

STEMI WITH CARDIOGENIC SHOCK — Key Sources

Companion to the STEMI Cardiogenic Shock OnePager · every name links to the primary publication via doi.org · every DOI resolved in PubMed and its title read back (16 Sept 2026)

GUIDELINES, CONSENSUS AND DEFINITIONS

1. **ACC/AHA 2025 ACS guideline** — Rao SV et al., J Am Coll Cardiol 2025;85:2135 (also Circulation 2025;151:e771, doi 10.1161/CIR.0000000000001309). Sections 3.2, 8 and 9.1 read in full (JACC free-access text): every COR/LOE on the sheet comes from here. Makes no vasopressor, inotrope or PA-catheter recommendation.
2. **ACC Concise Clinical Guidance 2025** — Sinha SS et al., J Am Coll Cardiol 2025;85:1618. Consensus without COR/LOE: SUSPECT CS, shock-centre levels, transfer triggers, PA-catheter phenotyping, vasoactive table, norepinephrine as a reasonable first choice, weaning.
3. **SCAI SHOCK classification** — Baran DA et al., Catheter Cardiovasc Interv 2019;94:29. Stages A-E; the B/C line is hypoperfusion, D is failure of initial therapy.
4. **SCAI SHOCK 2022 update** — Naidu SS et al., J Am Coll Cardiol 2022;79:933. Table 3 descriptors reproduced on the sheet; A-modifier restricted to arrest with coma; 3-axis model separates severity from risk.
5. **SHARC definitions** — Waksman R et al., Circulation 2023;148:1113. Standardized cardiogenic-shock definitions for research, used by the CCG to define AMI-CS.
6. **Cardiogenic Shock Working Group staging** — Kapur NK et al., J Am Coll Cardiol 2022;80:185. Operational SCAI criteria in 3,455 patients; baseline and maximum stage track mortality.
7. **AHA mechanical complications statement** — Damluji AA et al., Circulation 2021;144:e16. Source of the mechanical-complication table: timing, incidence, clues, bridging and mortality.

REVASCULARIZATION

8. **SHOCK** — Hochman JS et al., N Engl J Med 1999;341:625. Emergency revascularization missed its 30-day endpoint (46.7% vs 56.0%) but cut 6-month mortality (50.3% vs 63.1%) — the basis of the COR 1. ► **Inspector**
9. **SHOCK registry** — Hochman JS et al., J Am Coll Cardiol 2000;36:1063. 1,190 patients: LV failure 78.5%, MR 6.9%, VSR 3.9%, RV 2.8%, tamponade 1.4%; mechanical cause 12%; VSR mortality 87.3%.
10. **CULPRIT-SHOCK** — Thiele H et al., N Engl J Med 2017;377:2419. Culprit-only PCI cut 30-day death or RRT (45.9% vs 55.4%) — the COR 3: Harm for immediate multivessel PCI in shock. ► **Inspector**
11. **CULPRIT-SHOCK 1 year** — Thiele H et al., N Engl J Med 2018;379:1699. 1-year death 50.0% vs 56.9% (RR 0.88, 0.76–1.01) — no longer significant; repeat revascularization 32.3% vs 9.4%. ► **Inspector**
12. **FITT-STEMI (treatment delay)** — Scholz KH et al., Eur Heart J 2018;39:1065. Each 10-min delay cost 3.31 deaths/100 in shock without arrest vs 0.34 in stable STEMI.

MECHANICAL CIRCULATORY SUPPORT

13. **IABP-SHOCK II** — Thiele H et al., N Engl J Med 2012;367:1287. 30-day death 39.7% vs 41.3% — routine IABP COR 3: No Benefit. ► **Inspector**
14. **IABP-SHOCK II 6 years** — Thiele H et al., Circulation 2019;139:395. 6.2-year mortality 66.3% vs 67.0%; two-thirds of shock patients dead despite revascularization. ► **Inspector**
15. **ISAR-SHOCK** — Seyfarth M et al., J Am Coll Cardiol 2008;52:1584. Impella LP2.5 raised cardiac index more than IABP (n=26); 30-day mortality 46% in both. ► **Inspector**
16. **IMPRESS** — Ouweneel DM et al., J Am Coll Cardiol 2017;69:278. Impella CP vs IABP in 48 ventilated patients: 30-day death 46% vs 50%, 6-month 50% in both. ► **Inspector**
17. **DanGer Shock** — Møller JE et al., N Engl J Med 2024;390:1382. Microaxial pump cut 180-day death (45.8% vs 58.5%, HR 0.74) with more device harm (24.0% vs 6.2%) and RRT — the COR 2a. ► **Inspector**
18. **DanGer Shock long-term** — Møller JE et al., N Engl J Med 2025;393:1037 (letter). ~10-year mortality 52.5% vs 68.8% (HR ≈0.70) — figures taken from the ACC summary; the letter itself was not read.
19. **DanGer Shock — symptom delay** — Jensen LO et al., Circ Cardiovasc Interv 2026;19:e015718. Benefit appeared to weaken with delays >~11 h (OR 0.51 vs 0.92; interaction P=0.26) — hypothesis-generating.
20. **ECLS-SHOCK** — Thiele H et al., N Engl J Med 2023;389:1286. Early VA-ECMO: 30-day death 47.8% vs 49.0%; bleeding 23.4% vs 9.6% — routine ECMO COR 3: No Benefit. ► **Inspector**
21. **ECMO-CS** — Ostadal P et al., Circulation 2023;147:454. Immediate vs deferred VA-ECMO in severe shock: no difference (HR 0.72, P=0.21); 39% of controls crossed over. ► **Inspector**
22. **IPD meta-analysis of MCS trials** — Thiele H et al., Lancet 2024;404:1019. 9 RCTs, n=1,114: no overall 6-month benefit (HR 0.87); benefit in STEMI-CS without hypoxic brain-injury risk (HR 0.77); bleeding OR 2.64.
23. **HYPO-ECMO** — Levy B et al., JAMA 2022;327:442. Moderate hypothermia on VA-ECMO: 30-day death 42% vs 51%, not significant (P=0.15). ► **Inspector**
24. **STEMI-DTU** — Kapur NK et al., J Am Coll Cardiol 2026;88:76. Unloading before PCI in anterior STEMI WITHOUT shock: no infarct-size reduction (30.8% vs 31.9%), more bleeding — the 2a is shock-only. ► **Inspector**
25. **FITT-STEMI (MCS availability)** — Scholz KH et al., Eur Heart J Acute Cardiovasc Care 2026 (online). 5,604 STEMI-CS: hospital mortality 44.7% vs 45.0% at centres with vs without MCS.

VASOACTIVE DRUGS

26. **SOAP II** — De Backer D et al., N Engl J Med 2010;362:779. Dopamine doubled arrhythmias vs norepinephrine and had higher mortality in the cardiogenic-shock subgroup. ► **Inspector**
27. **OptimaCC** — Levy B et al., J Am Coll Cardiol 2018;72:173. Epinephrine vs norepinephrine in AMI shock: refractory shock 37% vs 7%; stopped early. ► **Inspector**
28. **DOREMI** — Mathew R et al., N Engl J Med 2021;385:516. Milrinone vs dobutamine: no difference in the composite (49% vs 54%) or in-hospital death. ► **Inspector**

29. COMMIT (metoprolol) — COMMIT Collaborative Group (Chen ZM et al.), Lancet 2005;366:1622. Early IV then oral metoprolol: 11 more shocks per 1,000 (5.0% vs 3.9%), mostly days 0–1. ► **Inspector**

HAEMODYNAMICS, RV SHOCK AND SYSTEMS OF CARE

- 30. Cardiac power output (SHOCK registry)** — Fincke R et al., J Am Coll Cardiol 2004;44:340. CPO = $\text{MAP} \times \text{CO} / 451$ was the strongest independent haemodynamic correlate of in-hospital death (n=541).
- 31. PAPI** — Korabathina R et al., Catheter Cardiovasc Interv 2012;80:593. PAPI ≤ 0.9 identified death or RV-support need in proximal RCA occlusion (n=20; small).
- 32. V4R in inferior MI** — Zehender M et al., N Engl J Med 1993;328:981. ST elevation in V4R: sensitivity 88%, specificity 78%; in-hospital death 31% vs 6%.
- 33. ESCAPE** — Binanay C et al., JAMA 2005;294:1625. PA catheter in severe non-shock HF: no benefit — the trial the CCG says does not apply to shock. ► **Inspector**
- 34. INOVA standardized shock team** — Tehrani BN et al., J Am Coll Cardiol 2019;73:1659. 30-day survival rose 47% → 58% → 77% (before/after); CPO < 0.6 W and PAPI < 1.0 at 24 h predicted death.
- 35. CCCTN shock teams** — Papalos AI et al., J Am Coll Cardiol 2021;78:1309. 24 CICUs: shock-team centres had lower CICU mortality (23% vs 29%, adjusted OR 0.72) and used more PA catheters.

CARDIAC ARREST

- 36. COACT** — Lemkes JS et al., N Engl J Med 2019;380:1397. Arrest without STEMI: immediate vs delayed angiography, 90-day survival 64.5% vs 67.2%. ► **Inspector**
- 37. TOMAHAWK** — Desch S et al., N Engl J Med 2021;385:2544. Arrest without STEMI: 30-day death 54.0% vs 46.0% with immediate angiography (HR 1.28) — no benefit. ► **Inspector**

Educational reference for cardiology fellows. Guideline rows are from the ACC/AHA 2025 ACS guideline read in full; ESC 2023 grades are not reproduced. The DanGer 10-year figures come from the ACC summary of the NEJM letter. Verify against current guidelines and labeling before clinical decisions. ► Inspector opens that trial's interactive Evidence Inspector (fellowship teaching material, not CME).