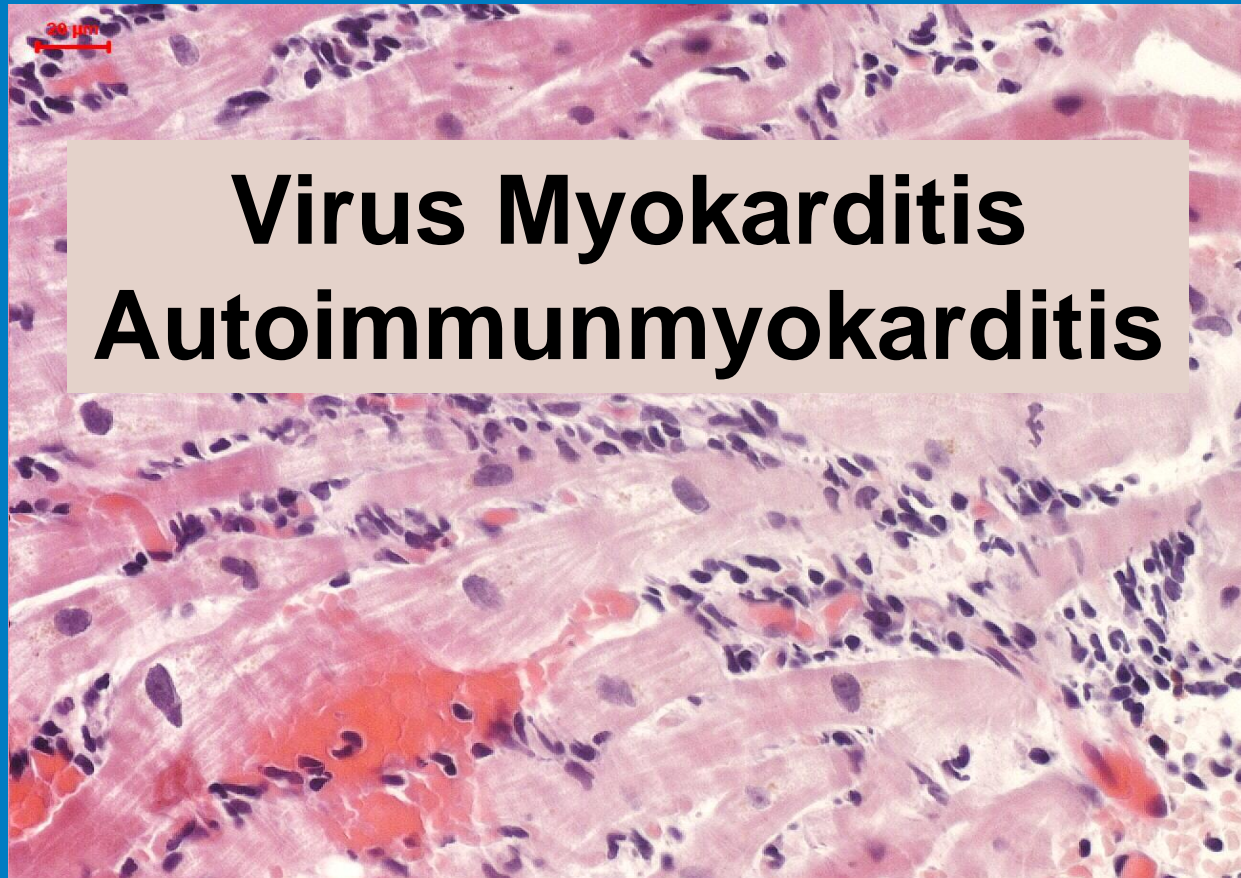
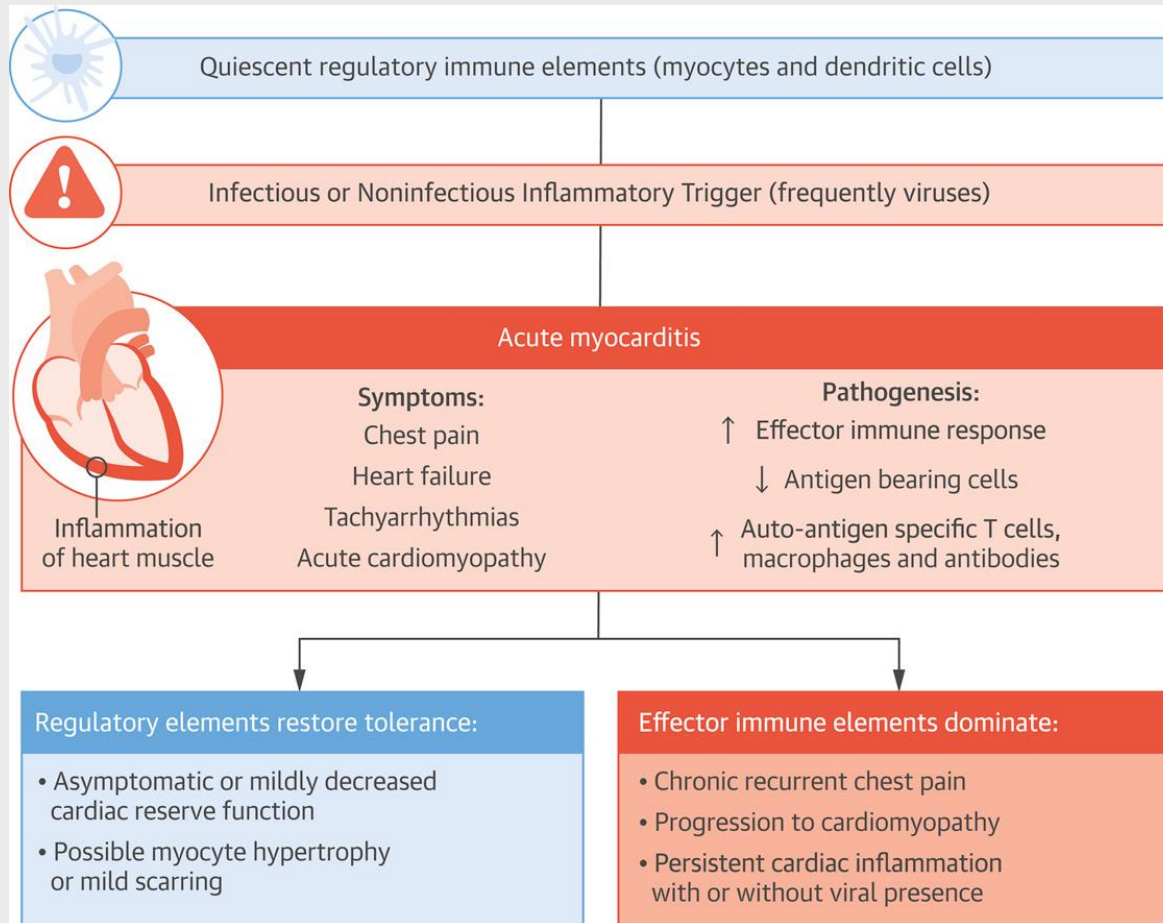


Prof Carsten Tschöpe – Charite – Berlin -



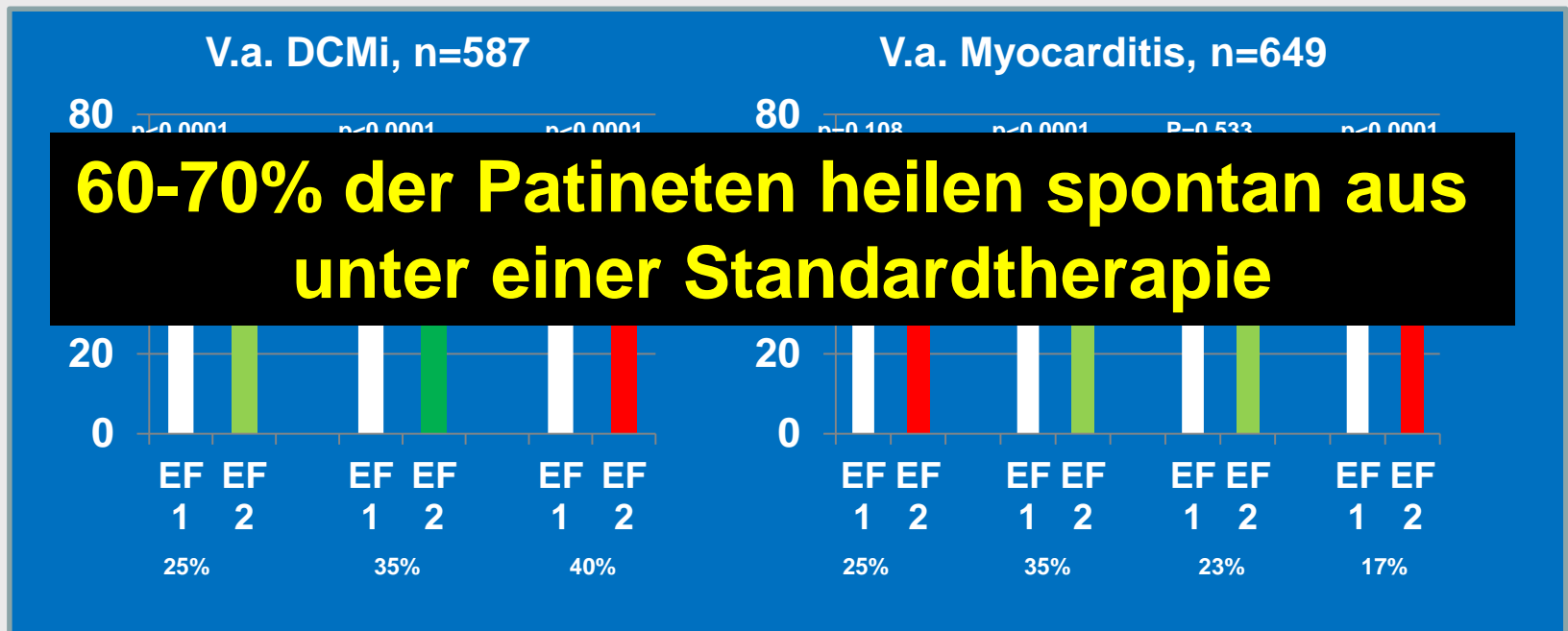
Pathogenese der Myokarditis

Heymans et al JACC 2016.



Verlauf einer Myokarditis

(mean follow-up: 4,5 Y (range 0,5-16 Y))



■ recovering
■ No recovering
 Kühl et al

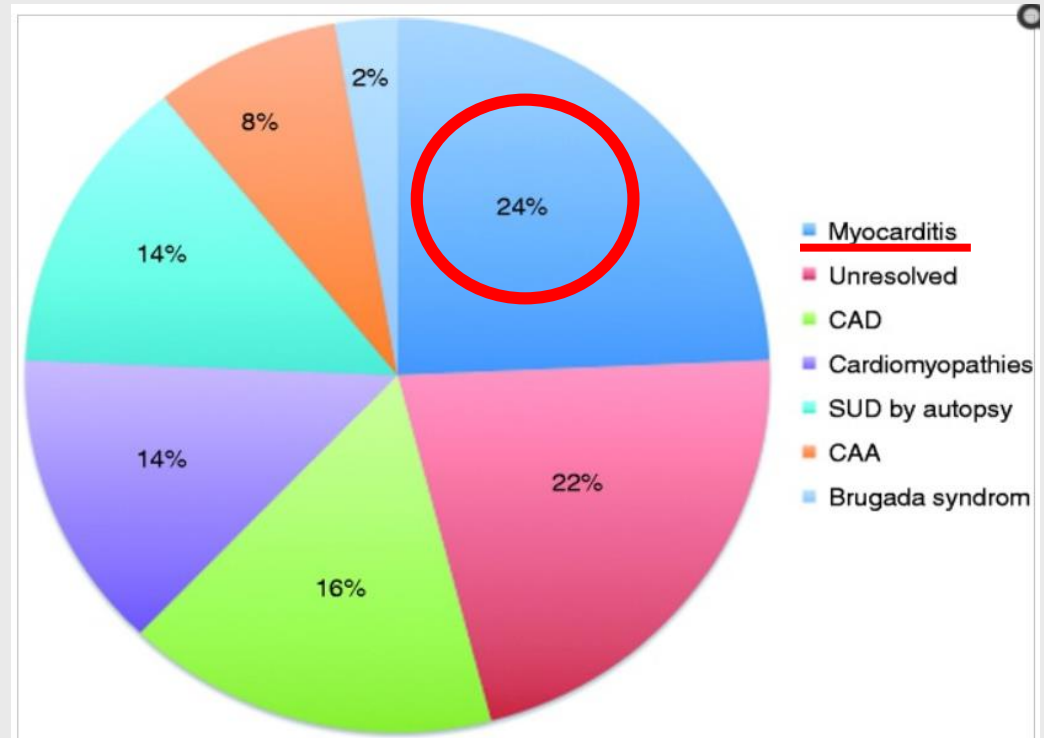
Standardtherapie

1. ACEI/ARB
2. Beta Blocker
3. MRA (EF <35%)
4. Diuretika
5. Ivabradin (HF > 70 bpm)
6. Kein Sport

Recommendation

20. Physical activity should be restricted during the acute phase of myocarditis and for at least 6 months in athletes and non-athletes. This recommendation is based upon expert opinion of this Task Force.

Deutsches Register zum plötzlichen Herztod bei Sportlern



Bohm et al Eu J Prev Cardiol 2016

Standardtherapie

1. ACEI/ARB
2. Beta Blocker
3. MRA (EF <35%)
4. Diuretika
5. Ivabradin (HF > 70 bpm)
6. kein Sport (für 6 Mo)
7. Devices

Management of ventricular arrhythmias in inflammatory heart disease

Anti-arrhythmic therapy should be considered in patients with symptomatic non-sustained or sustained VT during the acute phase of myocarditis.	IIa	C
The implant of an ICD or pacemaker in patients with inflammatory heart diseases should be considered <u>after resolution of the acute episode.</u>	IIa	C
In patients with haemodynamically compromising sustained VT occurring <u>after the resolution of acute episodes,</u> an ICD implantation should be considered if the patient is expected to survive <u>>1 year</u> with good functional status.	IIa	C
recovery or ICD implantation in patients <u>after inflammatory heart diseases with residual severe LV dysfunction and/or ventricular electrical instability.</u>	IIa	C

Standardtherapie



Management of ventricular arrhythmias in inflammatory heart disease

A wearable defibrillator should be considered 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

Akute Myokarditis

Chronische Myokarditis (DCMi)

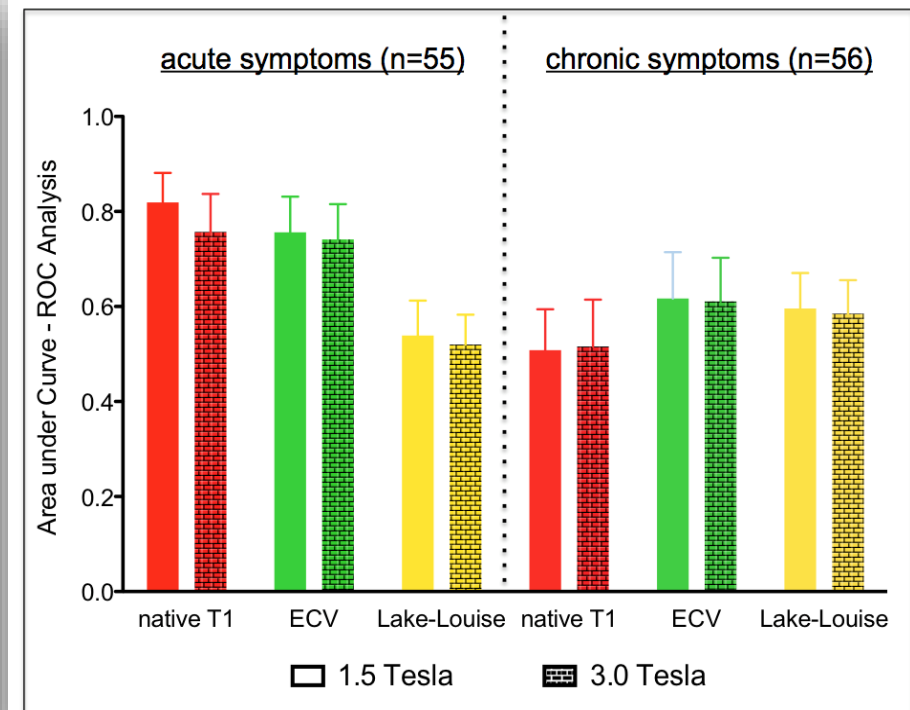
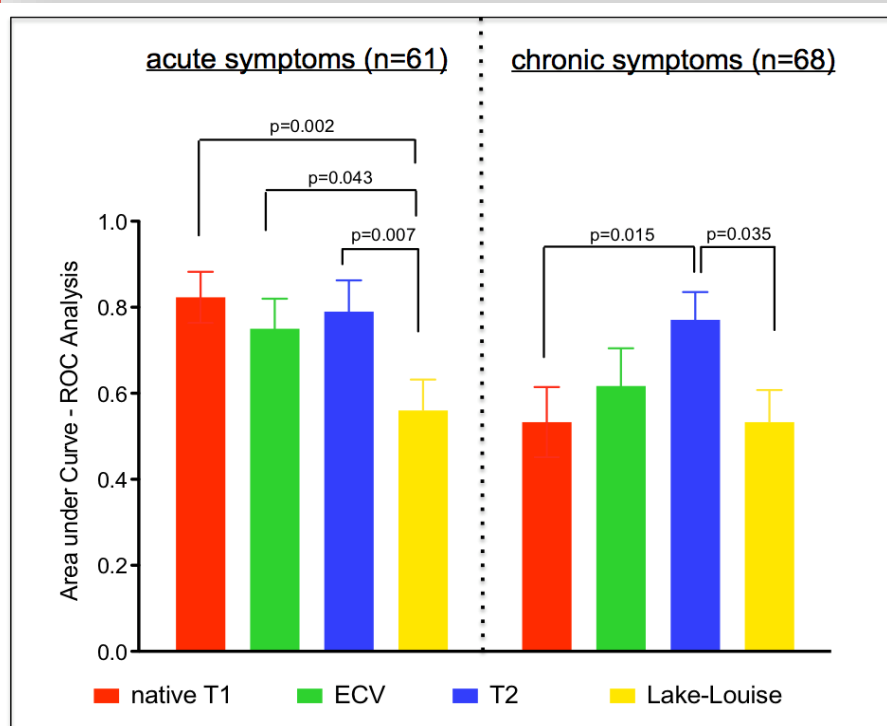
Diagnostik

MRT

Biopsie

MRT – bei der Myokarditis: T1-, T₂- Mapping bei kardialer Inflammation

Lurz P et al JACC 2016



Examination in 129/111 Patients with Suspected Myocarditis

Europäische Leitlinie der ESC zur Myokardbiopsie

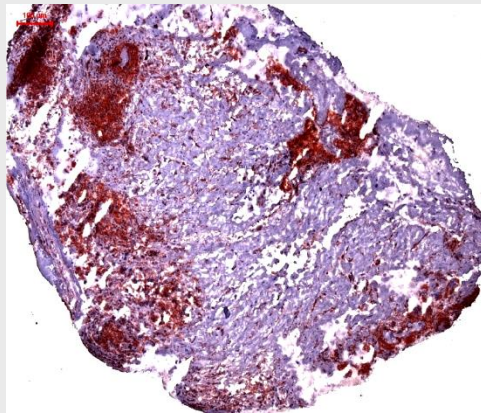
Ponikowski et al Eur Heart J 2016

<p>Chest radiography (X-ray) is recommended in patients with HF to detect/exclude alternative pulmonary or other diseases, which may contribute to dyspnoea. It may also identify pulmonary congestion/oedema and is more useful in patients with suspected HF in the acute setting.</p>	<p>I</p>	<p>C</p>
<p>Right heart catheterization with a pulmonary artery catheter:</p> <ul style="list-style-type: none"> - is recommended in patients with severe HF requiring circulatory support; - should be considered in patients with suspected pulmonary hypertension in order to confirm the diagnosis; - may be considered in order to adjust therapy in patients with pulmonary hypertension despite initial treatment. 	<p>I IIa IIb</p>	<p>C C C</p>
<p>EMB should be considered in patients with rapidly progressive HF despite standard therapy when there is a probability of a specific diagnosis which can be confirmed only in myocardial samples and specific therapy is available and effective.</p>	<p>IIa</p>	<p>C</p>
<p>Thoracic ultrasound may be considered for the confirmation of pulmonary congestion and pleural effusion in patients with AHF.</p>	<p>IIIb</p>	<p>C</p>
<p>Ultrasound measurement of inferior vena cava diameter may be considered for the assessment of volume status in patients with HF.</p>	<p>IIIb</p>	<p>C</p>

**Myokardbiopsie
bei unklaren Fällen**

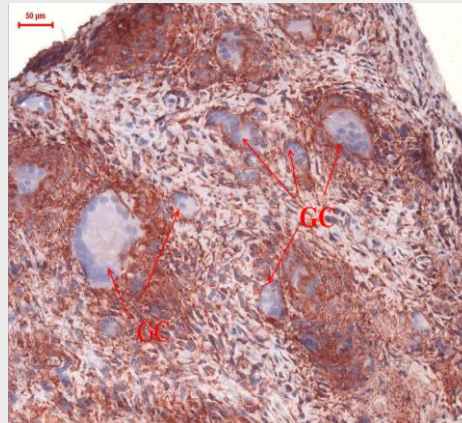
Schwere akute ungeklärte Herzinsuffizienz

**Fulminante
Myokarditis**



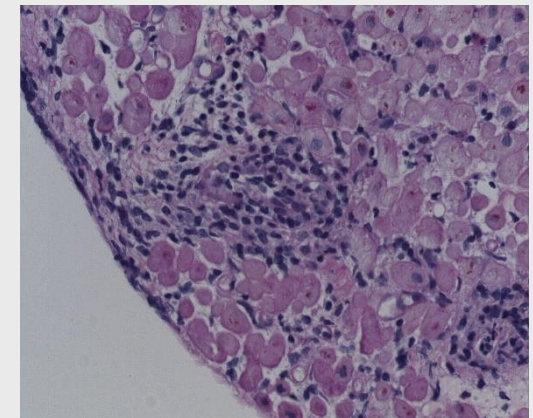
(EF: 32%)

**Riesenzell-
myokarditis**



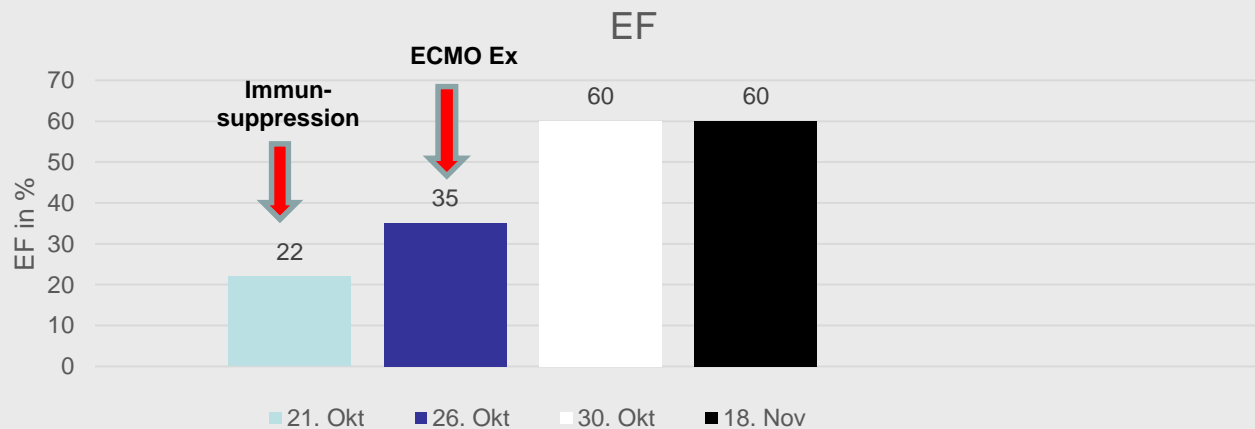
(EF: 32%)

**Eosinophilie
Myokarditis**



(EF: 30%,)

Verlauf einer Riesenzellmyokarditis



Tschöpe et al

Current Diagnostic and Treatment Strategies for Specific Dilated Cardiomyopathies

A Scientific Statement From the American Heart Association

Circulation December 2016

The intent of this American Heart Association (AHA) scientific statement is to summarize our current understanding of dilated cardiomyopathies. There is special emphasis on recent developments in diagnostic approaches and therapies for specific cardiomyopathies. Recommendations in this document are based on published studies, published practice guidelines from the American College of Cardiology (ACC)/AHA¹ and other organizations,^{2,3} and the multidisciplinary expertise of the writing group. Existing evidence in epidemiology, classification, diagnosis, and management of specific cardiomyopathies is usually derived from nonrandomized observational studies, registries, case reports, or expert opinion based on clinical experience, not large-scale randomized clinical trials or systematic reviews. Therefore, in this document, rather than using the standard ACC/AHA classification schema of recommendations and level of evidence,⁴ we have included key management strategies at the end of each section and categorized our recommendations according to the level of consensus. Although the format of our recommendations might resemble the ACC/AHA classification of recommendations used in the ACC/AHA practice guidelines, because of the preponderance of expert opinion or level of evidence C evidence in our document, we elected to use different terminology to provide a distinction from the practice guidelines, in which stronger levels and quality of evidence with randomized clinical trials or meta-analyses are usually present.⁴ The levels of evidence follow the AHA and ACC methods of classifying the level of certainty of the treatment effect.⁴

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mittee on Heart Failure

Current Diagnostic and Treatment Strategies for Specific Dilated Cardiomyopathies

A Scientific Statement From the American Heart Association

Circulation December 2016

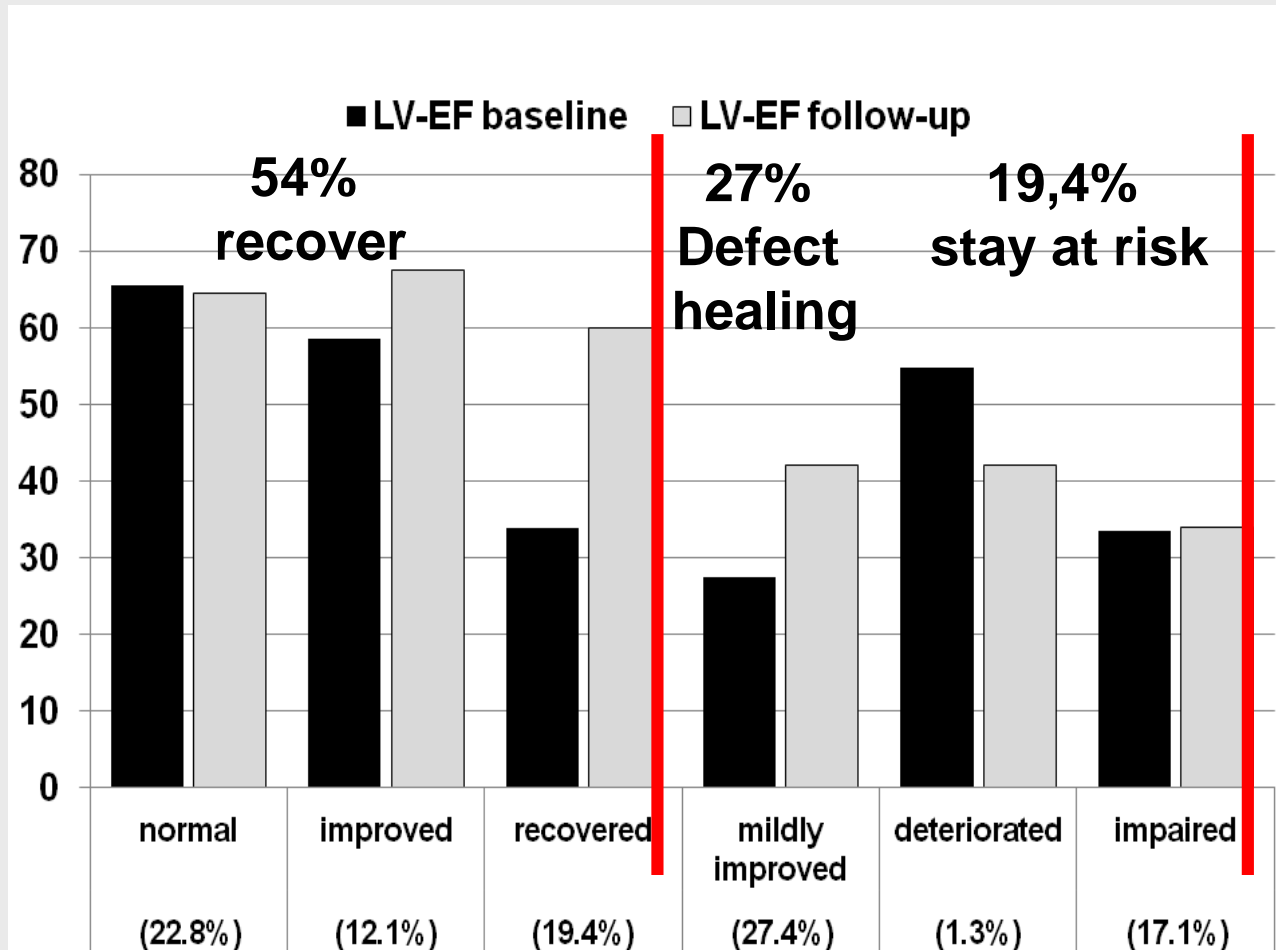
Indikation zur Biopsie

- 1. Schock**
- 2. AV- Block Mobitz oder AV Block III**
- 3. Symptomatische Tachykardien**
- 4. Herzinsuffizienz, die nicht adäquat in den folgenden
2 Wochen auf die Standardtherapie reagiert**

(Level of Evidence C)

45% der Patienten mit V.a. kardiale Inflammation werden sich nicht erholen trotz Standardtherapie

Spontaneous Course of biopsy proven MC/DCMi *
(clinical mean follow-up: 30 months, n=922)

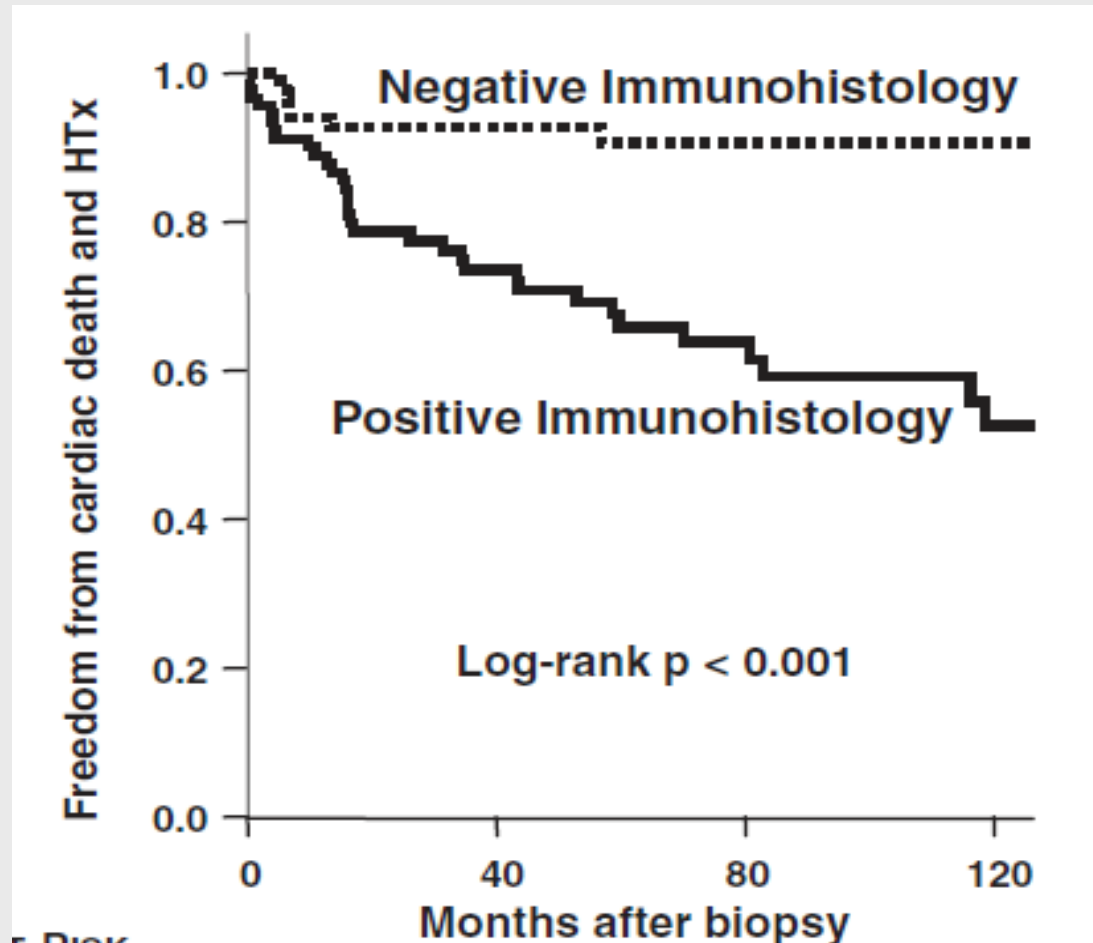


* No specific treatment due to viral persistence

Kühl et al

Immunhistologischer Nachweis einer Entzündungsreaktion ist für die Myokarditis Prognose entscheidend

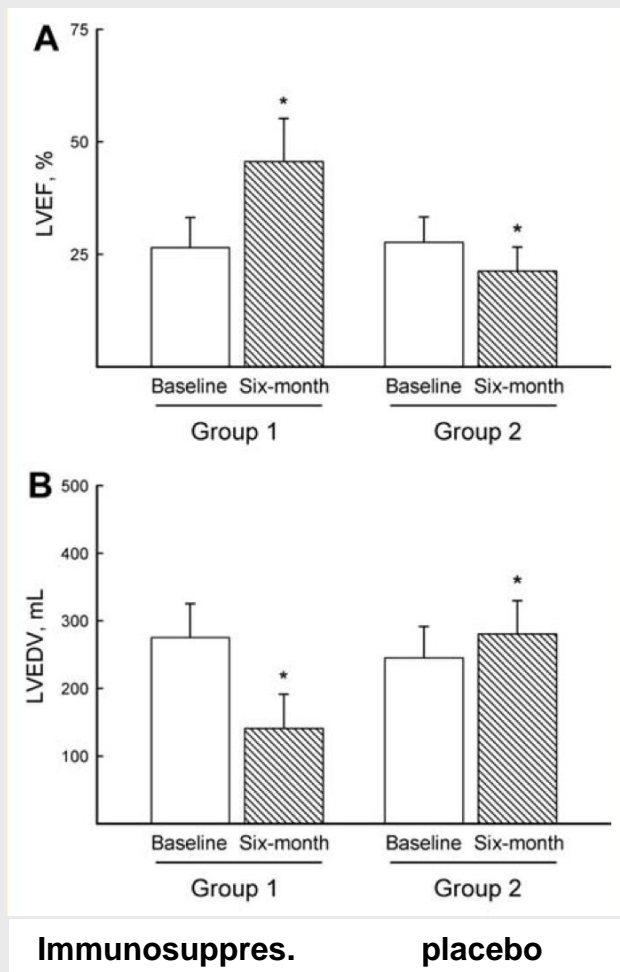
(Kindermann *et al* *Circulation*. 2008 Aug 5;118(6):639-48)



Immunosuppression in virus-negativer DCMi:

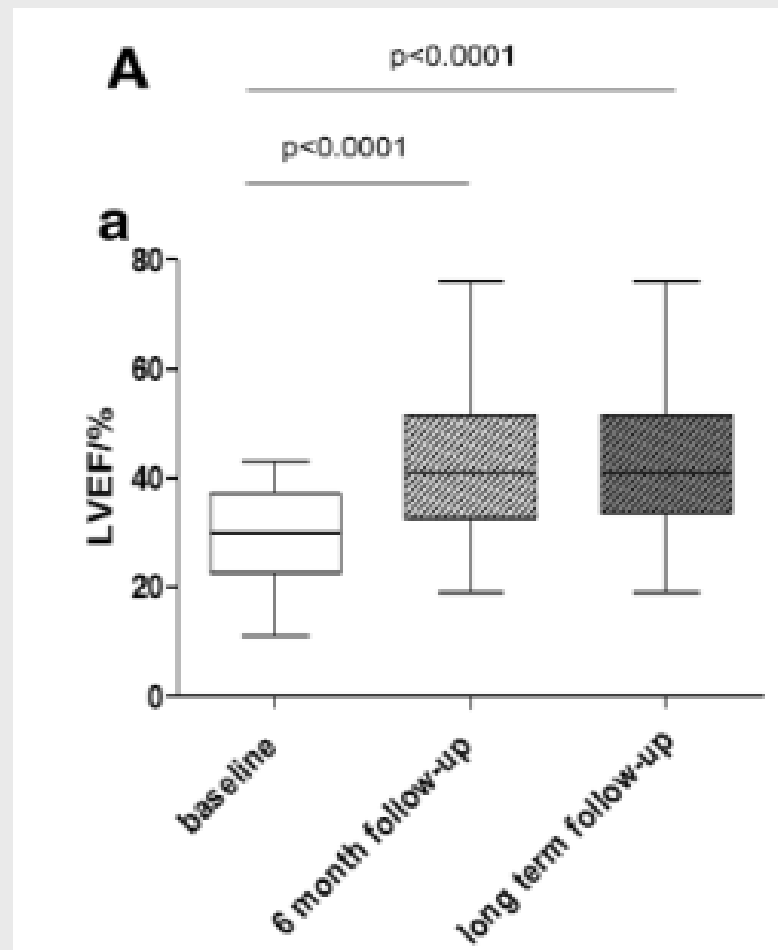
6 Wochen

Frustaci et al. Eur Heart J 2009



6 Jahren

Escher et al. CRC 2016



Immunosuppression in **virus-positiver** DCMi: Coxsacki/Adenoviren Parvovirus

Schultheiss et al. CRC 2016

BICC Studie

Response variable	Adeno/enterovirus (stratum 1, n = 15)	
	Placebo (n = 6)	IFN- β -1b (n = 9)
Overall response (virus elimination/reduction, primary)	1 (16.7 %)	4 (44.4 %)
NYHA improvement	(n = 5)	(n = 7)
Week 0–12	1 (20.0 %)	6 (85.7)
Week 0–24	1 (20.0 %)	6 (85.7)
Randomised untreated patients	3	

ESC Empfehlungen

Caforio et al, Eur Heart J 2013



European Heart Journal (2013) 34, 2636–2648
doi:10.1093/eurheartj/ehz210

ESC REPORT

Current state of knowledge on aetiology, diagnosis, management, and therapy of myocarditis:

Immunsuppression nach Ausschluss einer Entero/Adenovirus Persistenz

Roland Jansz¹⁰, Karin Kügeler¹¹, Ales Linnarsson¹², Bernhard Maisch³, William McKenna¹³,
Jens Mogensen¹⁴, Yigal M. Pinto¹⁵, Arsen Ristic¹⁶, Heinz-Peter Schultheiss¹⁷,
Hubert Seggewiss¹⁸, Luigi Tavazzi¹⁹, Gaetano Thiene⁴, Ali Yilmaz²⁰,
Philippe Charron²¹, and Perry M. Elliott¹³

Moykarditis

Zusammenfassung:

- **Meist gute Prognose unter Schonung und Standard-HF Therapie**
 - **Devices: abwarten / Weste**
 - **Biopsie: Schock (IIa)**
- **ca. 2- Wochen - 3 Monaten ohne Besserung (IIb)**
- **Biopsie-gesteuerte Immunsuppressive Therapie**