

ECC CS CQ

病院前でCSを疑う患者や難治性CS患者の「高度ショックセンター」への搬送は転帰を改善するか？

ECC CS CQ

CS診療における「高度ショックセンター」の要件は何か？

Evaluation of Outcomes by Transporting Cardiogenic Shock Patients to a Cardiogenic Shock Center: What Defines a Shock Center? – A Scoping Review

Okazaki Y, Kirigaya J, Yamamoto T, Kondo T, Tanaka A, Nakashima T, Yamamoto M, Nakayama N, Hanada H, Hashiba K, Ishizu T, Hosoya Y, Katasako-Yabumoto A, Osawa T, Sakamoto K, Arai M, Noguchi T, Tahara Y, Matsuo K, Yamaguchi J, Mano T, Kojima S, Funazaki T, Nonogi H, Kikuchi M, Matoba T. Defining a Cardiogenic Shock Center and Its Relationship to Outcomes Among Patients With Cardiogenic Shock — A Scoping Review —. *Circ Rep.* 2026;8(1):CR-25-0194. doi:10.1253/circrep.CR-25-0194

Search strategies of literature databases

Search strings

1. PubMed (MEDLINE & PMC)

#1: "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]))

#2: "shock center"[Text Word] OR "shock centre"[Text Word] OR "shock centres"[Text Word] OR "shock centers"[Text Word] OR "cardiogenic shock centre*"[Text Word] OR "shock team*"[Title/Abstract] OR "cs cent*"[Title/Abstract] OR "cs team*"[Title/Abstract] OR "heart attack cent*"[Title/Abstract] OR "heart attack team*"[Title/Abstract] OR "heart cent*"[Title/Abstract] OR "heart team*"[Title/Abstract] OR "specialty team*"[Title/Abstract] OR "specialty cent*"[Title/Abstract] OR "specialist team*"[Title/Abstract] OR "specialist cent*"[Title/Abstract] OR "specialized team*"[Title/Abstract] OR "specialized cent*"[Title/Abstract] OR "multidisciplinary cent*"[Title/Abstract] OR "multidisciplinary team*"[Title/Abstract] OR "multidisciplinary approach"[Title/Abstract] OR "multidisciplinary care"[Title/Abstract] OR "interdisciplinary cent*"[Title/Abstract] OR "interdisciplinary team*"[Title/Abstract] OR "interdisciplinary approach"[Title/Abstract] OR "interdisciplinary care"[Title/Abstract] OR "Coronary Care Units"[MeSH Terms] OR "critical care cent*"[Title/Abstract] OR "emergency cent*"[Title/Abstract] OR "intensive cardiovascular care"[Title/Abstract] OR "cardiac intensive care"[Title/Abstract] OR "CCU"[Title/Abstract] OR "CICU"[Title/Abstract] OR "ICCU"[Title/Abstract] OR "cardiac cent*"[Title/Abstract]

#3: "hub"[Title/Abstract] OR "hubs"[Title/Abstract] OR "hub and spoke"[Title/Abstract] OR "hub-spoke"[Title/Abstract] OR "spoke and hub"[Title/Abstract] OR "spoke-hub"[Title/Abstract]

#4: "high volume"[Title/Abstract] OR "volume of case*"[Title/Abstract] OR "case volume*"[Title/Abstract] OR "hospital volume"[Title/Abstract] OR "cs volume"[Title/Abstract]

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

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

#1: (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)))

#2: (TI="shock cent*" OR AB="shock cent*" OR AK="shock cent*" OR KP="shock cent*") OR (TI="cs cent*" OR AB="cs cent*" OR AK="cs cent*" OR KP="cs cent*") OR (TI="cs team*" OR AB="cs team*" OR AK="cs team*" OR KP="cs team*") OR (TI="heart attack cent*" OR AB="heart attack cent*" OR AK="heart attack cent*" OR KP="heart attack cent*") OR (TI="heart attack team*" OR AB="heart attack team*" OR AK="heart attack team*" OR KP="heart attack team*") OR (TI="heart cent*" OR AB="heart cent*" OR AK="heart cent*" OR KP="heart cent*") OR (TI="heart team*" OR AB="heart team*" OR AK="heart team*" OR KP="heart team*") OR (TI="specialty team*" OR AB="specialty team*" OR AK="specialty team*" OR KP="specialty team*") OR (TI="specialty cent*" OR AB="specialty cent*" OR AK="specialty cent*" OR KP="specialty cent*") OR (TI="specialist team*" OR AB="specialist team*" OR AK="specialist team*" OR KP="specialist team*") OR (TI="specialist cent*" OR AB="specialist cent*" OR AK="specialist cent*" OR KP="specialist cent*") OR (TI="specialized team*" OR AB="specialized team*" OR AK="specialized team*" OR KP="specialized team*") OR (TI="specialized cent*" OR AB="specialized cent*" OR AK="specialized cent*" OR KP="specialized cent*") OR (TI="multidisciplinary cent*" OR AB="multidisciplinary cent*" OR AK="multidisciplinary cent*" OR KP="multidisciplinary cent*") OR (TI="multidisciplinary team*" OR AB="multidisciplinary team*" OR AK="multidisciplinary team*" OR KP="multidisciplinary team*") OR (TI="multidisciplinary approach" OR AB="multidisciplinary approach" OR AK="multidisciplinary approach" OR KP="multidisciplinary approach") OR (TI="multidisciplinary care" OR AB="multidisciplinary care" OR AK="multidisciplinary care" OR KP="multidisciplinary care")

care" OR KP="multidisciplinary care") OR (TI="interdisciplinary cent*" OR AB="interdisciplinary cent*" OR AK="interdisciplinary cent*" OR KP="interdisciplinary cent*") OR (TI="interdisciplinary team*" OR AB="interdisciplinary team*" OR AK="interdisciplinary team*" OR KP="interdisciplinary team*") OR (TI="interdisciplinary approach" OR AB="interdisciplinary approach" OR AK="interdisciplinary approach" OR KP="interdisciplinary approach") OR (TI="interdisciplinary care" OR AB="interdisciplinary care" OR AK="interdisciplinary care" OR KP="interdisciplinary care") OR (TI="coronary care" OR AB="coronary care" OR AK="coronary care" OR KP="coronary care") OR (TI="emergency cent*" OR AB="emergency cent*" OR AK="emergency cent*" OR KP="emergency cent*") OR (TI="critical care cent*" OR AB="critical care cent*" OR AK="critical care cent*" OR KP="critical care cent*") OR (TI="intensive cardiovascular care" OR AB="intensive cardiovascular care" OR AK="intensive cardiovascular care" OR KP="intensive cardiovascular care") OR (TI="cardiac intensive care" OR AB="cardiac intensive care" OR AK="cardiac intensive care" OR KP="cardiac intensive care") OR (TI=CCU OR AB=CCU OR AK=CCU OR KP=CCU) OR (TI=CICU OR AB=CICU OR AK=CICU OR KP=CICU) OR (TI=ICCU OR AB=ICCU OR AK=ICCU OR KP=ICCU) OR (TI="cardiac cent*" OR AB="cardiac cent*" OR AK="cardiac cent*" OR KP="cardiac cent*")
#3: (TI=hub* OR AB=hub* OR AK=hub* OR KP=hub*) OR (TI=hub-spoke OR AB=hub-spoke OR AK=hub-spoke OR KP=hub-spoke) OR (TI=spoke-hub OR AB=spoke-hub OR AK=spoke-hub OR KP=spoke-hub)
#4: (TI="high volume" OR AB="high volume" OR AK="high volume" OR KP="high volume") OR (TI="volume of case*" OR AB="volume of case*" OR AK="volume of case*" OR KP="volume of case*") OR (TI="case volume*" OR AB="case volume*" OR AK="case volume*" OR KP="case volume*") OR (TI="hospital volume" OR AB="hospital volume" OR AK="hospital volume" OR KP="hospital volume") OR (TI="cs volume" OR AB="cs volume" OR AK="cs volume" OR KP="cs volume")
#5: #1 AND (#2 OR #3 OR #4)

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

#1: "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))
#2: ("shock" NEXT cent*):ti,ab,kw OR ("shock" NEXT team*):ti,ab,kw OR ("cs" NEXT cent*):ti,ab,kw OR ("cs" NEXT team*):ti,ab,kw OR ("heart attack" NEXT cent*):ti,ab,kw

OR ("heart attack" NEXT team*):ti,ab,kw OR ("heart" NEXT cent*):ti,ab,kw OR ("heart"
NEXT team*):ti,ab,kw OR ("specialty" NEXT team*):ti,ab,kw OR ("specialty" NEXT
cent*):ti,ab,kw OR ("specialist" NEXT team*):ti,ab,kw OR ("specialist" NEXT
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OR ("emergency" NEXT cent*):ti,ab,kw OR "intensive cardiovascular care":ti,ab,kw OR
"cardiac intensive care":ti,ab,kw OR CCU:ti,ab,kw OR CICU:ti,ab,kw OR ICCU:ti,ab,kw OR
("cardiac" NEXT cent*):ti,ab,kw
#3: hub*:ti,ab,kw OR ("hub" NEXT "spoke"):ti,ab,kw OR ("spoke" NEXT "hub"):ti,ab,kw
#4: "high volume":ti,ab,kw OR ("volume" NEXT case*):ti,ab,kw OR ("case" NEXT
volume*):ti,ab,kw OR "hospital volume":ti,ab,kw OR "cs volume":ti,ab,kw
#5: #1 AND (#2 OR #3 OR #4)

PRISMA Flow Chart

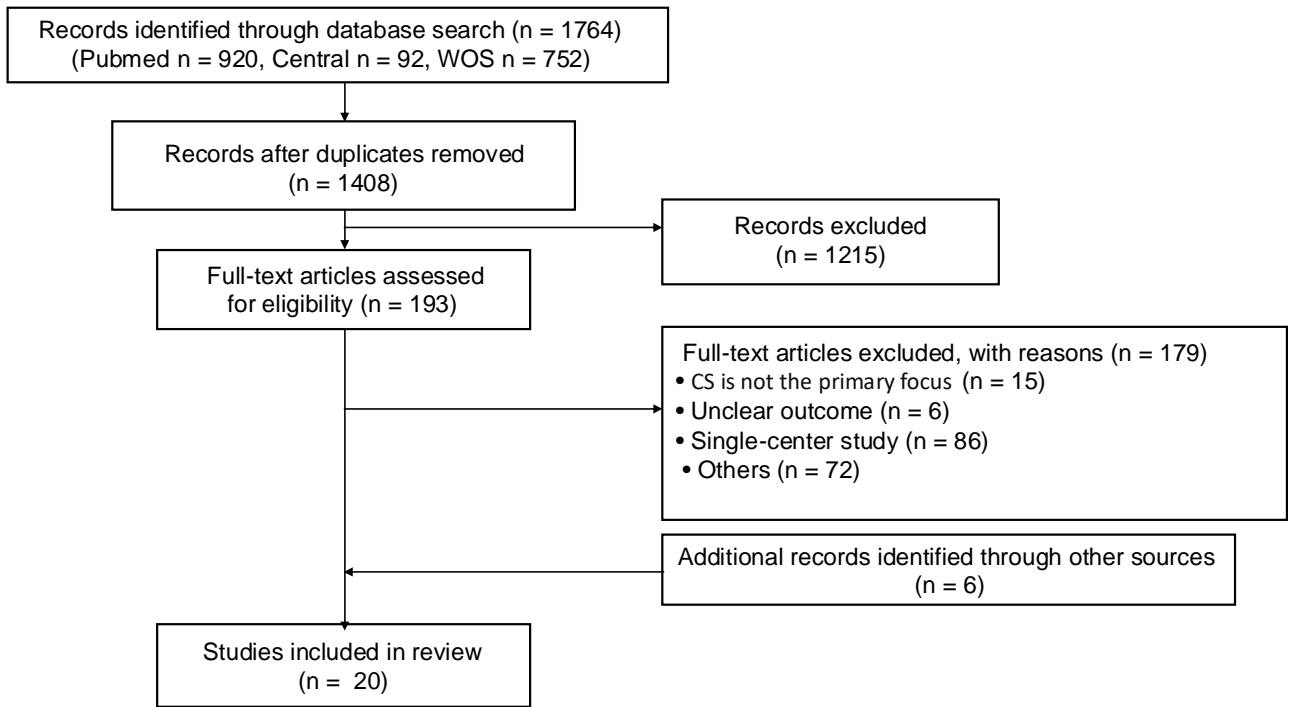


Table. Prognostic studies examining facility-level factors relevant to the definition of cardiovascular shock centers

Author, year	Factors relevant to the definition	Population / Country or region (Study period)	End point / Groups or cut off values	Results
Annual volume of CS or MCS cases				
Shaefi, 2015	CS case/hospital/year	All-CS (n=533179) / USA (2004-2011)	Adjusted in-hospital mortality / Quartiles ≤27, 28-58, 59-106, ≥107	Q1 42%, Q2 41%, Q3 39%, Q4 37%
Schrage, 2021	CS case/hospital/year	AMI-CS (n=1032) / Europe (2013-2015)	Estimated 1-year mortality / Three groups <50, 50-100, >100	G1 51%, G2 56%, G3 54%
Barrionuevo-Sánchez, 2023	CS case/hospital/year	CS (n=10826) including non-ACS-CS (n=5495) / Spain (2016-2019)	Adjusted in-hospital mortality / low volume or high volume	Non-ACS-CS: Low volume 57%, high volume 53%
Barrionuevo-Sánchez, 2023	CS case/hospital/year	STEMI-CS (n=3074) / Spain (2016-2020)	Adjusted in-hospital mortality / low volume (L) or high volume (H), ICCU or I non-cardiac CU (In CCU)	ICCU-H 49%, ICCU-L 54%, In CCU-H 54%, In CCU-L 52%
Bloom, 2022	CS case/hospital/year	All-CS (n=3217) / Australia (2015-2019)	Adjusted 30-day mortality/ Quartiles <18, 18-40, 41-55, >55	Adjusted 30-day mortality: Highest volume Q4 compared with Q1, aOR 0.71 (95%CI, 0.56-0.91)
Nakahara, 2016	Patient volume in tertiary care center	OHCA, ACS, HF (n=43632) in	In-hospital survival/ Low volume	Volume: ACS 92% vs 95%,

		emergency and critical care centers / Japan (2013-2014)	vs high volume	HF 87% vs 92%
Araki, 2023	IABP number/hospital/year	All-CS with IABP (n=48643) / Japan (2012-2020)	In-hospital mortality/ Quintile -6.3, 6.4-10.8, 10.9-16.1, 16.2-23.5, 23.6-	Q1 25%, Q2 21%, Q3 20%, Q4 16%, Q5 15%
Chen, 2003	IABP number/hospital/year	AMI-CS with IABP (n=12730) / USA (1994-1998)	In-hospital mortality / Tertiles (median) 3.4, 12.7, 37.4	T1 65%, T2 54%, T3 51%
Araki, 2023	VA-ECMO number/hospital/year	All-CS with ECMO (n=16871) / Japan (2012-2020)	In-hospital mortality/ Quintile - 2.8, 2.9-5.0, 5.1-8.0, 8.1-12.0, 12.1-	Q1 74%, Q2 70%, Q3 69%, Q4 69%, Q5 67%
Aso, 2016	VA-ECMO number/hospital/year	VA-ECMO (n=5263) including CS (n=4658) / Japan (2010-2013)	In-hospital mortality / Tertiles $\leq 9, 10-19, \geq 20$	T1 76%, T2 72%, T3 73%
Pozzi, 2023	VA-ECMO number/hospital/year	AMI-CS with VA-ECMO (n=649) / France (2013-2019)	90-day mortality/ Low volume vs high volume	Low volume 63%, high volume 65%
Cowger, 2017	LVAD number/hospital/year	LVAD (n=7416) including INTERMACS 1, 2 (n=3688) / USA (2012-2014)	90 days mortality / Four groups 10, 11-30, 31 to 50, >50	All G1 12%, G2 10%, G3 9%, G4 12% INTERMACS 1, 2 G1 15%, G2 11%, G3 12%, G4 15%
Araki, 2023	pVAD number/hospital/year	All-CS with pVAD (n=696) / Japan (2012-2020)	In-hospital mortality/ Tertiles pVAD -4.50, 4.51-9.00, 9.01-	T1 44%, T2 40%, T3 46%
Watanabe, 2024	pVAD	All-CS with pVAD	180-day	Number: Q1

本資料の図表および記載内容は、Okazaki Y, et al. Circ Rep. 2025;8:4-12. より引用。

	number/hospital/year	(n=6637) / USA (2016–2020)	mortality/ Quintile number (median) 1.8, 5.6, 9.9, 15.4, 24.2	66%, Q2 63%, Q3 64%, Q4 63%, Q5 64%
Kubo, 2019	PCI cases/hospital/3 year	ACS-CS (n=17549) / Japan (2014–2016)	In-hospital mortality / Quartiles <640, 640–968, 969–1490, >1490	Q1 14%, Q2 13%, Q3 13%, Q4 12%
Noaman, 2022	CS-PCI case/hospital/year	AMI-CS (n=1179) / Australia (2014– 2018)	30-day mortality/ Tertiles <10, 10–25, >25	T1 47%, T2 43%, T3 43%
Availability of specialized treatment on a 24/7 basis				
Nakahara, 2016	24-hour availability of cardiologists	OHCA, ACS, HF (n=43632) in emergency and critical care centers / Japan (2013–2014)	In-hospital survival/ Available vs not always	Cardiologist: ACS 94% vs 94%, HF 92% vs 89%
Bloom, 2022	Emergency PCI 24/7 capable cardiac center	All-CS (n=3217) / Australia (2015– 2019)	Adjusted 30-day mortality/ Cardiac center vs noncardiac	Adjusted 30- day mortality: lower for cardiac center aOR 0.78 (95%CI, 0.64–0.95)
Specialized units with dedicated infrastructure and expertise				
Barrionuevo- Sánchez, 2023	ICCU availability	STEMI-CS (n=3074) / Spain (2016–2020)	Adjusted in-hospital mortality / low volume (L) or high volume (H), ICCU or I non-cardiac CU (In CCU)	ICCU-H 49%, ICCU-L 54%, In CCU-H 54%, In CCU-L 52%
Barrionuevo- Sánchez, 2023	ICCU availability	CS (n=10826) including non-ACS- CS (n=5495) /	Adjusted in-hospital mortality / ICCU availability	ICCU available center 51%,

本資料の図表および記載内容は、Okazaki Y, et al. Circ Rep. 2025;8:4-12. より引用。

		Spain (2016–2019)		no available 58%
Sánchez-Salado, 2020	ICCU availability	STEMI-CS (n=19963), including structured cardiac unit with catheterization laboratory (n=11037) /Spain (2003–2015)	In-hospital risk- adjusted mortality/ICCU available vs not available	ICCU: available 65% vs not available 72%
Noaman, 2022	Cardiac surgical center	AMI-CS (n=1179) / Australia (2014- 2018)	30-day mortality/ Surgical centers vs nonsurgical	Surgical centers 43.1%, nonsurgical centers 45.2%
Wang, 2020	LVAD center (assuming shock team)	All-CS (n=272075) / USA (2012–2014)	In-hospital mortality/LVAD centers vs non-LVAD centers	LVAD 39% vs non-LVAD 43%
Matoba, 2021	JCS board-certified cardiologist number/hospital	AMI-CS (n=21823) / Japan (2012–2016)	30-day mortality / Four groups 0–3, 4–5, 6–8, ≥9	G1 48%, G2 43%, G3 39%, G4 37%
Ishii, 2021	JCS board-certified cardiologist number/hospital and	AMI-CS (n=45836) / Japan (2012–2018)	30-day mortality / Four groups 0–2, 3– 5, 6–9, ≥10	G1 ref, G2 HR 0.99, G3 HR 0.94, G4 HR 0.84
Regional coverage, systems, and related considerations				
Ishii, 2021	hospital density	AMI-CS (n=45836) / Japan (2012–2018)	30-day mortality / Hospital density Quartiles	Q1 ref, Q2 HR 0.90, Q3 HR 0.87, Q4 HR 0.79
Watanabe, 2024	Patient-hospital distances	All-CS with pVAD (n=6637) / USA (2016–2020)	180-day mortality/Quintile distance (median) 3.8, 11.1, 22.0,	Q1 65%, Q2 65%, Q3 61%, Q4 66%, Q5 62%

本資料の図表および記載内容は、Okazaki Y, et al. Circ Rep. 2025;8:4-12. より引用。

			47.6, 146.7	
Nakahara, 2016	Patient volume per population	OHCA, ACS, HF (n=43632) in emergency and critical care centers / Japan (2013-2014)	In-hospital survival/ Low density vs high density	ACS 92% vs 95%, HF 89% vs 91%
Tehrani, 2022	Standardized protocol, team-based approach and regional CS network	All-CS (n=520) / USA (2017-2019)	30-day mortality/Hub or spoke (transfer to hub)	Hub 38% vs spoke 36%
Lu, 2021	Regional hub-and-spoke triage systems	All-CS (n=412667) / USA (2010-2014)	In-hospital mortality/direct to spoke, direct to hub, transfer to hub	Direct to spoke 48%, direct to hub 39%, transfer to hub 33% Direct to hub OR 0.86 (95%CI, 0.84-0.89), transfer to hub OR 0.72 (95%CI, 0.69-0.76)

ACS: Acute Coronary Syndrome AMI: Acute Myocardial Infarction aHR: Adjusted Hazard Ratio BCC: Board-Certified Cardiologists CI: Confidence Interval CS: Cardiogenic Shock CULPRIT-SHOCK: Culprit Lesion Only PCI Versus Multivessel PCI in Cardiogenic Shock (Clinical Trial) ECCCs: Emergency and critical care centers HR: Hazard Ratio IABP: Intra-Aortic Balloon Pump ICCU: Intensive Cardiac Care Unit JCS: Japanese Circulation Society JROAD-DPC: Japanese Registry of All Cardiac and Vascular Diseases with Diagnosis Procedure Combination LVAD: Left Ventricular Assist Device MACCE: Major Adverse Cardiac and Cerebrovascular Events MCS: Mechanical Circulatory Support OR: Odds Ratio PCI: Percutaneous Coronary Intervention SNHS: Spanish National Health System STEMI: ST-Elevation Myocardial Infarction VA-ECMO: Veno-Arterial Extracorporeal Membrane Oxygenation