Utilisation & Outcomes of Perioperative Temporary Mechanical Circulatory Support in Contemporary Practice of Adult Cardiac Surgery in the UK

ACTACC National Audit Project 2024-2025



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Introduction

- Perioperative temporary mechanical circulatory support (tMCS) can support patients with low cardiac output state
 - Commonly IABP, VA-ECMO, transvalvular microaxial flow catheters
- Post-cardiotomy cardiogenic shock:
 - 2-6% in registry studies¹
 - 0.5-1.5% have refractory PCCS¹
- A single-centre study showed tMCS use (postoperatively):²
 - 82.9% IABP
 - 21.6% VA-ECMO
 - 4.3% VAD
- Survival-to-discharge after MCS 30-50%³
- 1) Khorsandi et al. J Cardiothorac Surg. 2016;11:29
- 2) Hess et al. J Card Surg. 2021;36:4030-4037
- 3) Rodriguez AC et al. J Cardiothorac Vasc Anesth. 2023;37:2621-2633.

Rationale

- Numerous limitations to current literature
 - Small datasets, single-centres
 - Historical data may not reflect contemporary practice
 - Increasing volume & complexity of cardiac surgical work
 - Increasingly comorbid patients
- Little prospective data available for contemporary UK practice
 - Including outcome data
- Little characterisation of the full scope of acute perioperative tMCS

Primary Outcomes

- To establish the incidence of temporary perioperative mechanical circulatory support (tMCS) in adult cardiac surgery
 - All forms of MCS (including IABP)
 - Immediately preoperative, intraoperative and up to 72h postoperatively
- To establish the current use of different forms of tMCS in adult cardiac surgery
- To establish the ICU and in-hospital mortality following acute perioperative tMCS in adult cardiac surgery

Secondary Objectives

- To ascertain the timing of tMCS application and duration of tMCS provided
- To determine whether the requirement for MCS was anticipated preoperatively
- To understand pre- and intraoperative factors associated with requirement for tMCS
- To establish the key outcomes for tMCS, including intensive care unit and hospital length of stay
- To establish the incidence of major complications associated with perioperative tMCS
 - Major haemorrhage, access issues, haemolysis, cerebrovascular accidents, limb ischaemia, sepsis, LV distension

Project Methodology & Phases

- National audit/service evaluation
- Aiming to capture all cases of acute perioperative tMCS in adult cardiac surgery
 - Local identification of cases at participating centres with central reporting
- Phases:
 - Baseline Activity & Centre Survey (Jan Feb 2024) OPEN NOW!
 - Prospective data collection (March 2024 March 2025)
 - Project Reporting (June August 2025)

Project Timeline

	Dec 2023	Jan 2024	Feb 2024	March 2024	June 2024	Sept 2024	March 2025	April 2025	May 2025	June 2025	July 2025
				Mandatory							
Project registration											
Committee review of CRF											
Setting up CRF for data capture											
Linkmen survey conducted											
Linkmen survey analysis											
Linkmen meeting - Intro											
Data collection											
Interim data collection meeting											
Tidying data											
Preliminary analysis											
Initial presentation of results											
Preparation of manuscript starts											
Additional											
NICOR application completion											
Data sharing preparation											
EACTAIC grant application											
Analysis of NICOR data											

Baseline Survey

Collecting information regarding:

- Linkperson
- Centres
- Caseload
- Cardiac ICU
- PCCS Management
- MCS
- Outcomes

Baseline activity survey of national cardiac centres. Thank you for taking the time to complete this survey.	ACTACC Mechanical Circulatory Support National Audit: Linkmen Baseline Activity Survey	×	
Thank you for taking the time to complete this survey.	Baseline activity survey of national cardiac centres.		
	Thank you for taking the time to complete this survey. Email *		

Data Collection

Inclusion criteria:

- Adult patients undergoing cardiac surgery within the 12 month audit period
- Elective, urgent and emergency procedures
- Requiring preoperative, intraoperative or immediate/early postoperative (up to 72h) tMCS (all forms)

Identified cases to be reported using SurveyMonkey data collection link.

Data Collection – Patient Characteristics

Data Field			Data Entry
Audit Number			Autogenerated
Demographics	Age (at operation)		Numerical entry
	Sex		Drop down
	Height (cm)		Numerical entry
	Weight (kg)		Numerical entry
Comorbidities	Respiratory	Asthma, COPD, Other	Tick box (Other –
	Cardiovascular	IHD, HFrEF, HFpEF, AF, Pulmonary Hypertension, Systemic Hypertension, Cardiomyopathy, Peripheral vascular disease, Other	free text)
	GI/Hepatic	CLD, Pancreatitis	1
	Endocrine	T1DM, T2DM, Hypercholesterolaemia, Other	
	Renal	Current AKI, CKD	1
	Haematology	Anaemia, Thrombocytopaenia, Other	
	Neurological	TIA/CVA, Cognitive Impairment, Other	
	Other		
Euroscore II	Score		Numerical entry
Date/Time	Enrolment		Date/Time
	Hospital Admission]
	Operation		

Data Collection – Pre- & Intraoperative

Data Field			Data Entry		
	Preopera	ative			
Cardiac Investigations	Echocardiogram	LVSF/RVSF, Significant Valvular Pathology, Other	Dropdown		
	Cross-sectional imaging	CTCA – Key findings, CMR – Key findings	-		
	Angiography	Lesions – location/significance	-		
Medications	ACEi, Anticoagulants	ACEi, Anticoagulants			
tMCS	Usage	Type, Timing	Dropdown		
	Decision to use	Intraoperative, Postoperative			
Mechanical Ventilation	Yes/No		Y/N		
	Duration		Numerical entry		
	Intraoper	ative			
TOE	Pre-CPB	LV/RV Size/Function, Valvular abnormalities	Dropdown		
	Post-CPB	LV/RV Size/Function, Valvular abnormalities	-		
Duration	CPB time		Numerical entry		
	Cross-Clamp time				
Liberation	From Bypass	ass Y/N			
	With tMCS	Туре	Dropdown		
Blood Products	RBCs	Volume	Numerical entry		
	Plts				
	FFP				
	Cryoprecipitate				
	Fibrinogen conc				
Post-bypass	FiO2/P:F		Numerical entry		
	ABG	рН	Numerical entry		
		PO2			
		PCO2			
		HCO3			
		BE	_		
		Lactate	_		
		Hb			

Data Collection - CRF

Data Field			Data Entry
ICU Admission	Date/Time		Date/Time
	FiO2		Numerical entry
	ABG	рН	Numerical entry
		PO2	
		PCO2	
		HCO3	
		BE	
		Lactate	
		Hb	
Ventilation	Mode		Drop down
	Pressures	Peak Inspiratory	Numerical
		Driving	entry
		PEEP	
Cardiac Output Monitoring	Туре		Drop down
Vasoactives	Dose	Dopamine (mcg/kg/min)	Numerical
		Dobutamine (mcg/kg/min)	entry
		Epinephrine (mcg/kg/min)	
		Milrinone (mcg/kg/min)	
		Vasopressin (U/kg/min)	
		Noradrenaline (mcg/kg/min)	

Data Collection - CRF

Data Field			Data Entry	
Pre-MCS				
Additional SAVE Score Variables	Cardiac Arrest	Y/N		
	BP	Systolic	Numerical	
		Diastolic	entry	
	Organ Failure	Liver	Y/N	
		CNS		
Additional PRESET Score Variables	MAP		Numerical	
	Platelets		entry	
SCAI Classification	Shock Class	Drop down		
tMCS	Primary	Mode	Drop down	
		Time (Bypass to primary tMCS)	Numerical entry	
	Secondary	Mode	Drop down	
		Time (Bypass to secondary tMCS)	Numerical entry	
	Post	-MCS		
Primary	Duration		Numerical	
Secondary	Duration		entry	
Outcome at liberation	Recovery, Death, Transplant,	Drop down		
Discharge Date/Time	ICU	Date/Time		
	Hospital			
Complications	Major haemorrhage, access issues, haemolysis, cerebrovascular accidents, limb ischaemia, sepsis, LV distension		Tick box	

Clinical Governance

- Project registered at King's College NHS Foundation Trust
- Project steering committee to meet: March 2024, September 2024, February 2024
- Any issues or concerns, please contact: actaccmcsaudit@gmail.com

Please complete the Linkperson Baseline Activity Survey:

ACTACC tMCS Baseline Survey

Any questions, please contact:

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