

Myocarditis

Arrhythmias and SCD

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- Mild symptoms

→ chest pain , palpitations.

→ cardiogenic shock, VA.

- 1-40 % of sudden death.

- 1- Infectious.

- 2- Au **Fulminant/ Chronic**

- 3- Toxic.

- Fulminant myocarditis → Refractory sustained arrhythmias.
- Very high risk of cardiac arrest

Dx

- Clinical suspicion.
- 12 lead ECG

Echo, CMR, **EMB**

- **Depressed LVEF** → the only risk marker for SCD in myocarditis.
- CMR, endomyocardial biopsy → ++ predictive accuracy.

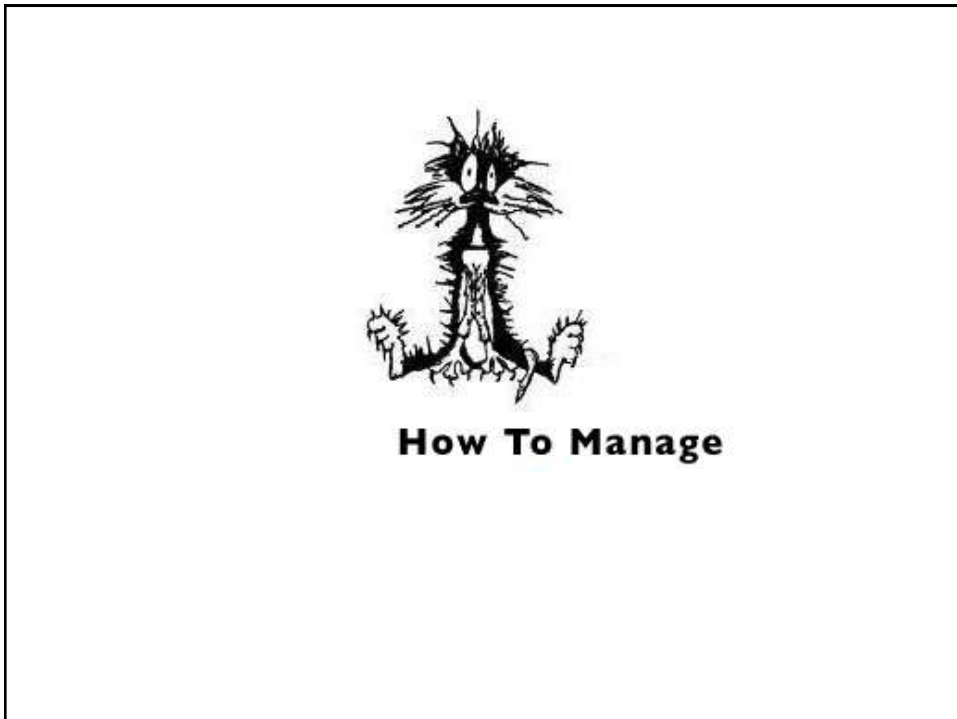
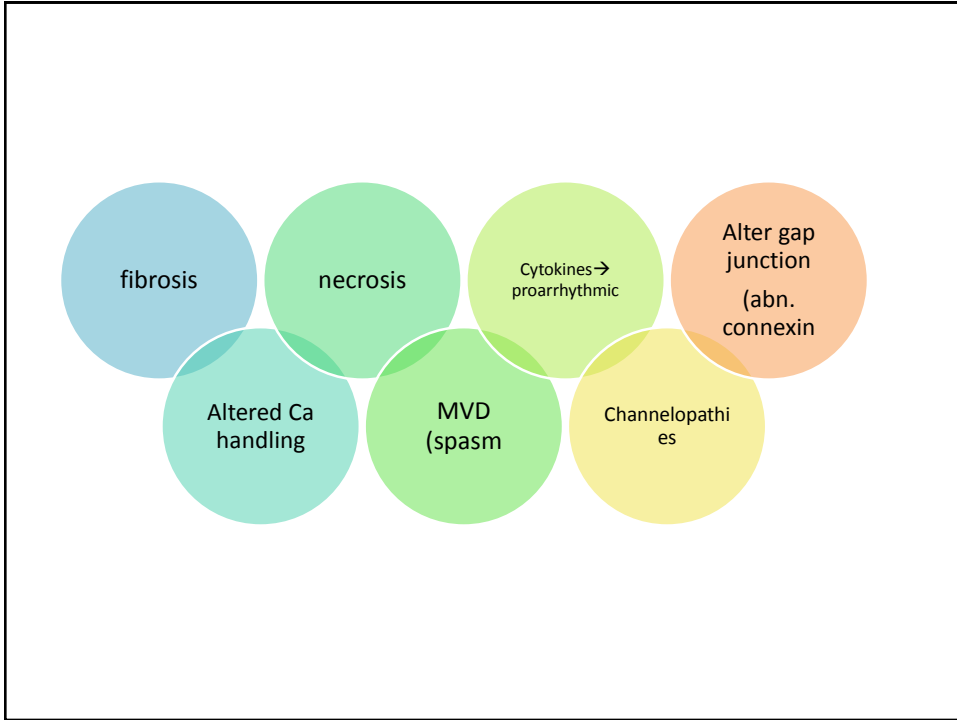
- CMR: prognostic stratification of myocarditis, even in normal EF

Detecting life-threatening arrhythmic substrate.

	Class	LOE
Demonstration of persistent myocardial inflammatory infiltrates immunohistological evidence and/or abnormal localized fibrosis by CMR after acute myocarditis may be considered as an additional indicator of increased risk of SCD in inflammatory heart disease.	IIb	C

ESC Guidelines 2015

MECHANISM



Specialized centres



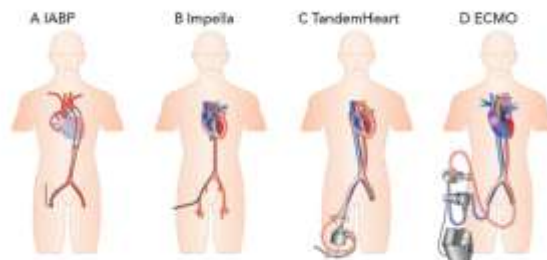
- Adequate haemodynamic monitoring
- Cardiac catheterization
- EMB
- Mechanical cardio-pulmonary assist devices.
- Specialized arrhythmia therapies.

	Class	LOE
Life threatening sustained v. tach in (clinically suspected myocarditis) → Specialized Centres	I	C

- Percutaneous cardiopulmonary support → initiated if refractory VT/ VF

(No response to 3-5 defibrillation attempts)

Figure 1: Percutaneous Assist Devices



(A) Intra-aortic balloon counterpulsator; (B) The Impella is inserted percutaneously and positioned across the aortic valve in the left ventricle; (C) The TandemHeart ventricular assist device, which is placed in the left ventricle using a retro-aortic catheter; (D) The venous access is connected to an extracorporeal membrane oxygenation (ECMO) system with an oxygenator, centrifugal pump, and membrane oxygenator (artificial lung) and connected to the arterial inflow access. From Weiden et al. / WSA permission.

VA or heart block in the setting of acute myocarditis

- Admission
Prolonged ECG monitoring.



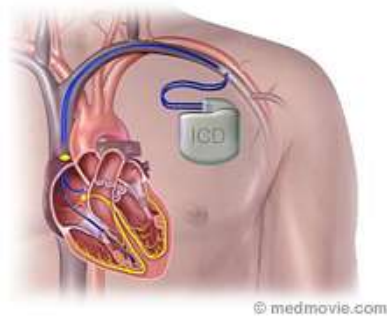
IF THE ECG ISN'T BROKEN THEN WE HAVE PROBLEM

	Class	LOE
Temporary pacer → Bradycardia/ heart block triggering VA during the acute phase of myocarditis/pancarditis.	I	C

	Class	LOE
Anti-arrhythmic TTT → symptomatic non-sustained or sustained VT during the acute phase of myocarditis.	Ila	C

- Drug treatment of arrhythmias in patients with inflammatory heart disease **does not differ** from generally accepted clinical principles.

- Arrhythmia management outside the acute phase should be in line with current ESC guidelines on arrhythmia and device implantation in chronic HF management.



- Same as for nonischaemic DCM.
- In secondary prevention of SCD, implantation of an ICD in patients with myocarditis is recommended after cardiac arrest due to VF or after symptomatic VT.

	Class	LOE
ICD/ pacemaker in inflammatory heart diseases → after resolution of the acute episode.	IIa	C

	Class	LOE
<p>Haemodynamically compromising sustained VT occurring after the resolution of acute episodes, an ICD implantation should be considered if the patient is expected to survive .1 year with good functional status.</p>	IIa	C

According to the recent HRS/ACC/AHA expert consensus statement

- ICD implantation for primary prevention between 3 and 9 months can be useful in selected patients with non-ischemic cardiomyopathy who are unlikely to recover LV function.

- Patients with giant cell myocarditis might benefit from ICD implantation during this period, as this drug-refractory myocarditis presents with a virulent course.

	Class	LOE
ICD → earlier in patients with giant cell myocarditis or sarcoidosis with haemodynamically compromising sustained VA or aborted cardiac arrest, due to adverse prognosis of these conditions, if survival > 1 year with expected good functional status.	IIb	C

CRT-D

- recommended for primary prevention:
Impaired LV function (LVEF ,35%) + LBBB +
NYHA functional classes II–IV

- As LV function may improve over time in patients with inflammatory cardiomyopathy due to the natural course of the disease and/or appropriate HF therapy
→ implantation of an ICD/CRT-D should not be indicated prematurely

	Class	LOE
A wearable defibrillator → for bridging until full recovery or ICD implantation in patients after inflammatory heart diseases with residual severe LV dysfunction and/or ventricular electrical instability.	IIa	C



Ventricular storms ????

Recommendations	Class ^a	Level ^b
Urgent catheter ablation is recommended in patients with scar-related heart disease presenting with incessant VT or electrical storm.	I	B

- Successful radiofrequency catheter ablation of epicardial arrhythmogenic foci in myocarditis has been described recently.



- Role of CMR.
- Specialized centers.
- Bridge to Recovery/ TTT.
- Timing of permanent device implantation.

thank
you