

# Cardiogene shock

## 1. Oorzaken

= falen van de hartpomp

- AMI:

- 7 à 15% gaat in shock
- of linkerventrikel (> 40% necrose) of rechter ventrikel

- ruptuur van papillaire spieren en of ventrikelwand
- myocarditis
- cardiomyopathie
- hartkleplijden
- ritmestoornissen
- toxiciteit

- Beta blokkers
- calciumantagonisten

- Adriamycine?

## Anamnese

- algemeen

- ischaemische retrosternale pijn
- angst
- cyanose
- bleekheid
- zweten
- afkoeling

- uitsluiten van andere vormen van shock

- hypovolemisch
- anafylactisch

- septische shock

## **Lichamelijk onderzoek**

- vitale parameters
  - Ademhaling: dyspnee, tachypnee
  - Pols: tachycardie, zwakke pols
  - bloeddruk: systolisch (BD S < 90 mmHG)

diastolisch: indien laag, denk aan ondervulling of vasodilatatie.

Indien hoog, denk aan cardiogene shockz

- zijn de halsvenen opgezet?
  - indien ja: overvulling? congestief hartfalen? tensie pneumothorax? Harttamponade? (constrictieve pericarditis of retrograde aortadissectie?)
  - Meten van de centraal veneuse druk: > 15 cm H<sub>2</sub>O suggereert tamponade. Kan ook bij hypovolemie.

- Auscultatie:

- longen: < VAG bij tensie pneumothorax en of longoedeem

reutels

- Hart:

- indien < harttonen? Denk aan harttamponade (constrictieve pericarditis, retrograde aortadissectie) of aan tensie pneumothorax.

- systolisch geruis aan de hartpunt

- systolische klik: ruptuur chordae tendinae

- galloppritme: S3: ernstige myocarddysfunctie, S4 bij AMI in 80% hoorbaar.

- Abdomen: epigastrische pijn, nausea en braken

- urineflow: < 20 ml/u

## **Lab**

- CBC

- elektrolyten

- hartenzymen

## **ECG**

beeld van AMI op ECG

## **Echocardio**

- ventrikel akinetisch

- klepdysfunctie

- ruptuur septum, papillairspier en of ventrikelwand

## **3. DD**

- mogelijke oorzaken van obstructieve shock

- cardiogeen:

- acuut myocardiïden (myocarditis, cardiomyopathie, rechter ventrikelfarct

- acuut klepliïden: ischaemie, endocarditis

- harttamponade: constrictieve pericarditis, retrograde aortadissectie

- septale ruptuur

- pulmonaal:

- longembolen (luchtembool?)

- tensie pneumothorax
- Medicatie:
  - beta blokkers
  - calciumantagonisten
  - adriamycine
- andere vormen van shock
  - hypovolemische shock
  - anafylactische shock
  - septische shock (koude septische shock, oesofagale ruptuur)
- Addison crisis

### **Eerste opvang**

- ABC
- IV-lijn
- O2 100%
- ALS
- monitoring
- intubatie (crush inductie)
- dringend consult cardioloog, owv kans op snelle revascularisatie. Dit is het allerbelangrijkste voor overleving.

### **Specifieke therapie**

#### **- Myocardischeaemie**

- Aspirine
- Heparine
- Bij hypotensie geen cedocard, diuretica of betablokkers

- bloeddruk voldoende hoog houden met dobutamine. Bij rechterventrikelfarct geen Dopamine geven omdat dit de longweerstand verhoogt.

#### - Harttamponade:

- eerste opvang: best 2 IV-lijnen, voldoende vocht IV, bij instabiele patient een pericardiocentese, evtl een spoedthoracotomie met pericardiotomie indien de patient onvoldoende stabiel is na pericardiocentese en vochttoediening. Ook uit te voeren bij hartstilstand door tamponade bij penetrerend trauma.
- plaatsen van een voorlopige pericarddrain
- specifieke therapie:
  - indien een bacteriele pericarditis: start antibiotica: tegen welke kiemen? gramnegatieven, staphylococcus aureus en anaeroben. Soms is heilkunde nodig (partiele resectie van het pericard)
  - indien een uremische pericarddeffusie: indicatie voor urgente dialyse
  - NSAID: bij het Dressler syndroom (enkele weken na AMI) of na radiotherapie
  - Bij penetrerend thoraxtrauma: dringend plannen van thoracotomie
  - bij aortadissectie: dringend plannen van operatie

#### - tensiepneumothorax:

- onmiddellijke naaldthoracotomie
- erna een thoraxdrain

#### - longembolen

- anticoagulatie:
  - IV Heparine: geef een bolus van 80 U/kg (volwassenen) of 75U/kg (pediatrie). Nadien continu infuus van 18U/kg (volwassenen) of 20U/kg (pediatrie). Dosage aanpassen aan PTT tussen 90 en 200.
  - LMWH: Fraxiparine

- Marcoumar: dosering: 3-2-1 co/d en direct erna INR meten. Titrezen tot INR = 2-3 Later opstarten

- Thrombolyse:

- indicaties: bij stabiele patient indien uitzetting rechter hart te zien is op echocardiogram. Bij onstabiele patient

- steeds associëren met Heparine en Aspirine

- Thrombolytica:

- Tirofiban (Aggrastat): eerste 30 min 0,4mg/kg/min. Dan 48 tot 108 uren 0,1microgram/kg/min. Bestaat in flacons van 12,5mg/50ml of prefabinfuus van 12,5mg/250ml

- Abciximab (Reopro): Bolus van 0,25mg/kg. 1 amp is 10mg

- embolectomie: heelkundig of locale thrombolyse via catheter.

- op termijn filter in de Vena Cava Inferior

- Longoedeem:

- is de patient hypotens (BDS < 90 mmHg)?

- Neen: Nitraten (SL of IV), Morfine, Diuretica (tegenindicaties hypotensie, niet-cardiogene oorzaak, nierdialysepatient)

- ja: geef geen nitraten, morfine en diuretica, wel inotropica zoals Dobutamine, Dopamine of Milrinone (Corotrope)

- positieve druk beademing:

- CPAP: niet bij risico op AMI

- intubatie: PEEP van 5-10 cm H<sub>2</sub>O, Tidal volume 12-15 ml/kg om atelectase te voorkomen. Initieel 100% O<sub>2</sub>, maar afbouwen zo mogelijk.

- indien nierdialysepatient:

- snelle dialyse.

- Zo niet mogelijk geef Nitroglycerine IV of ACE-inhibitoren: Enalapril (Renitec) 1,25mg IV over 5 min en elke 6u te herhalen zo nodig. Of geef Captopril (Capoten) 25-50mg/d PO

- best geen diuretica

- Intoxicatie:

- cave recidief longoedeem 1e 3 dagen

## REFERENTIES:

- Reynolds HR, Hochman JS. Cardiogenic shock: current concepts and improving outcomes. *Circulation* 2008; 117:686.
- Goldberg RJ, Spencer FA, Gore JM, et al. Thirty-year trends (1975 to 2005) in the magnitude of, management of, and hospital death rates associated with cardiogenic shock in patients with acute myocardial infarction: a population-based perspective. *Circulation* 2009; 119:1211.
- Goldberg RJ, Gore JM, Alpert JS, et al. Cardiogenic shock after acute myocardial infarction. Incidence and mortality from a community-wide perspective, 1975 to 1988. *N Engl J Med* 1991; 325:1117.
- Hochman JS, Boland J, Sleeper LA, et al. Current spectrum of cardiogenic shock and effect of early revascularization on mortality. Results of an International Registry. SHOCK Registry Investigators. *Circulation* 1995; 91:873.
- Goldberg RJ, Gore JM, Thompson CA, Gurwitz JH. Recent magnitude of and temporal trends (1994-1997) in the incidence and hospital death rates of cardiogenic shock complicating acute myocardial infarction: the second national registry of myocardial infarction. *Am Heart J* 2001; 141:65.
- Holmes DR Jr, Bates ER, Kleiman NS, et al. Contemporary reperfusion therapy for cardiogenic shock: the GUSTO-I trial experience. The GUSTO-I Investigators. Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries. *J Am Coll Cardiol* 1995; 26:668.
- Goldberg RJ, Samad NA, Yarzebski J, et al. Temporal trends in cardiogenic shock complicating acute myocardial infarction. *N Engl J Med* 1999; 340:1162.
- Holmes DR Jr, Berger PB, Hochman JS, et al. Cardiogenic shock in patients with acute ischemic syndromes with and without ST-segment elevation. *Circulation* 1999; 100:2067.
- Babaev A, Frederick PD, Pasta DJ, et al. Trends in management and outcomes of patients with acute myocardial infarction complicated by cardiogenic shock. *JAMA* 2005; 294:448.

- TRIUMPH Investigators, Alexander JH, Reynolds HR, et al. Effect of tilarginine acetate in patients with acute myocardial infarction and cardiogenic shock: the TRIUMPH randomized controlled trial. *JAMA* 2007; 297:1657.
- Jeger RV, Radovanovic D, Hunziker PR, et al. Ten-year trends in the incidence and treatment of cardiogenic shock. *Ann Intern Med* 2008; 149:618.
- Meinertz T, Kasper W, Schumacher M, Just H. The German multicenter trial of anisoylated plasminogen streptokinase activator complex versus heparin for acute myocardial infarction. *Am J Cardiol* 1988; 62:347.
- Sleeper LA, Ramanathan K, Picard MH, et al. Functional status and quality of life after emergency revascularization for cardiogenic shock complicating acute myocardial infarction. *J Am Coll Cardiol* 2005; 46:266.
- Hochman JS, Sleeper LA, Webb JG, et al. Early revascularization and long-term survival in cardiogenic shock complicating acute myocardial infarction. *JAMA* 2006; 295:2511.
- Hasdai D, Holmes DR Jr, Califf RM, et al. Cardiogenic shock complicating acute myocardial infarction: predictors of death. GUSTO Investigators. Global Utilization of Streptokinase and Tissue-Plasminogen Activator for Occluded Coronary Arteries. *Am Heart J* 1999; 138:21.
- Fincke R, Hochman JS, Lowe AM, et al. Cardiac power is the strongest hemodynamic correlate of mortality in cardiogenic shock: a report from the SHOCK trial registry. *J Am Coll Cardiol* 2004; 44:340.
- Wong SC, Sanborn T, Sleeper LA, et al. Angiographic findings and clinical correlates in patients with cardiogenic shock complicating acute myocardial infarction: a report from the SHOCK Trial Registry. Should we emergently revascularize Occluded Coronaries for cardiogenic shock? *J Am Coll Cardiol* 2000; 36:1077.
- Sanborn TA, Sleeper LA, Webb JG, et al. Correlates of one-year survival inpatients with cardiogenic shock complicating acute myocardial infarction: angiographic findings from the SHOCK trial. *J Am Coll Cardiol* 2003; 42:1373.
- Picard MH, Davidoff R, Sleeper LA, et al. Echocardiographic predictors of survival and response to early revascularization in cardiogenic shock. *Circulation* 2003; 107:279.
- Ortolani P, Marzocchi A, Marrozzini C, et al. Clinical impact of direct referral to primary percutaneous coronary intervention following pre-hospital diagnosis of ST-elevation myocardial infarction. *Eur Heart J* 2006; 27:1550.
- Hochman JS, Sleeper LA, Webb JG, et al. Early revascularization in acute myocardial infarction complicated by cardiogenic shock. SHOCK Investigators. Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock. *N Engl J Med* 1999; 341:625.
- Ramanathan K, Farkouh ME, Cosmi JE, et al. Rapid complete reversal of systemic hypoperfusion after intra-aortic balloon pump counterpulsation and survival in cardiogenic shock complicating an acute myocardial infarction. *Am Heart J* 2011; 162:268.
- Antman EM, Anbe DT, Armstrong PW, et al. ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction. [www.acc.org/qualityandscience/clinical/statements.htm](http://www.acc.org/qualityandscience/clinical/statements.htm) [1] (Accessed on August 24, 2006).
- [www.acc.org/qualityandscience/clinical/statements.htm](http://www.acc.org/qualityandscience/clinical/statements.htm) [1] (Accessed on September 18, 2007).
- [www.acc.org/qualityandscience/clinical/statements.htm](http://www.acc.org/qualityandscience/clinical/statements.htm) [1] (Accessed on September 18, 2007).
- Hasdai D, Harrington RA, Hochman JS, et al. Platelet glycoprotein IIb/IIIa blockade and outcome of cardiogenic shock complicating acute coronary syndromes without persistent ST-segment elevation. *J Am Coll Cardiol* 2000; 36:685.
- Bonello L, De Labriolle A, Roy P, et al. Bivalirudin with provisional glycoprotein IIb/IIIa inhibitors in patients undergoing primary angioplasty in the setting of cardiogenic shock. *Am J Cardiol* 2008; 102:287.
- De Backer D, Biston P, Devriendt J, et al. Comparison of dopamine and norepinephrine in the treatment of shock. *N Engl J Med* 2010; 362:779.
- Mueller HS, Chatterjee K, Davis KB, et al. ACC expert consensus document. Present use of bedside right heart catheterization in patients with cardiac disease. American College of Cardiology. *J Am Coll Cardiol* 1998; 32:840.



- Califf RM, Bengtson JR. Cardiogenic shock. *N Engl J Med* 1994; 330:1724.
- Menon V, White H, LeJemtel T, et al. The clinical profile of patients with suspected cardiogenic shock due to predominant left ventricular failure: a report from the SHOCK Trial Registry. *SHould we emergently revascularize Occluded Coronaries in cardiogenic shock?* *J Am Coll Cardiol* 2000; 36:1071.
- Kontoyannis DA, Nanas JN, Kontoyannis SA, et al. Mechanical ventilation in conjunction with the intra-aortic balloon pump improves the outcome of patients in profound cardiogenic shock. *Intensive Care Med* 1999; 25:835.
- Thiele H, Zeymer U, Neumann FJ, et al. Intraaortic balloon support for myocardial infarction with cardiogenic shock. *N Engl J Med* 2012; 367:1287.
- Thiele H, Zeymer U, Neumann FJ, et al. Intra-aortic balloon counterpulsation in acute myocardial infarction complicated by cardiogenic shock (IABP-SHOCK II): final 12 month results of a randomised, open-label trial. *Lancet* 2013; 382:1638.
- Barron HV, Every NR, Parsons LS, et al. The use of intra-aortic balloon counterpulsation in patients with cardiogenic shock complicating acute myocardial infarction: data from the National Registry of Myocardial Infarction 2. *Am Heart J* 2001; 141:933.
- Chen EW, Canto JG, Parsons LS, et al. Relation between hospital intra-aortic balloon counterpulsation volume and mortality in acute myocardial infarction complicated by cardiogenic shock. *Circulation* 2003; 108:951.
- Sjaauw KD, Engström AE, Vis MM, et al. A systematic review and meta-analysis of intra-aortic balloon pump therapy in ST-elevation myocardial infarction: should we change the guidelines? *Eur Heart J* 2009; 30:459.
- Abdel-Wahab M, Saad M, Kynast J, et al. Comparison of hospital mortality with intra-aortic balloon counterpulsation insertion before versus after primary percutaneous coronary intervention for cardiogenic shock complicating acute myocardial infarction. *Am J Cardiol* 2010; 105:967.
- Sanborn TA, Sleeper LA, Bates ER, et al. Impact of thrombolysis, intra-aortic balloon pump counterpulsation, and their combination in cardiogenic shock complicating acute myocardial infarction: a report from the SHOCK Trial Registry. *SHould we emergently revascularize Occluded Coronaries for cardiogenic shock?* *J Am Coll Cardiol* 2000; 36:1123.
- Prewitt RM, Gu S, Garber PJ, Ducas J. Marked systemic hypotension depresses coronary thrombolysis induced by intracoronary administration of recombinant tissue-type plasminogen activator. *J Am Coll Cardiol* 1992; 20:1626.
- Prewitt RM, Gu S, Schick U, Ducas J. Intraaortic balloon counterpulsation enhances coronary thrombolysis induced by intravenous administration of a thrombolytic agent. *J Am Coll Cardiol* 1994; 23:794.
- Anderson RD, Ohman EM, Holmes DR Jr, et al. Use of intraaortic balloon counterpulsation in patients presenting with cardiogenic shock: observations from the GUSTO-I Study. *Global Utilization of Streptokinase and TPA for Occluded Coronary Arteries*. *J Am Coll Cardiol* 1997; 30:708.
- Lauten A, Engström AE, Jung C, et al. Percutaneous left-ventricular support with the Impella-2.5-assist device in acute cardiogenic shock: results of the Impella-EUROSHOCK-registry. *Circ Heart Fail* 2013; 6:23.
- Thiele H, Sick P, Boudriot E, et al. Randomized comparison of intra-aortic balloon support with a percutaneous left ventricular assist device in patients with revascularized acute myocardial infarction complicated by cardiogenic shock. *Eur Heart J* 2005; 26:1276.
- Seyfarth M, Sibbing D, Bauer I, et al. A randomized clinical trial to evaluate the safety and efficacy of a percutaneous left ventricular assist device versus intra-aortic balloon pumping for treatment of cardiogenic shock caused by myocardial infarction. *J Am Coll Cardiol* 2008; 52:1584.
- Jeger RV, Harkness SM, Ramanathan K, et al. Emergency revascularization in patients with cardiogenic shock on admission: a report from the SHOCK trial and registry. *Eur Heart J* 2006; 27:664.
- O'Neill WW. Angioplasty therapy of cardiogenic shock: are randomized trials necessary? *J Am Coll Cardiol* 1992; 19:915.
- Van de Werf F, Bax J, Betriu A, et al. Management of acute myocardial infarction in patients

presenting with persistent ST-segment elevation: the Task Force on the Management of ST-Segment Elevation Acute Myocardial Infarction of the European Society of Cardiology. *Eur Heart J* 2008; 29:2909.

- Zeymer U, Vogt A, Zahn R, et al. Predictors of in-hospital mortality in 1333 patients with acute myocardial infarction complicated by cardiogenic shock treated with primary percutaneous coronary intervention (PCI); Results of the primary PCI registry of the Arbeitsgemeinschaft Leitende Kardiologische Krankenhausärzte (ALKK). *Eur Heart J* 2004; 25:322.
- Bengtson JR, Kaplan AJ, Pieper KS, et al. Prognosis in cardiogenic shock after acute myocardial infarction in the interventional era. *J Am Coll Cardiol* 1992; 20:1482.
- Antman EM, Anbe DT, Armstrong PW, et al. ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction--executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 1999 Guidelines for the Management of Patients With Acute Myocardial Infarction). *Circulation* 2004; 110:588.
- Indications for fibrinolytic therapy in suspected acute myocardial infarction: collaborative overview of early mortality and major morbidity results from all randomised trials of more than 1000 patients. Fibrinolytic Therapy Trialists' (FTT) Collaborative Group. *Lancet* 1994; 343:311.
- French JK, Feldman HA, Assmann SF, et al. Influence of thrombolytic therapy, with or without intra-aortic balloon counterpulsation, on 12-month survival in the SHOCK trial. *Am Heart J* 2003; 146:804.
- Hasdai D, Holmes DR Jr, Topol EJ, et al. Frequency and clinical outcome of cardiogenic shock during acute myocardial infarction among patients receiving reteplase or alteplase. Results from GUSTO-III. Global Use of Strategies to Open Occluded Coronary Arteries. *Eur Heart J* 1999; 20:128.
- Webb JG, Sleeper LA, Buller CE, et al. Implications of the timing of onset of cardiogenic shock after acute myocardial infarction: a report from the SHOCK Trial Registry. Should we emergently revascularize Occluded Coronaries for cardiogenic shock? *J Am Coll Cardiol* 2000; 36:1084.
- Bates ER, Topol EJ. Limitations of thrombolytic therapy for acute myocardial infarction complicated by congestive heart failure and cardiogenic shock. *J Am Coll Cardiol* 1991; 18:1077.
- Antoniucci D, Valenti R, Santoro GM, et al. Systematic direct angioplasty and stent-supported direct angioplasty therapy for cardiogenic shock complicating acute myocardial infarction: in-hospital and long-term survival. *J Am Coll Cardiol* 1998; 31:294.
- Berger PB, Holmes DR Jr, Stebbins AL, et al. Impact of an aggressive invasive catheterization and revascularization strategy on mortality in patients with cardiogenic shock in the Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries (GUSTO-I) trial. An observational study. *Circulation* 1997; 96:122.
- Hochman JS, Sleeper LA, White HD, et al. One-year survival following early revascularization for cardiogenic shock. *JAMA* 2001; 285:190.
- Mylotte D, Morice MC, Eltchaninoff H, et al. Primary percutaneous coronary intervention in patients with acute myocardial infarction, resuscitated cardiac arrest, and cardiogenic shock: the role of primary multivessel revascularization. *JACC Cardiovasc Interv* 2013; 6:115.
- Webb JG, Sanborn TA, Sleeper LA, et al. Percutaneous coronary intervention for cardiogenic shock in the SHOCK Trial Registry. *Am Heart J* 2001; 141:964.
- Lim HS, Farouque O, Andrianopoulos N, et al. Survival of elderly patients undergoing percutaneous coronary intervention for acute myocardial infarction complicated by cardiogenic shock. *JACC Cardiovasc Interv* 2009; 2:146.
- Dzavik V, Sleeper LA, Cocke TP, et al. Early revascularization is associated with improved survival in elderly patients with acute myocardial infarction complicated by cardiogenic shock: a report from the SHOCK Trial Registry. *Eur Heart J* 2003; 24:828.
- Marso SP, Steg G, Plokker T, et al. Catheter-based reperfusion of unprotected left main stenosis during an acute myocardial infarction (the ULTIMA experience). Unprotected Left Main Trunk Intervention Multi-center Assessment. *Am J Cardiol* 1999; 83:1513.
- White HD, Assmann SF, Sanborn TA, et al. Comparison of percutaneous coronary intervention and coronary artery bypass grafting after acute myocardial infarction complicated by cardiogenic shock: results from the Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock

(SHOCK) trial. *Circulation* 2005; 112:1992.

- Hochman JS, Buller CE, Sleeper LA, et al. Cardiogenic shock complicating acute myocardial infarction--etiologies, management and outcome: a report from the SHOCK Trial Registry. Should we emergently revascularize Occluded Coronaries for cardiogenic shock? *J Am Coll Cardiol* 2000; 36:1063.
- Wong SC, Sleeper LA, Monrad ES, et al. Absence of gender differences in clinical outcomes in patients with cardiogenic shock complicating acute myocardial infarction. A report from the SHOCK Trial Registry. *J Am Coll Cardiol* 2001; 38:1395.
- Berger PB, Tuttle RH, Holmes DR Jr, et al. One-year survival among patients with acute myocardial infarction complicated by cardiogenic shock, and its relation to early revascularization: results from the GUSTO-I trial. *Circulation* 1999; 99:873.
- Kushner FG, Hand M, Smith SC Jr, et al. 2009 Focused Updates: ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction (updating the 2004 Guideline and 2007 Focused Update) and ACC/AHA/SCAI Guidelines on Percutaneous Coronary Intervention (updating the 2005 Guideline and 2007 Focused Update): a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *Circulation* 2009; 120:2271.
- Hochman JS. Cardiogenic shock complicating acute myocardial infarction: expanding the paradigm. *Circulation* 2003; 107:2998.

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