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 46

Re-approved by ED guidelines committee on TBC
Review due Apr26 · 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 → Determine AAS pre-test probability (PTP; see box 3); Y →)

D-Dimer <0.5µg/mL FEU? (Y → Determine AAS pre-test probability (PTP; see box 3); N →)

CT3 or above to arrange urgent CT aortogram

Ensure good pain control – will help reduce BP

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

- 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

Refer to vascular surgical team, stating any features of 'Complicated Type B AAS' (box 4) if present

Cardiac surgical emergency

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

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

If GH team unable to accept, call NUH cardiac surgical registrar on **07812 275 357**

If NUH also unable to accept, call ACCOTS on **0300 200 1100**; a conference call will be set up with a West Midlands regional aortic centre and the ACCOTS Duty Coordinating Consultant

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

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

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

* *AAS include*
- Acute aortic dissection
- Intramural haematoma
- Penetrating aortic ulcer
- Aortic rupture

'Blue-light' transfer 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 ☐
*(**NB**: If this box has been ticked, move on directly to the high-risk pain features without asking about other risk factors)*

Other risk factors
- ☐ Marfan syndrome
- ☐ Loeys-Dietz syndrome
- ☐ Turner syndrome
- ☐ Bicuspid aortic valve
- ☐ Ehlers-Danlos Syndromes
- ☐ Aortic valve disease
- ☐ Aortic procedure within last 6 weeks (e.g. cardiac surgery, PCI, diagnostic coronary angiography, TAVI or TEVAR)
- ☐ Family history of aortic dissection
- ☐ Family history of intramural haematoma
- ☐ Family history of ulcer with leak

Score if any of the above → → → → → → 1 ☐
*(NB: **DO NOT** score here if patient already scoring for known aortic aneurysm 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 ☐

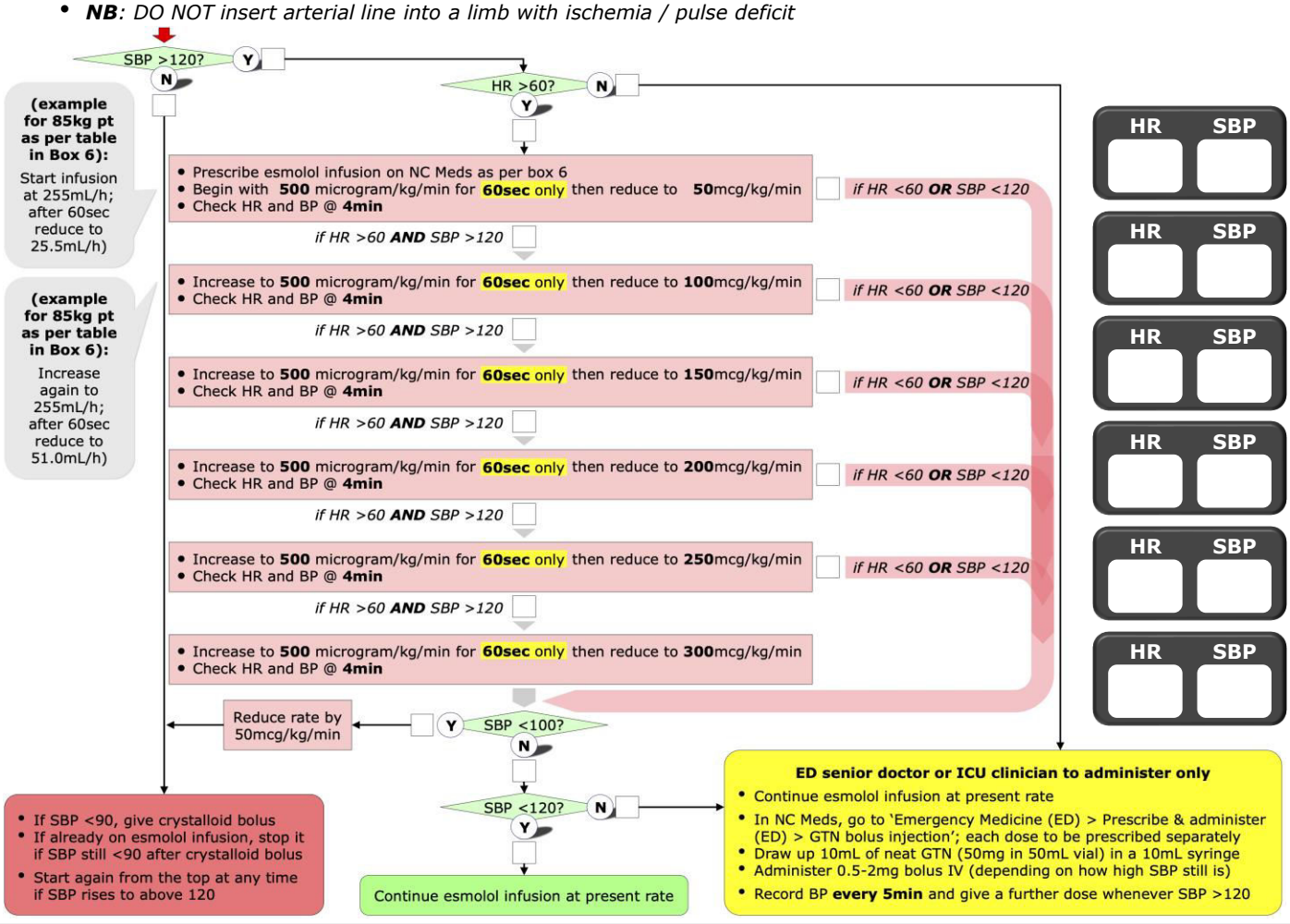
Organ malperfusion features
- AKI ☐
- Metabolic acidosis ☐
- Rising lactate ☐
- Lower limb ischaemia ☐
- Paraplegia ☐
- Leg pain/paraesthesia/motor deficit ☐

☐ **NO**, as none of the above

⑤ Anti-impulse therapy

- *IV-trained nurse competent to manage fluid infusion pump required*
- *Initial titration phase is complicated – clinician and nurse must stay with patient throughout*
- *Take this proforma to the bedside to guide you through the infusion rate changes & other actions*
- ***NB**: Sudden or accidental infusion stops cause hazardous BP spikes – **protect IV access***
- *Consider inserting arterial line to allow accurate, real-time BP monitoring*
- ***NB**: DO NOT insert arterial line into a limb with ischemia / pulse deficit*

HR SBP



HR SBP
HR SBP
HR SBP
HR SBP
HR SBP
HR SBP

⑥ Esmolol infusion

- *Our pre-mixed esmolol infusion bags contain 2.5G in 250mL of 0.9% NaCl (10mg/mL)*
- *Tick nearest weight in table below; the corresponding column contains the infusion rates you will need*
- *In NC Meds, go to Emergency Medicine (ED) > Vasoactive meds (ED) > Esmolol. Select nearest weight and prescribe '60-sec bolus & maintenance infusion' + 'extra 60-sec boluses' (both are already ticked).*
- *If NC is offline, prescribe infusion on a paper drug chart as per box 7 below*
- ***NB**: Infusion start and rate changes are best captured initially as verbal orders on the 'ER critical interventions log' rather than trying to record them in NC Meds in real time*

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

⑦ Esmolol example prescription during Nervecentre downtime

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.	Prescriber
	Type/strength	Volume	Drug	Dose						
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