

ECC CS CQ

CS を合併した AMI 患者の治療において、MCS の選択（IABP または IMPELLA）は転帰に影響するか？

Systematic Review and Meta-Analysis: The Prognostic Impact of the Difference of Mechanical Circulatory Support in Patients with Acute Coronary Syndrome Complicated by Cardiogenic Shock

P (patients): Patients with AMI-related CS

I (intervention): MCS with IMPELLA

C (comparisons, controls): MCS with IABP

O (Outcomes): Short-term survival (30-day survival), major bleeding, and stroke

S (study designs): Randomized controlled trials

T (timeframe): all literature published up to April 30, 2023

Open Science Framework (OSF registry; DOI: 10.17605/OSF.IO/NTZXJ)

Hashiba K, Sakamoto K, Katasako-Yabumoto A, Yamamoto T, Nakayama N, Hanada H, Nakashima T, Kirigaya J, Ishizu T, Hosoya Y, Kondo T, Okazaki Y, Yamamoto M, Osawa T, Arai M, Tahara Y, Nonogi H, Noguchi T, Tsujimoto Y, Funazaki T, Kikuchi M, Matoba T. Prognostic Impact of the Difference of Mechanical Circulatory Support in Patients With Acute Coronary Syndrome Complicated by Cardiogenic Shock — A Systematic Review and Meta-Analysis —. *Circ Rep.* 2025;7(11):CR-25-0161.

doi:10.1253/circrep.CR-25-0161

Search strategies of literature databases

Search strings

1. PubMed (MEDLINE & PMC)

#1: (("st elevat*" [Title/Abstract] OR "st segment" [Title/Abstract] OR "with st segment" [Title/Abstract] OR "with st elevat*" [Title/Abstract] OR "Q-Wave" [Title/Abstract]) AND ("Myocardial Ischemia" [MeSH Terms:noexp] OR "myocardial isch*" [Title/Abstract] OR "myocardial infarction" [MeSH Terms:noexp] OR "myocardial infarction*" [Title/Abstract] OR "acute coronary syndrome*" [Title/Abstract] OR "ACS" [Title/Abstract] OR "acute coronary syndrome" [MeSH Terms] OR "ischemic syndrome*" [Title/Abstract] OR "coronary disease" [MeSH Terms] OR "coronary disease*" [Title/Abstract] OR "coronary artery disease*" [Title/Abstract])) OR "non st elevated myocardial infarction" [MeSH Terms] OR "st elevation myocardial infarction" [MeSH Terms] OR "STEMI" [Title/Abstract] OR "STEACS" [Title/Abstract] OR "STE-ACS" [Title/Abstract] OR "Q-wave-MI" [Title/Abstract] OR "acute myocardial Infarction" [Title/Abstract] OR "chest pain" [Title/Abstract] OR "unstable angina*" [Title/Abstract] OR "angina, unstable" [MeSH Terms])

#2: "cardiac shock" [Title/Abstract] OR "cardiogenic shock" [Title/Abstract] OR ("myocardial infarction" [MeSH Terms] AND "shock" [MeSH Terms:noexp]) OR "shock, cardiogenic" [MeSH Terms] OR "hypoperfusion" [Title/Abstract] OR ("hypotension" [Title/Abstract] AND ("heart failure" [Title/Abstract] OR "cardiac failure" [Title/Abstract] OR "myocardial failure" [Title/Abstract] OR "heart failure" [MeSH Terms] OR "HF" [Title/Abstract] OR "AHF" [Title/Abstract] OR "CHF" [Title/Abstract] OR "ADHF" [Title/Abstract]))

#3: "early reperfusion" [Title/Abstract] OR "rapid reperfusion" [Title/Abstract] OR "urgent reperfusion" [Title/Abstract] OR "emergency reperfusion" [Title/Abstract] OR "immediate reperfusion" [Title/Abstract] OR ("reperfusion" [Title/Abstract] OR "Myocardial Reperfusion" [MeSH Terms] OR "thromboly*" [Title/Abstract] OR "thrombolytic therapy" [MeSH Terms] OR "percutaneous coronary intervention" [MeSH Terms] OR "percutaneous coronary intervention" [Title/Abstract] OR "PCI" [Title/Abstract] OR "reflow" [Title/Abstract]) AND ("timing" [Title/Abstract] OR

"timeliness"[Title/Abstract] OR "Time Factors"[MeSH Terms] OR "Time-to-Treatment"[MeSH Terms]))

#4: "Extracorporeal Membrane Oxygenation"[MeSH Terms] OR "percutaneous cardiopulmonary support"[Title/Abstract] OR "PCPS"[Title/Abstract] OR "ECMO"[Title/Abstract] OR "extracorporeal membrane oxygenat*"[Title/Abstract] OR "extra corporeal membrane oxygenat*"[Title/Abstract] OR "venoarterial extracorporeal membrane oxygenat*"[Title/Abstract] OR "veno arterial extracorporeal membrane oxygenat*"[Title/Abstract] OR "IMPELLA"[Title/Abstract] OR "intra-aortic balloon pump"[Title/Abstract] OR "IABP"[Title/Abstract] OR "percutaneous mechanical*"[Title/Abstract] OR "mechanical circulatory"[Title/Abstract] OR "MCS"[Title/Abstract] OR "ventricular assist device*"[Title/Abstract] OR "device implantation"[Title/Abstract] OR "ECLS"[Title/Abstract] OR "Extracorporeal life support"[Title/Abstract] OR "Extra-corporeal life support"[Title/Abstract] OR "non invasive positive pressure ventilat*"[Title/Abstract] OR "noninvasive positive pressure ventilat*"[Title/Abstract] OR "nppv"[Title/Abstract] OR "airway management"[Title/Abstract] OR "airway management"[MeSH Terms] OR "mechanical ventilation"[Title/Abstract] OR "mechanical ventilation"[Title/Abstract] OR "IMV"[Title/Abstract] OR "Endotracheal tube"[Title/Abstract] OR "Intratracheal intubation"[Title/Abstract] OR "Endotracheal intubation"[Title/Abstract]

#5: #1 and #2 and (#3 or #4)

2. Web of Science (Science Citation Index Expanded(SCIE))

#1: (((TI="st elevat*" OR AB="st elevat*" OR AK="st elevat*" OR KP="st elevat*") OR (TI="st segment" OR AB="st segment" OR AK="st segment" OR KP="st segment") OR (TI="with st segment" OR AB="with st segment" OR AK="with st segment" OR KP="with st segment") OR (TI="with st elevat*" OR AB="with st elevat*" OR AK="with st elevat*" OR KP="with st elevat*") OR (TI=Q-Wave OR AB=Q-Wave OR AK=Q-Wave OR KP=Q-Wave)) AND ((TI="myocardial isch*" OR AB="myocardial isch*" OR AK="myocardial isch*" OR KP="myocardial isch*") OR (TI="myocardial infarction*" OR AB="myocardial infarction*" OR AK="myocardial infarction*" OR KP="myocardial infarction*") OR (TI="acute coronary syndrome*" OR AB="acute coronary syndrome*" OR AK="acute coronary syndrome*" OR KP="acute coronary syndrome*") OR (TI=ACS OR AB=ACS OR AK=ACS OR KP=ACS)

OR ALL="acute coronary syndrome" OR (TI="ischemic syndrome*" OR AB="ischemic syndrome*") OR (TI="coronary disease*" OR AB="coronary disease*" OR AK="coronary disease*" OR KP="coronary disease*") OR (TI="coronary artery disease*" OR AB="coronary artery disease*" OR AK="coronary artery disease*" OR KP="coronary artery disease*")) OR (TI=STEMI OR AB=STEMI OR AK=STEMI OR KP=STEMI) OR (TI=STEACS OR AB=STEACS OR AK=STEACS OR KP=STEACS) OR (TI=STE-ACS OR AB=STE-ACS OR AK=STE-ACS OR KP=STE-ACS) OR (TI=Q-wave-MI OR AB=Q-wave-MI OR AK=Q-wave-MI OR KP=Q-wave-MI) OR (TI="acute myocardial Infarction" OR AB="acute myocardial Infarction" OR AK="acute myocardial Infarction" OR KP="acute myocardial Infarction") OR (TI="chest pain" OR AB="chest pain" OR AK="chest pain" OR KP="chest pain") OR (TI="unstable angina*" OR AB="unstable angina*" OR AK="unstable angina*" OR KP="unstable angina*")

#2: (TI="cardiac shock" OR AB="cardiac shock" OR AK="cardiac shock" OR KP="cardiac shock") OR (TI="cardiogenic shock" OR AB="cardiogenic shock" OR AK="cardiogenic shock" OR KP="cardiogenic shock") OR ((TI="myocardial infarction" OR AB="myocardial infarction" OR AK="myocardial infarction" OR KP="myocardial infarction") AND (TI="shock" OR AB="shock" OR AK="shock" OR KP="shock")) OR (TI=hypoperfusion OR AB=hypoperfusion OR AK=hypoperfusion OR KP=hypoperfusion) OR ((TI=hypotension OR AB=hypotension OR AK=hypotension OR KP=hypotension) AND ((TI="heart failure" OR AB="heart failure" OR AK="heart failure" OR KP="heart failure") OR (TI="cardiac failure" OR AB="cardiac failure" OR AK="cardiac failure" OR KP="cardiac failure") OR (TI="myocardial failure" OR AB="myocardial failure" OR AK="myocardial failure" OR KP="myocardial failure") OR (TI=HF OR AB=HF OR AK=HF OR KP=HF) OR (TI=AHF OR AB=AHF OR AK=AHF OR KP=AHF) OR (TI=CHF OR AB=CHF OR AK=CHF OR KP=CHF) OR (TI=ADHF OR AB=ADHF OR AK=ADHF OR KP=ADHF)))

#3: (TI="early reperfusion" OR AB="early reperfusion" OR AK="early reperfusion" OR KP="early reperfusion") OR (TI="rapid reperfusion" OR AB="rapid reperfusion" OR AK="rapid reperfusion" OR KP="rapid reperfusion") OR (TI="urgent reperfusion" OR AB="urgent reperfusion" OR AK="urgent reperfusion" OR KP="urgent reperfusion") OR (TI="emergency reperfusion" OR AB="emergency reperfusion" OR AK="emergency reperfusion" OR KP="emergency reperfusion") OR (TI="immediate reperfusion" OR AB="immediate reperfusion" OR AK="immediate reperfusion" OR KP="immediate reperfusion") OR (((TI=reperfusion OR AB=reperfusion OR AK=reperfusion OR KP=reperfusion) OR (TI=thromboly* OR AB=thromboly* OR AK=thromboly* OR KP=thromboly*))

(TI="percutaneous coronary intervention" OR AB="percutaneous coronary intervention" OR AK="percutaneous coronary intervention" OR KP="percutaneous coronary intervention") OR (TI=PCI OR AB=PCI OR AK=PCI OR KP=PCI) OR (TI=reflow OR AB=reflow OR AK=reflow OR KP=reflow)) AND ((TI=timing OR AB=timing OR AK=timing OR KP=timing) OR (TI=timeliness OR AB=timeliness OR AK=timeliness OR KP=timeliness) OR (TI="time factor*" OR AB="time factor*" OR AK="time factor*" OR KP="time factor*") OR (TI="Time-to-Treatment" OR AB="Time-to-Treatment" OR AK="Time-to-Treatment" OR KP="Time-to-Treatment")))

#4 (TI="percutaneous cardiopulmonary support" OR AB="percutaneous cardiopulmonary support" OR AK="percutaneous cardiopulmonary support" OR KP="percutaneous cardiopulmonary support") OR (TI=PCPS OR AB=PCPS OR AK=PCPS OR KP=PCPS) OR (TI=ECMO OR AB=ECMO OR AK=ECMO OR KP=ECMO) OR (TI="extracorporeal membrane oxygenat*" OR AB="extracorporeal membrane oxygenat*" OR AK="extracorporeal membrane oxygenat*" OR KP="extracorporeal membrane oxygenat*") OR (TI="extra corporeal membrane oxygenat*" OR AB="extra corporeal membrane oxygenat*" OR AK="extra corporeal membrane oxygenat*" OR KP="extra corporeal membrane oxygenat*") OR (TI="venoarterial extracorporeal membrane oxygenat*" OR AB="venoarterial extracorporeal membrane oxygenat*" OR AK="venoarterial extracorporeal membrane oxygenat*" OR KP="venoarterial extracorporeal membrane oxygenat*") OR (TI="veno arterial extracorporeal membrane oxygenat*" OR AB="veno arterial extracorporeal membrane oxygenat*" OR AK="veno arterial extracorporeal membrane oxygenat*" OR KP="veno arterial extracorporeal membrane oxygenat*") OR (TI=IMPELLA OR AB=IMPELLA OR AK=IMPELLA OR KP=IMPELLA) OR (TI="intra-aortic balloon pump" OR AB="intra-aortic balloon pump" OR AK="intra-aortic balloon pump" OR KP="intra-aortic balloon pump") OR (TI=IABP OR AB=IABP OR AK=IABP OR KP=IABP) OR (TI="percutaneous mechanical*" OR AB="percutaneous mechanical*" OR AK="percutaneous mechanical*" OR KP="percutaneous mechanical*") OR (TI="mechanical circulatory" OR AB="mechanical circulatory" OR AK="mechanical circulatory" OR KP="mechanical circulatory") OR (TI=MCS OR AB=MCS OR AK=MCS OR KP=MCS) OR (TI="ventricular assist device*" OR AB="ventricular assist device*" OR AK="ventricular assist device*" OR KP="ventricular assist device*") OR (TI="device implantation" OR AB="device implantation" OR AK="device implantation" OR KP="device implantation") OR (TI=ECLS OR AB=ECLS OR AK=ECLS OR KP=ECLS) OR (TI="Extracorporeal life support" OR AB="Extracorporeal life support" OR AK="Extracorporeal life support" OR

KP="Extracorporeal life support") OR (TI="Extra-corporeal life support" OR AB="Extra-corporeal life support" OR AK="Extra-corporeal life support" OR KP="Extra-corporeal life support") OR (TI="non invasive positive pressure ventilat*" OR AB="non invasive positive pressure ventilat*" OR AK="non invasive positive pressure ventilat*" OR KP="non invasive positive pressure ventilat*") OR (TI="noninvasive positive pressure ventilat*" OR AB="noninvasive positive pressure ventilat*" OR AK="noninvasive positive pressure ventilat*" OR KP="noninvasive positive pressure ventilat*") OR (TI= nppv OR AB= nppv OR AK= nppv OR KP= nppv) OR (TI="airway management" OR AB="airway management" OR AK="airway management" OR KP="airway management") OR (TI="mechanical ventilation" OR AB="mechanical ventilation" OR AK="mechanical ventilation" OR KP="mechanical ventilation") OR (TI="mechanical ventilation" OR AB="mechanical ventilation" OR AK="mechanical ventilation" OR KP="mechanical ventilation") OR (TI=IMV OR AB=IMV OR AK=IMV OR KP=IMV) OR (TI="Endotracheal tube" OR AB="Endotracheal tube" OR AK="Endotracheal tube" OR KP="Endotracheal tube") OR (TI="Intratracheal intubation" OR AB="Intratracheal intubation" OR AK="Intratracheal intubation" OR KP="Intratracheal intubation") OR (TI="Endotracheal intubation" OR AB="Endotracheal intubation" OR AK="Endotracheal intubation" OR KP="Endotracheal intubation")

#5: #1 AND #2 AND (#3 OR #4)

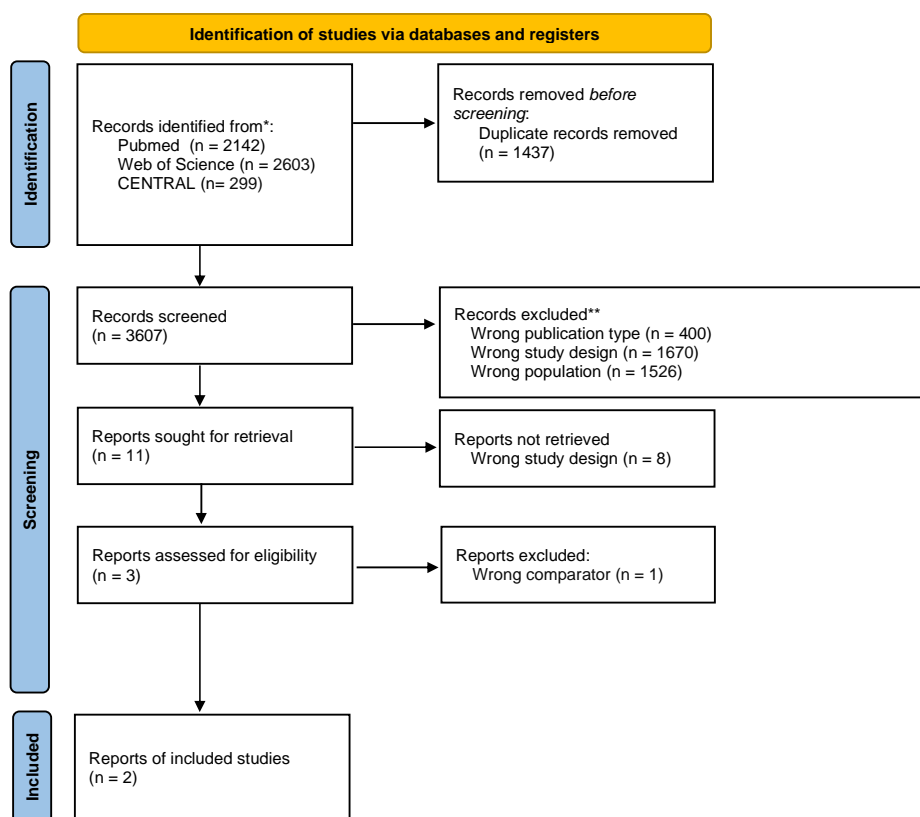
3. Cochrane Library (Cochrane Central Register of Controlled Trials(CENTRAL))

#1: (((("st" NEXT elevat*):ti,ab,kw OR "st segment":ti,ab,kw OR "with st segment":ti,ab,kw OR ("with st" NEXT elevat*):ti,ab,kw OR Q-Wave:ti,ab,kw) AND ([mh ^"Myocardial Ischemia"] OR ("myocardial" NEXT isch*):ti,ab,kw OR [mh ^"myocardial infarction"] OR ("myocardial" NEXT infarction*):ti,ab,kw OR ("acute coronary" NEXT syndrome*):ti,ab,kw OR ACS:ti,ab,kw OR [mh "acute coronary syndrome"] OR ("ischemic" NEXT syndrome*):ti,ab,kw OR [mh "coronary disease"] OR ("coronary" NEXT disease*):ti,ab,kw OR ("coronary artery" NEXT disease*):ti,ab,kw)) OR [mh "non st elevated myocardial infarction"] OR [mh "st elevation myocardial infarction"] OR STEMI:ti,ab,kw OR STEACS:ti,ab,kw OR STE-ACS:ti,ab,kw OR Q-wave-MI:ti,ab,kw OR "acute myocardial Infarction":ti,ab,kw OR "chest pain":ti,ab,kw OR ("unstable" NEXT angina*):ti,ab,kw OR [mh "angina, unstable"]

#2: "cardiac shock":ti,ab,kw OR "cardiogenic shock":ti,ab,kw OR ([mh "myocardial

infarction"] AND [mh ^shock]) OR [mh "shock, cardiogenic"] OR
hypoperfusion:ti,ab,kw OR (hypotension:ti,ab,kw AND ("heart failure":ti,ab,kw OR
"cardiac failure":ti,ab,kw OR "myocardial failure":ti,ab,kw OR [mh "heart
failure"] OR HF:ti,ab,kw OR AHF:ti,ab,kw OR CHF:ti,ab,kw OR ADHF:ti,ab,kw))
#3: "early reperfusion":ti,ab,kw OR "rapid reperfusion":ti,ab,kw OR "urgent
reperfusion":ti,ab,kw OR "emergency reperfusion":ti,ab,kw OR "immediate
reperfusion":ti,ab,kw OR ((reperfusion:ti,ab,kw OR [mh "Myocardial
Reperfusion"] OR thromboly*:ti,ab,kw OR [mh "thrombolytic therapy"] OR [mh
"percutaneous coronary intervention"] OR "percutaneous coronary
intervention":ti,ab,kw OR PCI:ti,ab,kw OR reflow:ti,ab,kw) AND
(timing:ti,ab,kw OR timeliness:ti,ab,kw OR [mh "Time Factors"] OR [mh "Time-
to-Treatment"])))
#4: [mh "Extracorporeal Membrane Oxygenation"] OR "percutaneous
cardiopulmonary support":ti,ab,kw OR PCPS:ti,ab,kw OR ECMO:ti,ab,kw OR
("extracorporeal membrane" NEXT oxygenat*):ti,ab,kw OR ("extra corporeal
membrane" NEXT oxygenat*):ti,ab,kw OR ("venoarterial extracorporeal membrane"
NEXT oxygenat*):ti,ab,kw OR ("veno arterial extracorporeal membrane" NEXT
oxygenat*):ti,ab,kw OR IMPELLA:ti,ab,kw OR "intra-aortic balloon
pump":ti,ab,kw OR IABP:ti,ab,kw OR ("percutaneous" NEXT mechanical*):ti,ab,kw
OR "mechanical circulatory":ti,ab,kw OR MCS:ti,ab,kw OR ("ventricular assist"
NEXT device*):ti,ab,kw OR "device implantation":ti,ab,kw OR ECLS:ti,ab,kw OR
"Extracorporeal life support":ti,ab,kw OR "Extra-corporeal life
support":ti,ab,kw OR ("non invasive positive pressure" NEXT
ventilat*):ti,ab,kw OR ("noninvasive positive pressure" NEXT
ventilat*):ti,ab,kw OR nppv:ti,ab,kw OR "airway management":ti,ab,kw OR [mh
"airway management"] OR "mechanical ventilation":ti,ab,kw OR "mechanical
ventilation":ti,ab,kw OR IMV:ti,ab,kw OR "Endotracheal tube":ti,ab,kw OR
"Intratracheal intubation":ti,ab,kw OR "Endotracheal intubation":ti,ab,kw
#5: #1 AND #2 AND(#3 OR #4)

PRISMA flow chart



Evidence profile

Certainty assessment							No. of patients		Effect		Certainty	Importance
No. of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Impella	IABP	Relative (95% CI)	Absolute (95% CI)		

30D mortality

2	randomised trials	not serious	not serious	not serious	very serious ^{a,b}	none	17/37 (45.9%)	18/37 (48.6%)	RR 0.94 (0.58 to 1.53)	29 fewer per 1,000 (from 204 fewer to 258 more)	⊕⊕○ ○ Low ^{a,b}	CRITICAL
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Major bleeding

1	randomised trials	not serious	not serious	not serious	very serious ^{a,c}	none	8/24 (33.3%)	2/24 (8.3%)	RR 4.00 (0.95 to 16.92)	250 more per 1,000 (from 4 fewer to 1,000 more)	⊕⊕○ ○ Low ^{a,c}	CRITICAL
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Stroke

Certainty assessment							No. of patients		Effect		Certainty	Importance
No. of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Impella	IABP	Relative (95% CI)	Absolute (95% CI)		
1	randomised trials	not serious	not serious	not serious	very serious ^{a,c}	none	1/24 (4.2%)	1/24 (4.2%)	RR 1.00 (0.07 to 15.08)	0 fewer per 1,000 (from 39 fewer to 587 more)	⊕⊕○ ○ Low ^{a,c}	IMPORTANT

本資料の図表および記載内容は、Hashiba K, et al. Circ Rep. 2025;7:1014-1020. より引用。