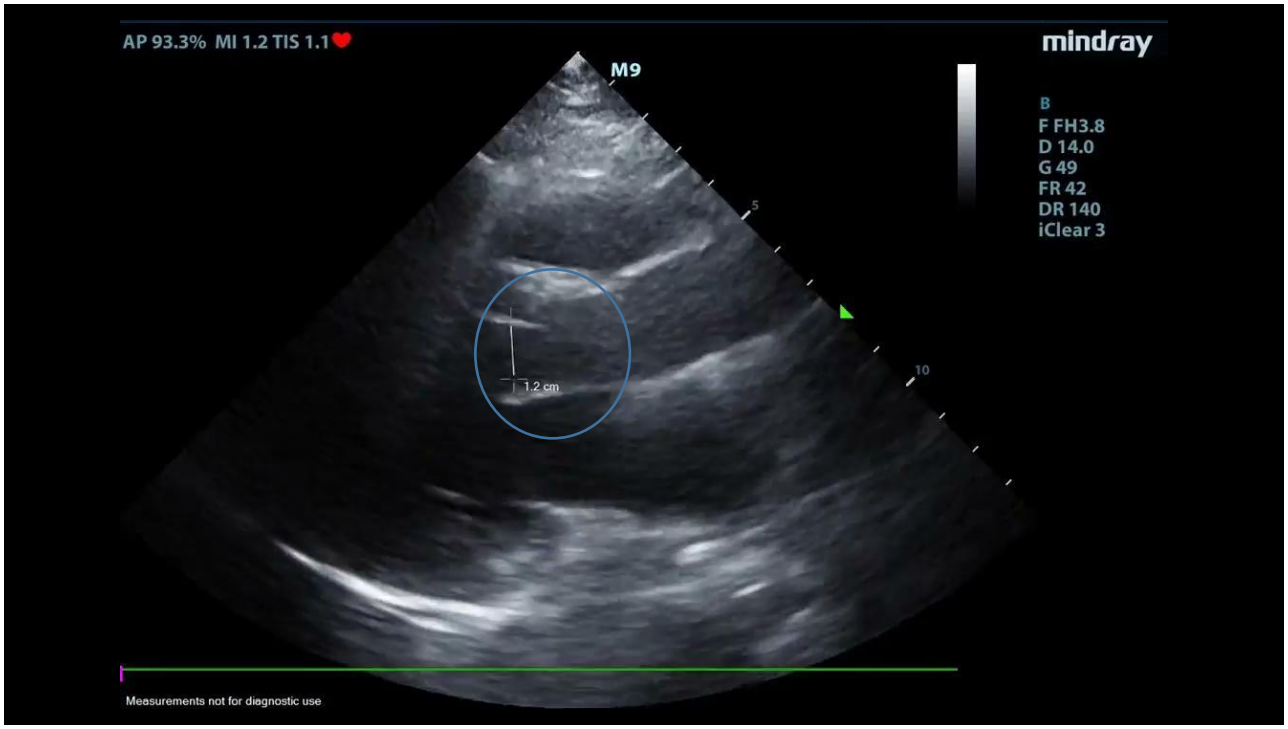
AP 93.3% MI 1.2 TIS 1.1
M9
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FR 42
DR 140
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1.2 cm
Measurements not for diagnostic use

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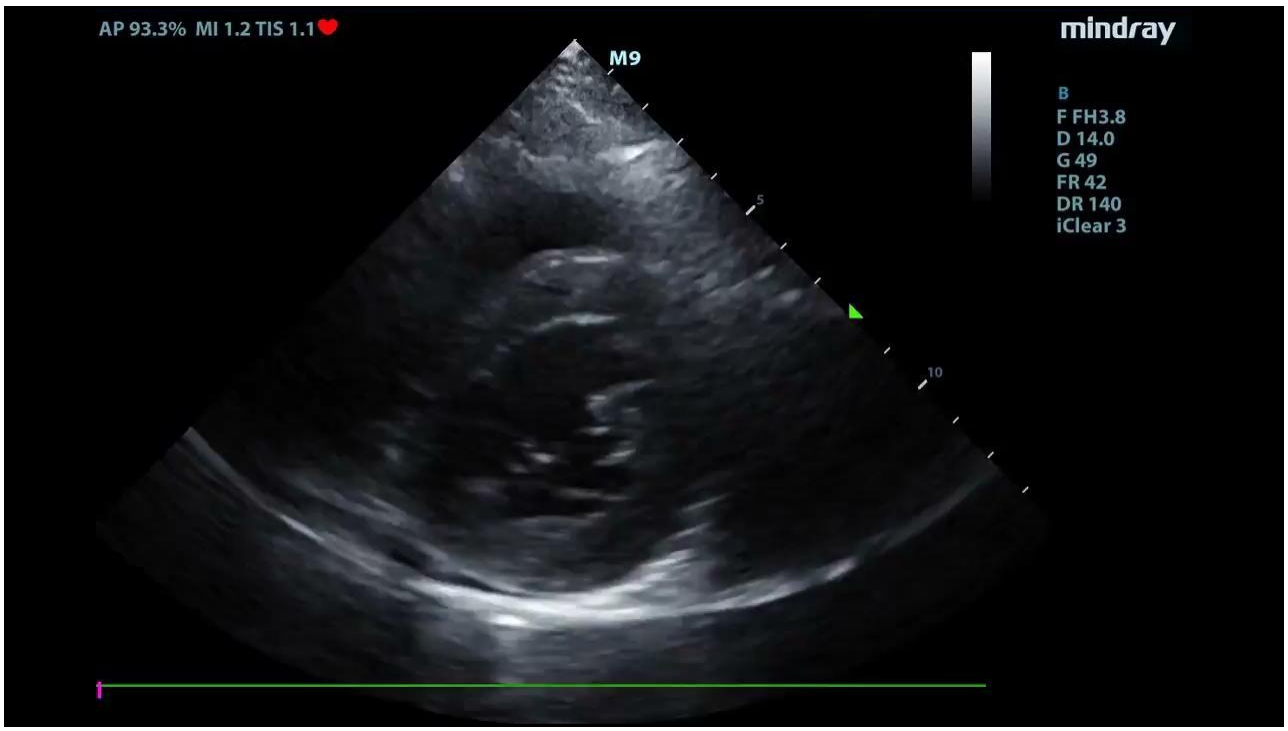
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Case Conclusion

- Troponin 6881 pg/ml (ref 0-19)
- Admitted for post-vaccine myocarditis
- Cardiology-based echo showed 34% ejection fraction
- Treated with NSAIDS and gradually had improvement in pain
- 3 days later he was discharged with downtrending trops and normal function on serial echos

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Myocarditis concerns post vaccine:

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Case presentation:

- 14 Y/O male awoke with chest pain , worsened by the early morning
- Dyspnea with activity and at rest. Not at baseline
- Of note he is 2 days post second Covid vaccine with some mild fatigue symptoms occurring
- Vitals stable: HR:90, BP: 124/72, Temp :37, sats 99%
- Noted increased Troponin
- EKG with ST elevations

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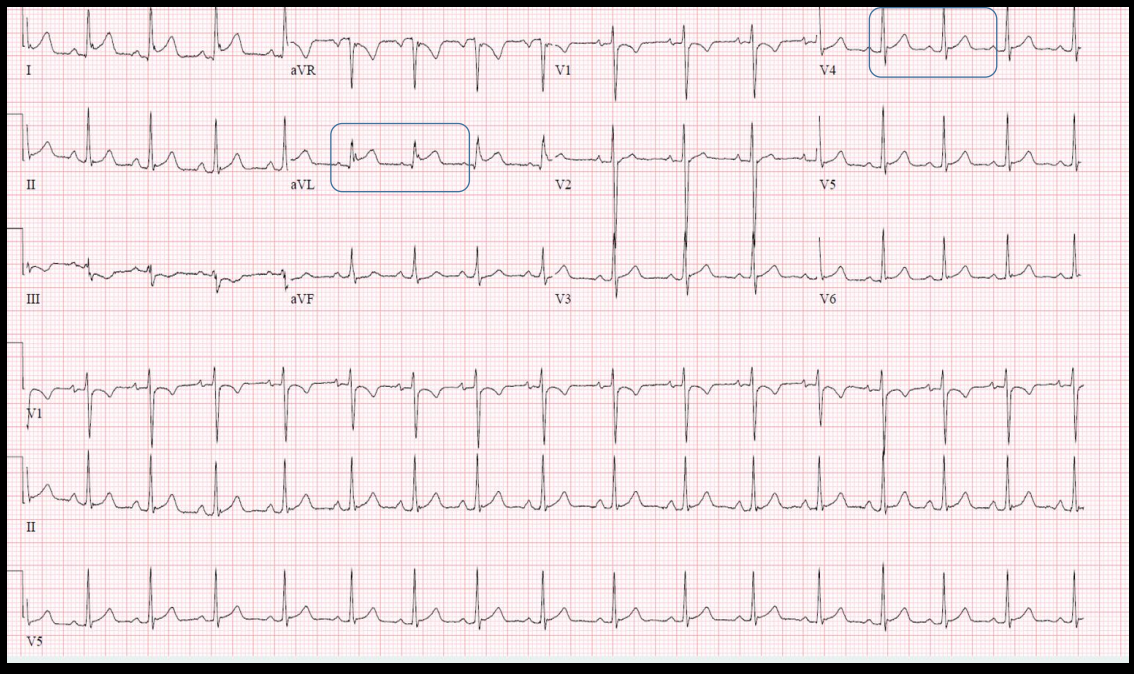

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More Labs:

CBC: nl

Crp: 11.4 (.0-.06mg/dl)

ESR:31 (0-15mm)

BNP : 9 (0-100pg/dl)

Troponin: max 1540,then down trended.

POCUS echo US: no effusion, good contractility

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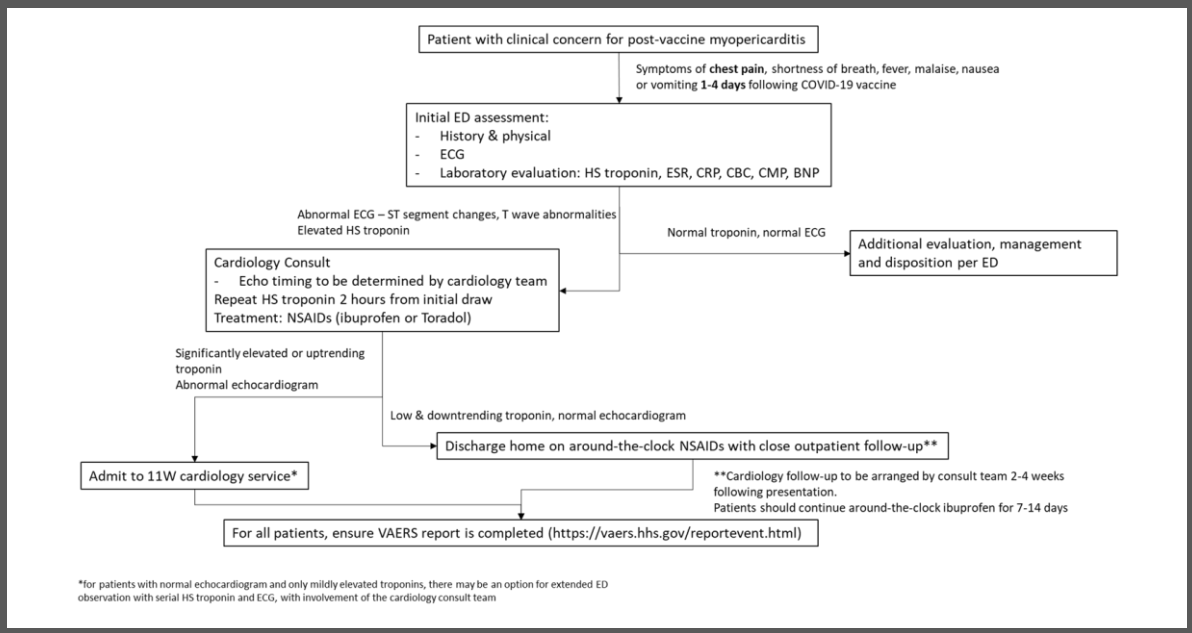

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TABLE 2 Demographic and Clinical Characteristics of 7 Cases of Symptomatic Myocarditis After Dose 2 of Pfizer-BioNTech COVID-19 Vaccine

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7
Age, y	16	19	17	18	17	16	14
Sex	Male	Male	Male	Male	Male	Male	Male
Race or ethnicity	White	White	White	White	Hispanic	White	White
Wt, kg	68	68	71	69	64	71	92
BMI	24	19	21	21	19	22	28
Exposure to COVID-19 in 14 d before illness onset	None	None	None	None	None	None	None
Time between vaccine dose 2 and symptom onset, d	2	3	2	2	4	3	2
Total hospital LOS, d	6	2	2	4	5	3	4
ICU LOS, d	4	None	None	4	5	2	2
Symptoms on presentation							
Chest pain	Present	Present	Present	Present	Present	Present	Present
Other pain	Bilateral arm pain	Myalgias	Bilateral arm pain, numbness, paresthesia	—	Bilateral arm pain, abdominal pain	—	—
Fever	38.3°C by history	Subjective, chills	—	Subjective	Subjective	—	38.3°C by history
Fatigue	Present	Present	—	Present	—	—	—
Other	Nausea, vomiting, anorexia, headache	Weakness	—	Nausea	Nausea, vomiting, anorexia, SOB, palpitations	SOB	SOB

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Israeli Health System Data:

Table 1. Characteristics of the Study Population and Myocarditis Cases at Baseline.*

Characteristic	Study Population (N=2,558,421)	Patients with Myocarditis (N=54)
Median age (IQR) — yr	44 (30–63)	27 (21–35)
Sex — no. (%)		
Female	1,309,988 (51)	3 (6)
Male	1,248,433 (49)	51 (94)
Coexisting illness — no. (%)†		
Any		9 (17)
Diabetes mellitus	—	1 (2)
Hypertension	—	7 (13)
Dyslipidemia	—	5 (9)
Coronary artery disease	—	1 (2)
Previous pericarditis	—	1 (2)
Known left ventricular dysfunction	—	1 (2)
Medication use — no. (%)†		
Any		7 (13)
Aspirin	—	2 (4)
$P2Y_{12}$ inhibitor	—	1 (2)
Beta-blocker	—	1 (2)
ACE inhibitor or ARB	—	4 (7)
Statin	—	4 (7)
Proton-pump inhibitor	—	1 (2)
Insulin	—	1 (2)
Oral hypoglycemic agent	—	1 (2)

* ACE denotes angiotensin-converting enzyme, ARB angiotensin-receptor blocker, and IQR interquartile range.

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TABLE 1 Clinical Characteristics in Children and Young Adults with Myocarditis After COVID-19 Vaccination

Characteristic	Overall ($N = 63$)	12–15 y ($n = 31$)	16–20 y ($n = 32$)	P
Age, y	15.6 ± 1.8 (12–20)	14.4 ± 1.1	16.9 ± 1.0	—
Height, cm	172 ± 11	169 ± 11	176 ± 10	.01
Wt, kg	73.3 ± 19.4	67.5 ± 16.6	79 ± 20.5	.02
BSA, m^2	1.86 ± 0.30	1.77 ± 0.30	1.95 ± 0.30	.008
Male sex, *n* (%)	58 (92)	27 (87)	31 (97)	.16
Second dose, *n* (%)	62 (98)	30	32	.32
Days from recent vaccination to symptoms onset	2.1 ± 1.3 (0–7)	1.9 ± 0.9 (1–3)	2.3 ± 1.7 (0–7)	.15

Recent article with 16 pediatric centers data

- COVID-19 Vaccination–Associated Myocarditis in Adolescents Jain,etal PEDIATRICS Volume 148, number 5, November 2021

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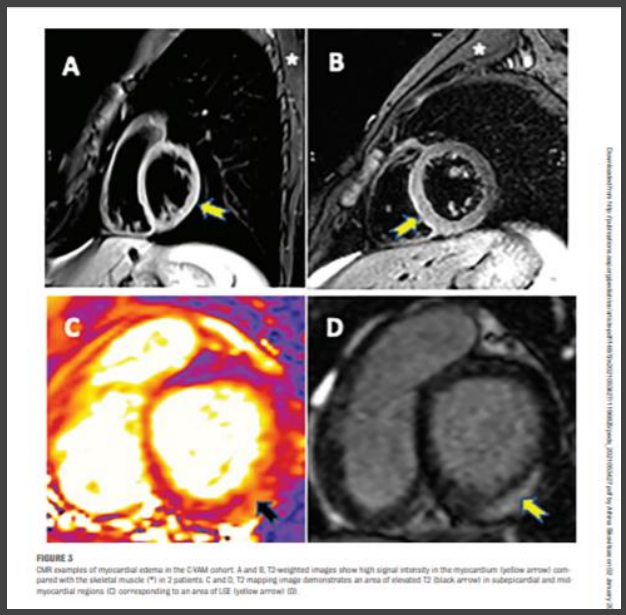

FIGURE 3
CMR examples of myocardial edema in the CHAM cohort. A and B, T2-weighted images show high signal intensity in the myocardium (yellow arrow) compared with the skeletal muscle (*), in 2 patients. C and D, T2 mapping image demonstrates an area of elevated T2 (black arrow) in subepicardial and mid myocardial regions (C) corresponding to an area of LGE (yellow arrow) (D).

Cardiac MRI :

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TABLE 3 Comparison Between Patients With C-VAM and MIS-C

	C-VAM (n = 63)	MIS-C (n = 16)	P
Age, y	15.6 ± 1.8	13.3 ± 4.3	.05
Wt, kg	73.3 ± 19.4	57.1 ± 20.8	.01
Troponin, ng/mL	8.78 ± 9.15	0.67 ± 1.10	<.0001
C-reactive protein, mg/L	37.0 ± 35.4	151.1 ± 119.5	.002
Intensive care length of stay	2.5 ± 1.5	6.6 ± 4.6	.004
LVEF % (echocardiography)	60.9 ± 6.5	45.1 ± 9.5	<.0001
LGE, n (%)	49 (88)	3 (20)	.0005
Myocardial edema,[a] n (%)	47 (83.9)	4 (28.6)	<.0001

Data are reported as mean ± SD, unless specified. LVEF, left ventricular ejection fraction.

- As of present, most Vaccine related myocarditis has been self limited and recovery has been very good.

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Table 1. Centers for Disease Control and Prevention Case Definitions for Probable and Confirmed Cases of COVID-19 Vaccine Associated Myocarditis[11]

Probable Case	Confirmed Case
• ≥1 new or worsening symptom: o Chest pain, pressure or discomfort o Dyspnea or shortness of breath o Palpitations o Syncope • AND ≥ 1 new finding of: o Elevated troponin o Abnormal ECG or rhythm monitoring consistent with myocarditis o Abnormal ventricular systolic function or wall motion abnormality on echocardiogram o cMRI findings consistent with the original or revised Lake Louise criteria for myocarditis[14] • AND no other identifiable cause of the symptoms and findings	• ≥1 new or worsening symptom: o Chest pain, pressure or discomfort o Dyspnea or shortness of breath o Palpitations o Syncope • AND o Histologic confirmation of myocarditis OR o Elevated troponin AND cMRI findings consistent with the original or revised Lake Louise criteria for myocarditis[14] • AND no other identifiable cause of the symptoms and findings

ECG=electrocardiogram; cMRI=cardiac magnetic resonance imaging

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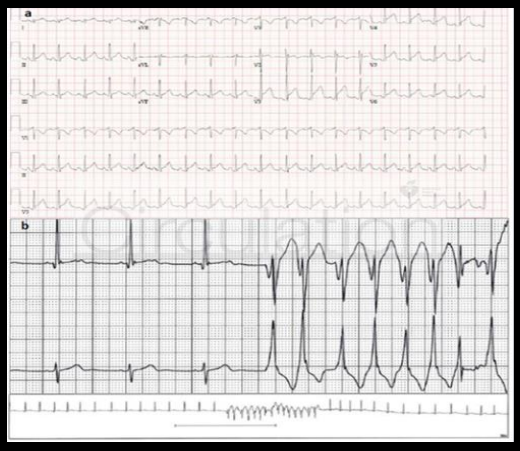
Concerning arrythmia:



Recent Circulation article from 21 pediatric centers that MM was a part of.

https://doi.org/10.1161/CIRCULATIONAHA.121.056583

Includes 15 of our patients…

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Treatment:

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  - NSAIDS
  - IVIG
  - IV-solumedrol
  - Colchicine

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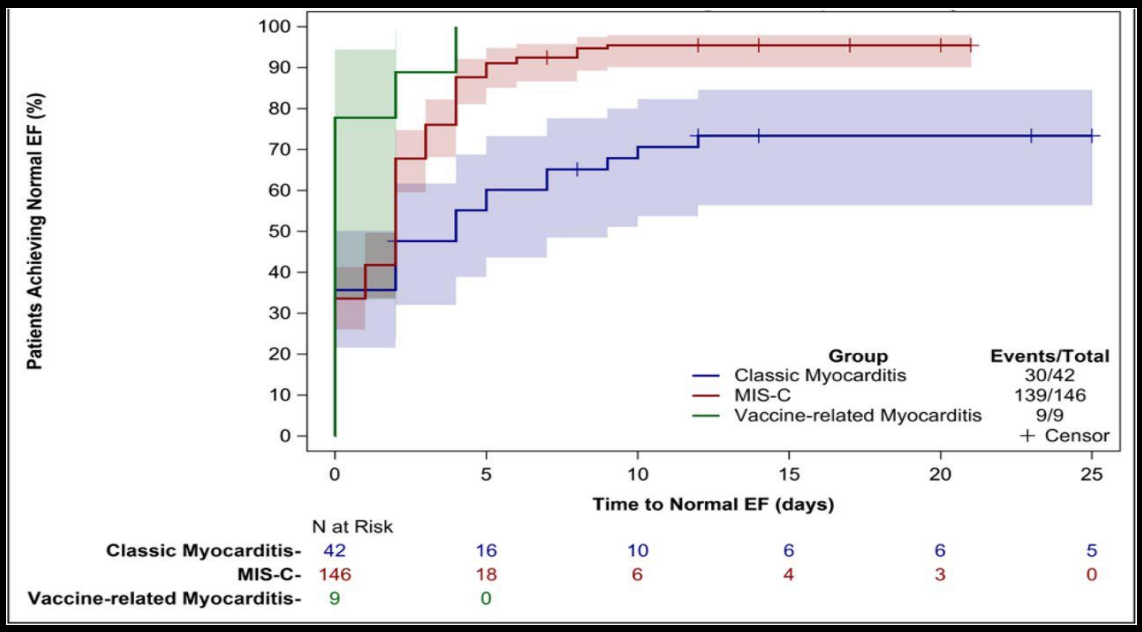

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Conclusions so far:

- Occurrence is rare
- More likely in males 14-29 Y/O
- Most with mild symptoms and full recovery

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Current Recs:

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Tips on Counseling:

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Questions?

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