Differences in Adult Anaphylaxis Treatment

Paramedic | Intensive Care | Extended Care | Specialist

Method

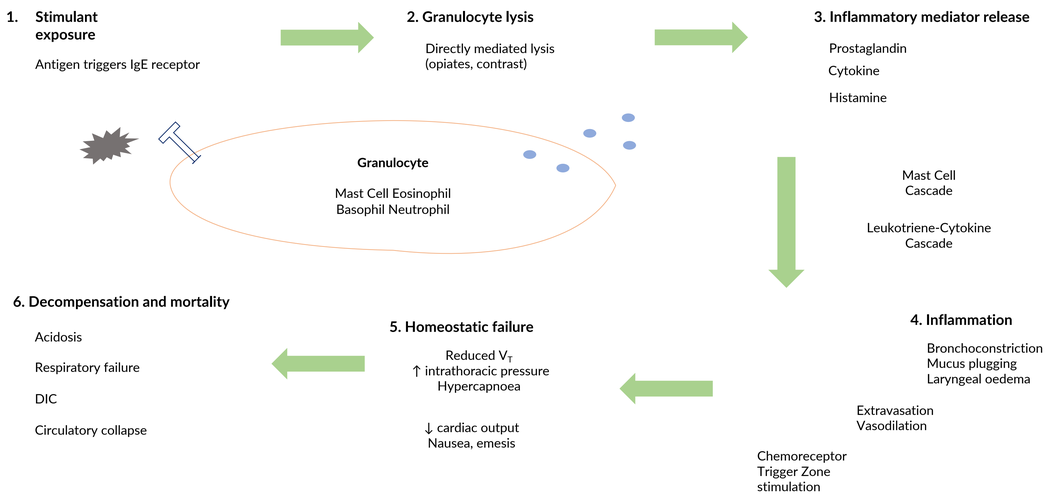
Produced July 2022. This poster is a descriptive analysis and comparison of a specific and discrete cluster of primary sources. All of the ten jurisdictional services have open access Clinical Practice Guidelines (CPGs). Content was extracted by two paramedics, with oversight from two senior lecturers 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). Routine cares were omitted for brevity, as were medications administered post-anaphylaxis or for non-anaphylactic allergies. 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.

Jurisdiction (Service)	Pharmacology													Intervention		
	Adrenergic						Anticholinergic		Corticosteroid			Inotrope	Electrolyte	Endotracheal intubation		
	Adrenaline (intramuscular)	Adrenaline (nebulised)	Adrenaline (infusion)	Salbutamol (MDI)	Salbutamol (nebulised)	Salbutamol (intravenous)	Ipratropium Bromide (MDI)	Ipratropium Bromide (nebulised)	Hydrocortisone	Dexamethasone	Prednisolone	Glucagon	Magnesium	Unassisted (arrest)	KOBI & IFS	DSI & RSI
Aus. Capital Territory (ACTAS)	✓		ICP	✓ (d)			✓ (d)							ICP	ICP	ICP
New South Wales (NSWA)	✓	✓	ICP (b)	Specialist (e)	✓				✓ (f)			✓ (j)		ICP		
New Zealand (SJNZ)	✓	✓	ICP											ICP		ICP
New Zealand (WFA)	✓	✓	ICP											ICP		ICP
Northern Territory (SJNT)	✓	✓	ICP	✓	✓			✓	✓			✓ (a, j)		ICP		ICP
Queensland (QAS)	✓	✓ (a)	ICP (a)	✓ (a, f)	✓ (a, f)	Specialist (c, g)		(i)	✓ (a, f)			✓ (a, k)		ICP		Specialist (l)
South Australia (SAAS)	✓	✓	ICP	✓	✓		✓	✓	ICP		✓		ICP	ICP		Specialist (c, m)
Tasmania (AT)	✓	✓	ICP	✓	✓	ICP	✓	✓		ICP		✓ (c, j)	ICP	ICP		
Victoria (AV)	✓	✓	ICP	✓	✓		(h)	✓		✓		✓		ICP		ICP
Western Australia (SJWA)	✓		ICP (c)	✓	✓									✓		ICP

DSI = Delayed sequence intubation ICP = Intensive care paramedic IFS = Intubation facilitated by sedation KOBI = Ketamine-only breathing intubation MDI = Metered dose inhaler RSI = Rapid sequence induction

(a) Indicated for patients refractory to three IM adrenaline injections (b) Indicated for patients refractory to four IM adrenaline injections (c) Medical consultation required (d) Indicated for patients refractory to IM adrenaline (e) Carried by Special Operations Team paramedic only, where nebulised salbutamol is unavailable (f) Indicated for unresolved wheeze (g) ICP – "Critical Care Flight Paramedic" only (h) Not currently carried, however approved for use if available (i) Not listed on the Anaphylaxis CPG; however, indicated on the relevant drug protocol for bronchospasm (j) Indicated for certain patients on beta blockers (k) Indicated for ongoing hypotension / shock (l) ICP – "High Acuity Response Unit" only (m) ICP – "Retrievalist Flight Paramedic: only

Pathology flowchart



Treatment rationale

Adrenaline
- Alpha-1 agonism causes peripheral vasoconstriction, improving central organ perfusion.
- Alpha-2 agonism increases glucagon and decreases insulin, raising serum glucose.
- Beta-1 agonism causes positive inotropy, chronotropy, dromotropy, and lusitropy, improving cardiac output and systemic perfusion.
- Beta-2 agonism induces bronchodilation, offsetting obstructive gas trapping and improving tidal volume.
- Beta-3 agonism triggers lipolysis, raising serum glucose.
- Stabilises mast cells, reducing degranulation and release of inflammatory mediators.

Salbutamol
- Adrenergic preferencing beta-2 receptors, inducing bronchodilation, improving ventilation and reducing intrathoracic pressure.

Ipratropium Bromide
- Muscarinic cholinergic antagonist, decreasing cGMP, reducing bronchial smooth muscle contraction, improving ventilation and reducing intrathoracic pressure.

Corticosteroids
- Agonises glucocorticoid or mineralocorticoid receptors respectively, inducing a wide range of changes including reducing inflammation and immunosuppression.

Glucagon
- Activates glucagon receptors in the myocardium, increasing cAMP, stimulating the inward funny current (increasing pacemaker rate), increasing pacemaker calcium release from the sarcoplasmic reticulum (increasing pacemaker rate), and enhancing calcium-induced-calcium-release (increasing contractility).

Magnesium
- Smooth muscle dilator via reduction in calcium-induced-calcium-release (due to competitive ryanodine receptor antagonism), leading to bronchodilation; also induced bronchodilation via additional pathways including reduced mast cell degradation and increased nitric oxide.

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