LRI Emergency Department

Acute aortic syndrome

Use in adults in whom AAS is the main concern or who have high-risk pain features or exam findings or risk factors for AAS listed in box 3 if presenting with:

- **Chest, abdo or back pain**
- **Neurological deficit**
- **Mesenteric ischaemia**
- **Limb ischaemia**
- **Syncope**
- **BP differential >20**
- **Systolic blood pressure >180**

Use individualized approach if pregnant, trauma patient or recent cocaine use

Disclaimer: **This is a clinical template; clinicians should always use judgment when managing individual patients**

Created by Martin Wiese . Version 2

Re-approved by ED guidelines committee on 26Oct22
Review due Oct25 . Trust Ref: C54//2021

Patient details

Full name

DoB

Unit number

(use sticker if available)

ECHO is ideal but **NOT** essential; move on if unavailable or delayed >15min

Hypotension, shock or critical organ/limb ischaemia? (Y → Manage in ER; N →)

Timely ECHO expertise available in the ED? (N → Determine AAS pre-test probability (PTP; see box 3); Y →)

Arrange bedside ECHO (complete boxes 1 and 2)

EITHER direct ECHO signs (see box 1) alone **OR** indirect ECHO signs (see box 2) **AND** patient unstable? (Y → Manage in ER; N →)

Determine AAS pre-test probability (PTP; see box 3)

PTP high (see box 3)? (Y → Manage in ER; N →)

PTP moderate (see box 3)? (N → D-Dimer <0.5µg/mL FEU?; Y →)

D-Dimer <0.5µg/mL FEU? (Y → AAS excluded - manage as appropriate; N →)

NB: ED Senior **MAY** opt to start anti-impulse therapy (see box 5) before confirming diagnosis if BP high **AND** pain uncontrolled **AND** AAS highly likely

Manage in ER

If unstable, fluid-resuscitate and involve ITU and ED consultant (EPIC after hours)

CT3 or above to arrange urgent CT aortogram
Ensure meticulous pain control

This will also help control blood pressure

AAS confirmed? (N → AAS excluded - manage as appropriate; Y →)

AAS include acute aortic dissection, intramural aortic haematoma, penetrating aortic ulcer and aortic rupture

- Move patient into the ER (if not already)
- Involve ED consultant (EPIC after hours)
- Urgent anti-impulse therapy as appropriate (see box 5)
- Constant 1:1 supervision required if hypotension, critical ischaemia or patient on anti-impulse therapy

Type A? (Y → Cardiac surgical emergency; N →)

E-referral **08:00 – 17:00**; outside those hours and if no response, contact registrar via switchboard

Cardiac surgical emergency

IMMEDIATELY refer to cardiac surgical registrar on **07950 891 093**

If no timely response, ask switchboard for the 'on-call consultant aortic surgeon'

AAS excluded - manage as appropriate

If NSTEMI is suspected, consider CXR / ECHO / possibly D-dimer

If PE is suspected, **DO NOT** give LMWH until diagnosis confirmed

Refer to vascular surgical team, stating presence or absence of features of Complicated Type B AAS (see box 4)

'Blue-light' transfer to GH once accepting clinician has communicated exact destination
Ensure appropriate escorting arrangements:
- Patients on single anti-impulse therapy need DART escort or higher
- If critical care needs or on dual anti-impulse therapy, ITU clinician escort

This patient was managed by

Print name Signature Role

① Direct ECHO signs of AAS?

***NB**: Omit if timely ECHO expertise unavailable*

☐ **Yes**, at least one of the below

- Intimal flap ☐
- Intramural aortic haematoma ☐
- Penetrating aortic ulcer ☐

☐ **NO**, none of the above

② Indirect ECHO signs of AAS?

***NB**: Omit if timely ECHO expertise unavailable*

☐ **Yes**, at least one of the below

- Thoracic aorta dilatation (diameter ≥ 4 cm at any level) ☐
- Pericardial effusion/tamponade ☐
- Aortic valve regurgitation at least ☐

☐ **NO**, none of the above

③ AAS pre-test probability (PTP)

Tick applicable criteria & record total score

☐ Known aortic aneurysm → → → → → → 2 ☐

Other risk factors
- ☐ Marfan syndrome
- ☐ Loeys-Dietz syndrome
- ☐ Turner syndrome
- ☐ Bicuspid aortic valve
- ☐ Ehlers-Danlos Syndromes
- ☐ Aortic valve disease
- ☐ Recent aortic manipulation (e.g. CABG)
- ☐ Family history of acute aortic syndrome:
  - ☐ Aortic dissection
  - ☐ Intramural haematoma
  - ☐ Ulcer with leak

Score if any of the above → → → → → → 1 ☐

*(NB: **DO NOT** score if known aortic aneurysm already scored above)*

High-risk chest/abdo/back pain features
- ☐ Severe or worst ever
- ☐ Thunderclap or abrupt
- ☐ Tearing or ripping
- ☐ Migrating or radiating

EITHER score if 1 or 2 of the above → → 1 ☐
OR score if 3 or 4 of the above → → 2 ☐

High-risk exam findings
- ☐ Pulse deficit including limb ischaemia (check for decrease or absence of radial, carotid, subclavian and femoral pulses)
- ☐ New neurological deficit:
  - ☐ Stroke or TIA (RIGHT most common)
  - ☐ Paraplegia
  - ☐ Limb pain/paraesthesia/motor deficit
  - ☐ Hypoxic encephalopathy (confusion)
  - ☐ Horner syndrome
- ☐ Aortic insufficiency / regurgitation
- ☐ Hypotension
- ☐ Pericardial effusion (see box 2) *(omit if no ECHO expertise available)*

Score if any of the above → → → → → → 2 ☐

Senior clinical judgement (ST3 or above)
- ☐ Alternative diagnosis more likely → → → -1 ☐
- ☐ Unsure → → → → → → → → → → → → 0 ☐
- ☐ AAS is most likely diagnosis → → → → → 1 ☐

☐ **>1 - High** PTP is >5%
☐ **1 - Moderate** PTP is 0.5-5%
☐ **0 - Low** PTP is <0.5%

④ Complicated Type B AAS?

☐ **Yes**, as at least one of the below

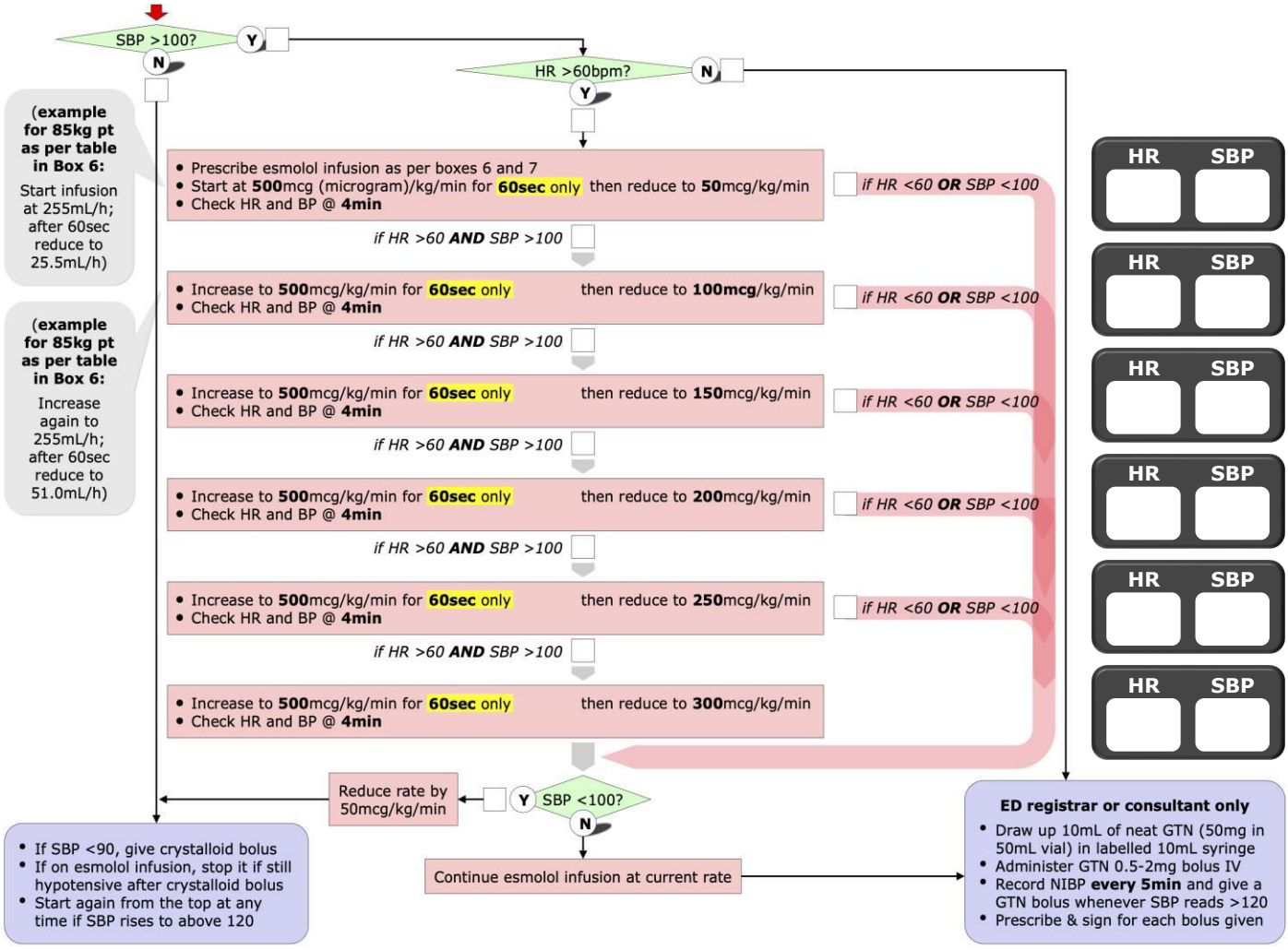
CT findings
- Severe aortic dilatation ☐
- Aortic rupture signs
  - Haemothorax ☐
  - Periaortic/mediastinal haematoma ☐

Organ malperfusion features
- AKI ☐
- Metabolic acidosis ☐
- Rising lactate ☐
- Lower limb ischaemia ☐
- Paraplegia ☐
- Leg pain/paraesthesia/motor deficit ☐

☐ **NO**, as none of the above

⑤ Anti-impulse therapy

- *Consider inserting arterial line to allow accurate, real-time BP monitoring*
- *NB: **DO NOT** insert arterial line into limb with ischemia / pulse deficit*
- *Record time, heart rate and systolic blood pressure before starting therapy*
- *Requires IV-trained nurse with competency to manage fluid infusion pump*



⑥ Esmolol 60-second bolus and infusion dosing table

- *Pre-mixed esmolol infusion bags contain 2.5G in 250mL of 0.9% NaCl (10mg/mL)*
- *Tick applicable weight in table below to find the appropriate doses*
- *Prescribe each 60-second bolus and the maintenance infusion as per example in box 7 (information should initially be captured as verbal order on ER critical interventions log)*
- *Initial titration requires constant attention – clinician and nurse to remain with patient*
- ***NB**: Sudden or accidental infusion stop will cause dangerous BP spike – **protect IV access***

Esmolol dose	microgram/kg/min delivered	Patient weight (kg; select closest value)												
		☐ 50	☐ 55	☐ 60	☐ 65	☐ 70	☐ 75	☐ 80	☐ 85	☐ 90	☐ 95	☐ 100	☐ 105	☐ >109
60-sec bolus (mL/h)	**500**	150	165	180	195	210	225	240	255	270	285	300	315	330
Maintenance (mL/h)	**50**	15	16.5	18	19.5	21	22.5	24	25.5	27	28.5	30	31.5	33
	100	30	33.0	36	39.0	42	45.0	48	51.0	54	57.0	60	63.0	66
	150	45	49.5	54	58.5	63	67.5	72	76.5	81	85.5	90	94.5	99
	200	60	66.0	72	78.0	84	90.0	96	102.0	108	114.0	120	126.0	132
	250	75	82.5	90	97.5	105	112.5	120	127.5	135	142.5	150	157.5	165
	300	90	99.0	108	117.0	126	135.0	144	153.0	162	171.0	180	189.0	198

⑦ Esmolol example prescription

For 85kg patient as per table in box 6

Date	Infusion fluid		Additions to infusion		IV or SC	Line	Start Time	Time to run or ml/hr	Fluid Batch No.	
	Type/strength	Volume	Drug	Dose						Prescriber
DD/MM/YY	10mg/mL	250mL	Esmolol (premixed)	2.5g	IV		HH:MM	255 mL/h 60-second bolus only		Dr.'s Name
DD/MM/YY	10mg/mL	250mL	Esmolol (premixed)	2.5g	IV		HH:MM	25.5 - 153mL/h		Dr.'s Name