

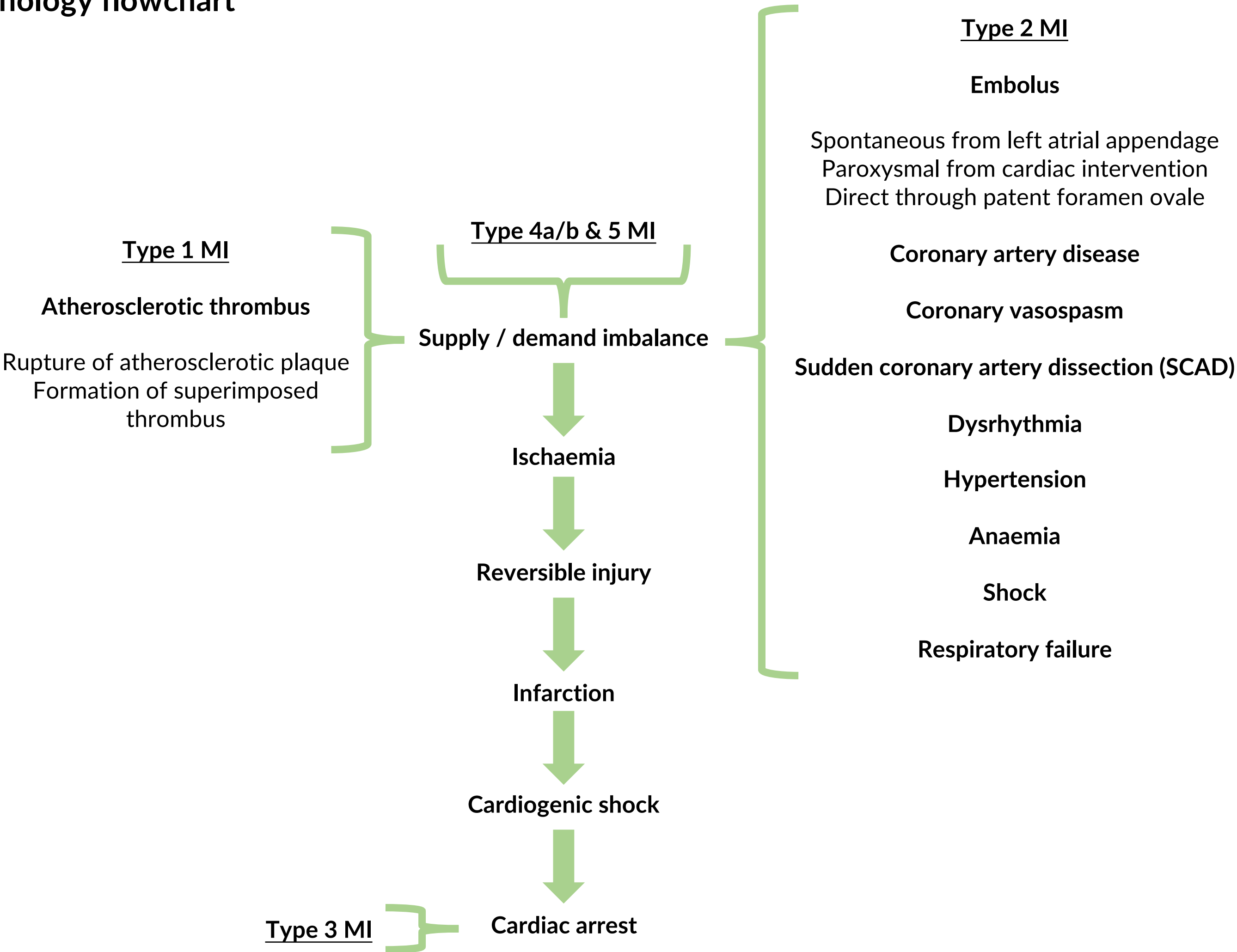
Differences in Acute Coronary Syndrome Treatment

Method

Produced August 2022. This poster is a descriptive analysis and comparison of a specific and discrete cluster of primary sources. All of the ten jurisdictional services have open access Clinical Practice Guidelines (CPGs). Content was extracted by four paramedics, with oversight from two senior lecturers in paramedicine. Scope of practice was classified as 'Paramedic' (undergraduate degree, represented by a ✓), 'Intensive Care Paramedic' (intensive care postgraduate degree), 'Extended Care Paramedic' (primary care postgraduate degree), or 'Specialist' (all other advanced roles, e.g. Retrievalist). Standard, routine cares were omitted for brevity, as were other complaints and/or conditions covered under their own, separate CPG (such as cardiogenic shock, dysrhythmias, and treatment in the rare case of paediatric ACS). This comparison does not review the peer-reviewed, published literature to determine current best practice in treatment. Consequently, no CPG is inferred to be superior or inferior to any other, nor that the most common treatment is necessarily optimal. This resources is created purely to assist making paramedics aware of current Australasian treatment options across JASs. Management is heavily focussed on Type 1 myocardial infarction.

Jurisdiction (Service)	Pharmacology													Intervention				
	Antiplatelet				Anticoagulant		Thrombolytic	Beta blocker		Nitrates			Opioid	Phlebotomy	pPCI referral	Intubation		
	Aspirin	Clopidogrel	Ticagrelor	Tirofiban	Enoxaparin	Heparin	Tenecteplase	Labetalol	Metoprolol	Glyceryl Trinitrate (sublingual)	Glyceryl Trinitrate (transdermal)	Glyceryl Trinitrate (infusion)	Preferred opioid (if any)			Unassisted (arrest)	KOBI & IFS	DSI & RSI
Aus. Capital Territory (ACTAS)	✓					ICP (a)				✓					✓	ICP	ICP	ICP
New South Wales (NSWA)	✓	✓ (a, c)			✓ (a, c)		✓ (a)			✓					✓	ICP		
New Zealand (SJNZ)	✓	✓ (a, c)			✓ (a, c)	✓ (a, c)	✓ (a)	✓ (a, b, c, d)	✓ (a, b, c, d)	✓	✓ (a, b, c)	ICP (a, c)	Fentanyl		✓	ICP		ICP
New Zealand (WFA)	✓	✓ (a, c)			✓ (a, c)	✓ (a, c)	✓ (a)	✓ (a, b, c, d)	✓ (a, b, c, d)	✓	✓ (a, b, c)	ICP (a, c)	Fentanyl		✓	ICP		ICP
Northern Territory (SJNT)	✓					✓ (a, c, e)	✓ (a, c, e)			✓	✓ (a)				✓	ICP		ICP
Queensland (QAS)	✓	✓ (a and c / d, f)	✓ (a, d, f)	Specialist (e, f, g)	✓ (a, c, d)	✓ (a, d, f)	✓ (a, c, d)		Specialist (e, g, h)	✓		Specialist (e, g)	Fentanyl		✓	ICP		Specialist (i)
South Australia (SAAS)	✓									✓		ICP	Fentanyl		✓	ICP		Specialist (e, j)
Tasmania (AT)	✓	ICP (a, c, e)			ICP (a, c, e)	ICP (a, c, e)	ICP (a, e)			✓					✓	ICP		
Victoria (AV)	✓					✓ (a, c, d, f)	✓ (a, d)			✓	✓				✓	ICP		ICP
Western Australia (SJWA)	✓					✓ (a, e, f)				✓			Fentanyl	✓	✓	✓		ICP
DSI = Delayed sequence intubation ICP = Intensive care paramedic IFS = Intubation facilitated by sedation KOBI = Ketamine-only breathing intubation pPCI = Primary Percutaneous Coronary Intervention RSI = Rapid sequence induction																		
(a) ST elevation (b) Hypertensive (c) Conjunction with lysis (d) Medical consultation for paramedics; not required for ICPs (e) Medical consultation required (f) pPCI (g) ICP – Critical Care Flight Paramedic only (h) Tachycardia or unresponsive to nitrates (i) ICP – “High Acuity Response Unit” only (j) ICP – “Retrievalist Flight Paramedic: only																		

Pathology flowchart



Treatment rationale

Definitive therapy

- Three forms of definitive treatment exist for Type 1 myocardial infarction: percutaneous coronary intervention (cardiac catheterisation with angiography, angioplasty and/or stenting or thrombectomy), fibrinolysis (dissolution of a thrombus using fibrinolytics), and, rarely, coronary artery bypass grafting (creating collateral circulation using a harvested vessel).

Aspirin, Clopidogrel, Ticagrelor, Tirofiban

- Aspirin inhibits the synthesis of thromboxane A2 by cyclooxygenase enzymes, reducing platelet aggregation and promoting vasodilation.
- Clopidogrel and Ticagrelor are P2Y₁₂ inhibitors that antagonise ADP-induced platelet aggregation; Clopidogrel is irreversible, while Ticagrelor is reversible.
- Tirofiban is a reversible IIb/IIIa inhibitor that antagonises platelet aggregation receptors on the phospholipid bilayer.

Enoxaparin and Heparin

- Both form a protein called antithrombin that irreversibly inhibits factors XA and IIA in the coagulation cascade. Enoxaparin is a low molecular weight heparin (LMWH), while 'heparin' refers to unfractionated (also known as 'standard') heparin. Unfractionated heparin is completely reversible (and LMWH partially reversible) by protamine sulfate for subsequent PCI angiography +/- stenting/thrombectomy.

Tenecteplase

- Tissue plasminogen activator ("tPA") that converts plasminogen into plasmin, allowing that plasmin to then cleave fibrin, degrading the fibrin matrix and causing fibrinolysis leading to thrombolysis.

Labetalol and Metoprolol

- Beta blockers antagonise adrenergic beta-1 and, to a lesser extent, beta-2 receptors, reducing inotropy, dromochropy, chromotropy, and decreasing myocardial work - reducing ischaemic injury.

Glyceryl Trinitrate

- Forms nitric oxide in the tunica intima, increasing cGMP, decreasing calcium, causing primarily venodilation. The decrease in preload decreases myocardial demand, reducing hypoxic myocardial injury; additionally, coronary artery vasodilation is theorised to increase collateral circulation, further reducing hypoxic injury (unproven, possibly due to coronary steal). At larger doses it also reduces afterload.
- Three large scale RCTs found no benefit to mortality; the utility of nitrates is limited to analgesia of angina.

Opioids

- Studies suggest opioids reduces the effectiveness of P2Y₁₂ inhibitors.