

# Myocarditis

## MYOCARDITIS

### 1. Oorzaken

#### Niet-infectieus

#### - toxisch:

##### - medicatie:

- overgevoeligheid aan penicilline, sulfamethoxazole (Bactrim, Eusaprim) of sulfadiazine (Flammazine)
- chemotherapie
- koolwaterstoffen

##### - intoxicatie

- koolmonoxide
- zware metalen
- arseen

- zwangerschap: postpartum cardiomyopathie
- auto-immuunziekten: SLE, ziekte van Kawasaki, Wegener granulomatose
- sarcoidose
- transplantrejectie
- bestraling

#### Infectieus

#### - parasitair:

##### - Protozoa

- ziekte van Chagas: wereldwijd grootste oorzaak van myocarditis. Enkel in Centraal en Zuid-Amerika. Ongeveer 20 miljoen personen zijn geïnfecteerd door *Tryposama Cruzi*.

- Toxoplasmose
- Trypanosomias
- Malaria

- Leishmaniasis
- Spirocheten (Syphilis)
- Rickettsia
- Wormen (Helminthic)
  - Trichinose
  - Echinococcus
  - Schistosomias
  - Cysticercosis
- Schimmelinfectie
  - candidiasis
  - aspergillosis
  - cryptococcus
  - histoplasmosis
  - actinomycosis
- bijtwonden
  - schorpioen
  - slang
  - zwarte weduwe
- bacterieel
  - difterie
  - tuberculose
  - brucellose
  - psittacosis
  - meningococci
  - mycoplasma
  - groep A streptococci
- Viraal
  - enterovirus (coxsackie B)

- adenovirus
- herpesvirus
- CMV
- Hepatitis C
- Influenza
- Mazelen
- Rubeola
- Variola
- Gele koorts
- Rabies
- HIV

## 2. Diagnostiek

### - anamnese:

- recent ontstane vermoeidheid
- gedaalde inspanningstolerantie
- dyspnee
- thoracale last bij AH
- koorts
- hartkloppingen

### - lichamelijk onderzoek:

- matige vorm: vitale parameters: zwakke pulsaties (hypotensie, tachycardie), cyanose, opgezette venae jugularis. Bij auscultatie S1 bedekt/zwak en zelden een diastolisch geruis.

- fulminante vorm: reutels, opzetting halsvenen, perifeer oedeem, hepatomegalie

### - ECG:

- ST- en T-afwijkingen maar nonspecifiek en transient.
- ritmestoornissen.
- Geleidingsstoornissen

- Rx Thorax: deze varieert van normaal tot cardiomegalie en longoedeem
- Labo:
  - CBC
  - CRP
  - Hartenzymen
  - infectie: virale titers, titers voor mycoplasma, antistreptolysine, hepatitis testen, monospot, CMV, bloedculturen
- Echocardiogram:
  - linker ventrikeldilatatie, hypertrofie. Thrombus?
  - Rechter ventrikel: slechte functie is een slechte prognose.
  - vullingstoestand van de ventrikels.
- scintigrafie: antimyosine antilichamen, gallium 67 gelabeld of Indium 111 gelabeld.
- MRI met gadolinium: cardiale inflammatie of necrose
- biopsie rechter ventrikel

### 3. Therapie

#### Eerste opvang

- eventueel longoedeem behandelen
  - ritmestoornissen behandelen: behandeling van tachycardie, bradycardie. Zo nodig transvenieuze pacing.
- Cave: geef GEEN NSAID in de acute fase!

#### Spoeddienst

- cardiale therapie:
  - preload en afterload verminderen. ACE-inhibitoren verminderen de inflammatie en de afterload. Ook diuretica passen hierin
  - bloedverdunners bij thrombus of verminderde LV functie
  - ritmestoornissen behandelen. Digoxine bij atriumfibrillatie
- specifieke therapie
  - CMV: hyperimmunoglobuline therapie. Bij kinderen worden bij virale myocarditis IV immunoglobulines gegeven.
  - Immunosuppressieve therapie: het effect is niet bewezen
- effecten op termijn:
  - mortaliteit op 5 jaar = 56%.

- Harttransplantatie kan een oplossing bieden.
- 20 à 33% geneest volledig.

#### Eerste opvang

- eventueel longoedeem behandelen
  - ritmestoornissen behandelen: behandeling van tachycardie, bradycardie. Zo nodig transvenieuze pacing.
- Cave: geef GEEN NSAID in de acute fase!

#### Spoeddienst

- cardiale therapie:

- preload en afterload verminderen. ACE-inhibitoren verminderen de inflammatie en de afterload. Ook diuretica passen hierin

- bloedverduunners bij thrombus of verminderde LV functie

- ritmestoornissen behandelen. Digoxine bij atriumfibrillatie

- specifieke therapie

- CMV: hyperimmunoglobuline therapie. Bij kinderen worden bij virale myocarditis IV immunoglobulines gegeven.

- Immunosuppressieve therapie: het effect is niet bewezen

- effecten op termijn:

- mortaliteit op 5 jaar = 56%.

- Harttransplantatie kan een oplossing bieden.

- 20 à 33% geneest volledig.

#### REFERENTIES:

- Caforio AL, Pankuweit S, Arbustini E, et al. Current state of knowledge on aetiology, diagnosis, management, and therapy of myocarditis: a position statement of the European Society of Cardiology Working Group on Myocardial and Pericardial Diseases. Eur Heart J 2013; 34:2636.
- Dec GW Jr, Palacios IF, Fallon JT, et al. Active myocarditis in the spectrum of acute dilated

cardiomyopathies. Clinical features, histologic correlates, and clinical outcome. *N Engl J Med* 1985; 312:885.

- O'Connell JB, Mason JW. Diagnosing and treating active myocarditis. *West J Med* 1989; 150:431.
- Olinde KD, O'Connell JB. Inflammatory heart disease: pathogenesis, clinical manifestations, and treatment of myocarditis. *Annu Rev Med* 1994; 45:481.
- Ansari AA, Wang YC, Danner DJ, et al. Abnormal expression of histocompatibility and mitochondrial antigens by cardiac tissue from patients with myocarditis and dilated cardiomyopathy. *Am J Pathol* 1991; 139:337.
- Grist NR, Bell EJ. Coxsackie viruses and the heart. *Am Heart J* 1969; 77:295.
- Gerzen P, Granath A, Holmgren B, Zetterquist S. Acute myocarditis. A follow-up study. *Br Heart J* 1972; 34:575.
- Baughman KL. Diagnosis of myocarditis: death of Dallas criteria. *Circulation* 2006; 113:593.
- Angelini A, Calzolari V, Calabrese F, et al. Myocarditis mimicking acute myocardial infarction: role of endomyocardial biopsy in the differential diagnosis. *Heart* 2000; 84:245.
- Gutberlet M, Spors B, Thoma T, et al. Suspected chronic myocarditis at cardiac MR: diagnostic accuracy and association with immunohistologically detected inflammation and viral persistence. *Radiology* 2008; 246:401.
- Mahrholdt H, Goedecke C, Wagner A, et al. Cardiovascular magnetic resonance assessment of human myocarditis: a comparison to histology and molecular pathology. *Circulation* 2004; 109:1250.
- Kindermann I, Kindermann M, Kandolf R, et al. Predictors of outcome in patients with suspected myocarditis. *Circulation* 2008; 118:639.
- Kühl U, Lauer B, Souvatzoglou M, et al. Antimyosin scintigraphy and immunohistologic analysis of endomyocardial biopsy in patients with clinically suspected myocarditis--evidence of myocardial cell damage and inflammation in the absence of histologic signs of myocarditis. *J Am Coll Cardiol* 1998; 32:1371.
- Engler, RJ, Collins, LC, Gibbs, BT, et al. Myocarditis after smallpox/vaccinia immunization: Passive vaccine safety surveillance compared to prospective studies. *J Allerg Clin Immunol* 2009; 123:S264.
- Mason JW, O'Connell JB, Herskowitz A, et al. A clinical trial of immunosuppressive therapy for myocarditis. The Myocarditis Treatment Trial Investigators. *N Engl J Med* 1995; 333:269.
- Felker GM, Thompson RE, Hare JM, et al. Underlying causes and long-term survival in patients with initially unexplained cardiomyopathy. *N Engl J Med* 2000; 342:1077.
- Dec GW Jr, Waldman H, Southern J, et al. Viral myocarditis mimicking acute myocardial infarction. *J Am Coll Cardiol* 1992; 20:85.
- Sarda L, Colin P, Boccara F, et al. Myocarditis in patients with clinical presentation of myocardial infarction and normal coronary angiograms. *J Am Coll Cardiol* 2001; 37:786.
- Miklozek CL, Crumpacker CS, Royal HD, et al. Myocarditis presenting as acute myocardial infarction. *Am Heart J* 1988; 115:768.
- Karjalainen J, Heikkilä J. Incidence of three presentations of acute myocarditis in young men in military service. A 20-year experience. *Eur Heart J* 1999; 20:1120.
- McCully RB, Cooper LT, Schreiter S. Coronary artery spasm in lymphocytic myocarditis: a rare cause of acute myocardial infarction. *Heart* 2005; 91:202.
- Theleman KP, Kuiper JJ, Roberts WC. Acute myocarditis (predominately lymphocytic) causing sudden death without heart failure. *Am J Cardiol* 2001; 88:1078.
- Drory Y, Turetz Y, Hiss Y, et al. Sudden unexpected death in persons less than 40 years of age. *Am J Cardiol* 1991; 68:1388.
- Maron BJ, Carney KP, Lever HM, et al. Relationship of race to sudden cardiac death in competitive athletes with hypertrophic cardiomyopathy. *J Am Coll Cardiol* 2003; 41:974.
- Eckart RE, Scoville SL, Campbell CL, et al. Sudden death in young adults: a 25-year review of autopsies in military recruits. *Ann Intern Med* 2004; 141:829.
- Maron BJ, Doerer JJ, Haas TS, et al. Sudden deaths in young competitive athletes: analysis of 1866 deaths in the United States, 1980-2006. *Circulation* 2009; 119:1085.
- Wang K, Asinger RW, Marriott HJ. ST-segment elevation in conditions other than acute myocardial infarction. *N Engl J Med* 2003; 349:2128.

- Nakashima H, Katayama T, Ishizaki M, et al. Q wave and non-Q wave myocarditis with special reference to clinical significance. *Jpn Heart J* 1998; 39:763.
- Caforio AL, Calabrese F, Angelini A, et al. A prospective study of biopsy-proven myocarditis: prognostic relevance of clinical and aetiopathogenetic features at diagnosis. *Eur Heart J* 2007; 28:1326.
- Ukena C, Mahfoud F, Kindermann I, et al. Prognostic electrocardiographic parameters in patients with suspected myocarditis. *Eur J Heart Fail* 2011; 13:398.
- Smith SC, Ladenson JH, Mason JW, Jaffe AS. Elevations of cardiac troponin I associated with myocarditis. Experimental and clinical correlates. *Circulation* 1997; 95:163.
- Lauer B, Niederau C, Kühl U, et al. Cardiac troponin T in patients with clinically suspected myocarditis. *J Am Coll Cardiol* 1997; 30:1354.
- Nieminen MS, Heikkilä J, Karjalainen J. Echocardiography in acute infectious myocarditis: relation to clinical and electrocardiographic findings. *Am J Cardiol* 1984; 53:1331.
- Pinamonti B, Alberti E, Cigalotto A, et al. Echocardiographic findings in myocarditis. *Am J Cardiol* 1988; 62:285.
- Escher F, Westermann D, Gaub R, et al. Development of diastolic heart failure in a 6-year follow-up study in patients after acute myocarditis. *Heart* 2011; 97:709.
- Felker GM, Boehmer JP, Hruban RH, et al. Echocardiographic findings in fulminant and acute myocarditis. *J Am Coll Cardiol* 2000; 36:227.
- Mendes LA, Picard MH, Dec GW, et al. Ventricular remodeling in active myocarditis. *Myocarditis Treatment Trial*. *Am Heart J* 1999; 138:303.
- Friedrich MG, Sechtem U, Schulz-Menger J, et al. Cardiovascular magnetic resonance in myocarditis: A JACC White Paper. *J Am Coll Cardiol* 2009; 53:1475.
- Friedrich MG, Marcotte F. Cardiac magnetic resonance assessment of myocarditis. *Circ Cardiovasc Imaging* 2013; 6:833.
- Ferreira VM, Piechnik SK, Dall'Armellina E, et al. T(1) mapping for the diagnosis of acute myocarditis using CMR: comparison to T2-weighted and late gadolinium enhanced imaging. *JACC Cardiovasc Imaging* 2013; 6:1048.
- Abdel-Aty H, Boyé P, Zagrosek A, et al. Diagnostic performance of cardiovascular magnetic resonance in patients with suspected acute myocarditis: comparison of different approaches. *J Am Coll Cardiol* 2005; 45:1815.
- Baccouche H, Mahrholdt H, Meinhardt G, et al. Diagnostic synergy of non-invasive cardiovascular magnetic resonance and invasive endomyocardial biopsy in troponin-positive patients without coronary artery disease. *Eur Heart J* 2009; 30:2869.
- Laissy JP, Messin B, Varenne O, et al. MRI of acute myocarditis: a comprehensive approach based on various imaging sequences. *Chest* 2002; 122:1638.
- De Cobelli F, Pieroni M, Esposito A, et al. Delayed gadolinium-enhanced cardiac magnetic resonance in patients with chronic myocarditis presenting with heart failure or recurrent arrhythmias. *J Am Coll Cardiol* 2006; 47:1649.
- O'Connell JB, Henkin RE, Robinson JA, et al. Gallium-67 imaging in patients with dilated cardiomyopathy and biopsy-proven myocarditis. *Circulation* 1984; 70:58.
- Takano H, Nakagawa K, Ishio N, et al. Active myocarditis in a patient with chronic active Epstein-Barr virus infection. *Int J Cardiol* 2008; 130:e11.
- Lieberman EB, Hutchins GM, Herskowitz A, et al. Clinicopathologic description of myocarditis. *J Am Coll Cardiol* 1991; 18:1617.
- McCarthy RE 3rd, Boehmer JP, Hruban RH, et al. Long-term outcome of fulminant myocarditis as compared with acute (nonfulminant) myocarditis. *N Engl J Med* 2000; 342:690.
- Blauwet LA, Cooper LT. Myocarditis. *Prog Cardiovasc Dis* 2010; 52:274.
- Howlett JG, McKelvie RS, Arnold JM, et al. Canadian Cardiovascular Society Consensus Conference guidelines on heart failure, update 2009: diagnosis and management of right-sided heart failure, myocarditis, device therapy and recent important clinical trials. *Can J Cardiol* 2009; 25:85.
- Maron BJ, Towbin JA, Thiene G, et al. Contemporary definitions and classification of the cardiomyopathies: an American Heart Association Scientific Statement from the Council on Clinical Cardiology, Heart Failure and Transplantation Committee; Quality of Care and Outcomes Research

and Functional Genomics and Translational Biology Interdisciplinary Working Groups; and Council on Epidemiology and Prevention. *Circulation* 2006; 113:1807.

- Elliott P, Andersson B, Arbustini E, et al. Classification of the cardiomyopathies: a position statement from the European Society Of Cardiology Working Group on Myocardial and Pericardial Diseases. *Eur Heart J* 2008; 29:270.
- Yancy CW, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA guideline for the management of heart failure: executive summary: a report of the American College of Cardiology Foundation/American Heart Association Task Force on practice guidelines. *Circulation* 2013; 128:1810.
- Chimenti C, Pieroni M, Maseri A, Frustaci A. Histologic findings in patients with clinical and instrumental diagnosis of sporadic arrhythmogenic right ventricular dysplasia. *J Am Coll Cardiol* 2004; 43:2305.
- Pieroni M, Dello Russo A, Marzo F, et al. High prevalence of myocarditis mimicking arrhythmogenic right ventricular cardiomyopathy differential diagnosis by electroanatomic mapping-guided endomyocardial biopsy. *J Am Coll Cardiol* 2009; 53:681.
- Rahman JE, Helou EF, Gelzer-Bell R, et al. Noninvasive diagnosis of biopsy-proven cardiac amyloidosis. *J Am Coll Cardiol* 2004; 43:410.
- Frustaci A, Verardo R, Caldarulo M, et al. Myocarditis in hypertrophic cardiomyopathy patients presenting acute clinical deterioration. *Eur Heart J* 2007; 28:733.
- Cooper LT, Baughman KL, Feldman AM, et al. The role of endomyocardial biopsy in the management of cardiovascular disease: a scientific statement from the American Heart Association, the American College of Cardiology, and the European Society of Cardiology. *Circulation* 2007; 116:2216.
- Aretz HT, Billingham ME, Edwards WD, et al. Myocarditis. A histopathologic definition and classification. *Am J Cardiovasc Pathol* 1987; 1:3.
- Wu LA, Lapeyre AC 3rd, Cooper LT. Current role of endomyocardial biopsy in the management of dilated cardiomyopathy and myocarditis. *Mayo Clin Proc* 2001; 76:1030.
- Frustaci A, Chimenti C, Calabrese F, et al. Immunosuppressive therapy for active lymphocytic myocarditis: virological and immunologic profile of responders versus nonresponders. *Circulation* 2003; 107:857.
- Kühl U, Pauschinger M, Seeberg B, et al. Viral persistence in the myocardium is associated with progressive cardiac dysfunction. *Circulation* 2005; 112:1965.
- Martin AB, Webber S, Fricker FJ, et al. Acute myocarditis. Rapid diagnosis by PCR in children. *Circulation* 1994; 90:330.
- Kühl U, Pauschinger M, Noutsias M, et al. High prevalence of viral genomes and multiple viral infections in the myocardium of adults with "idiopathic" left ventricular dysfunction. *Circulation* 2005; 111:887.
- Caforio AL, Mahon NG, Baig MK, et al. Prospective familial assessment in dilated cardiomyopathy: cardiac autoantibodies predict disease development in asymptomatic relatives. *Circulation* 2007; 115:76.

## Voeg een nieuwe reactie toe

[Login](#) [1] of [registreer](#) [2] om te kunnen reageren

---

**Bron-URL:** <https://medicsformedics.eu/nl/myocarditis>

### Links

[1] <https://medicsformedics.eu/nl/user/login?destination=node/%23comment-form>

[2] <https://medicsformedics.eu/nl/user/register?destination=node/%23comment-form>