

Guide to Trauma Care



Trauma Service
Queen Mary Hospital
Pokfulam, Hong Kong
2020

Roles and Responsibilities of Trauma Team Members

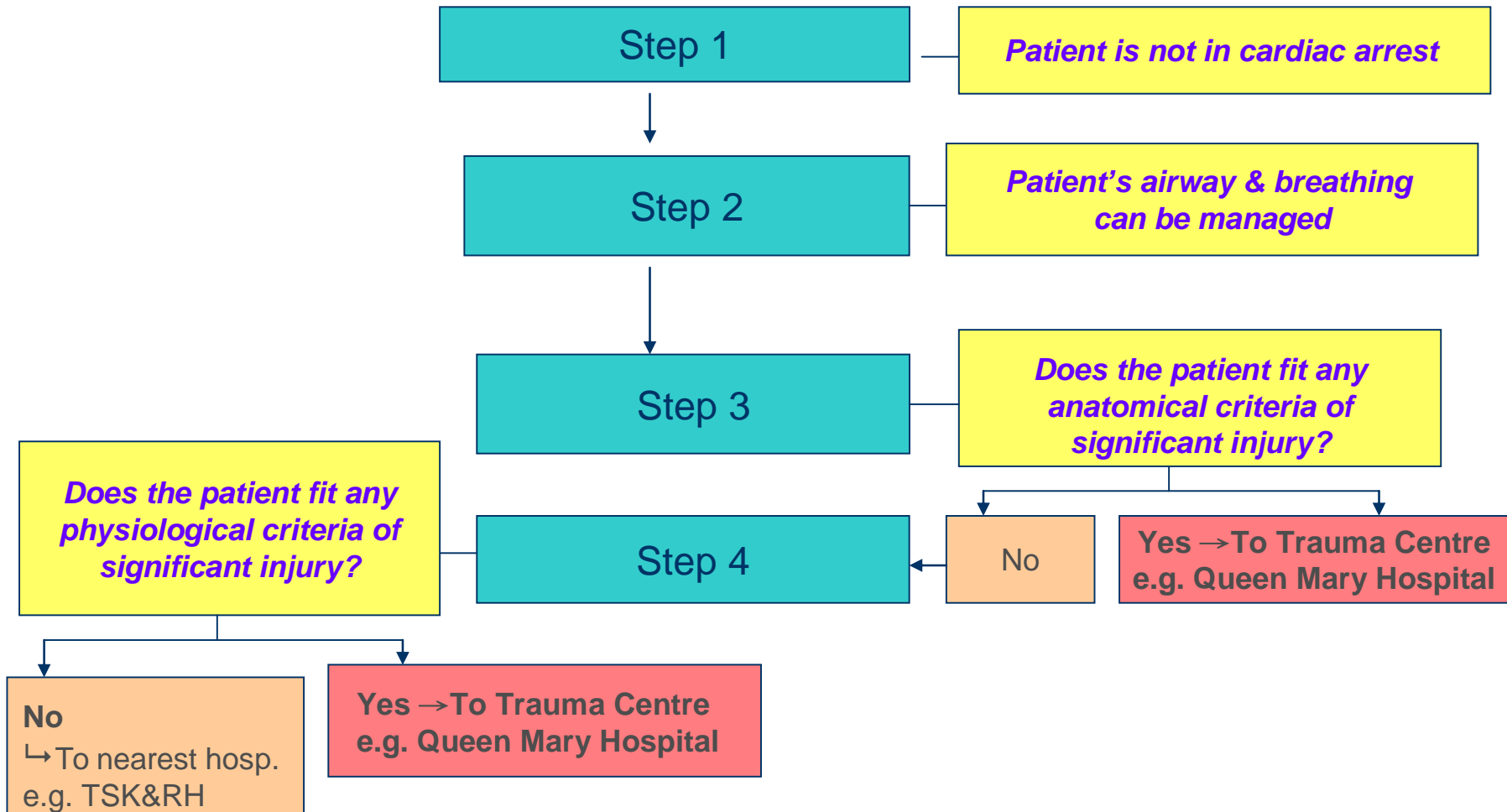
Policy:

1. Team members are responsible for the roles described in the following table.
2. Mutual respect, understanding and cooperation must be observed by all.
3. The ultimate responsibility rests with the trauma team leader.

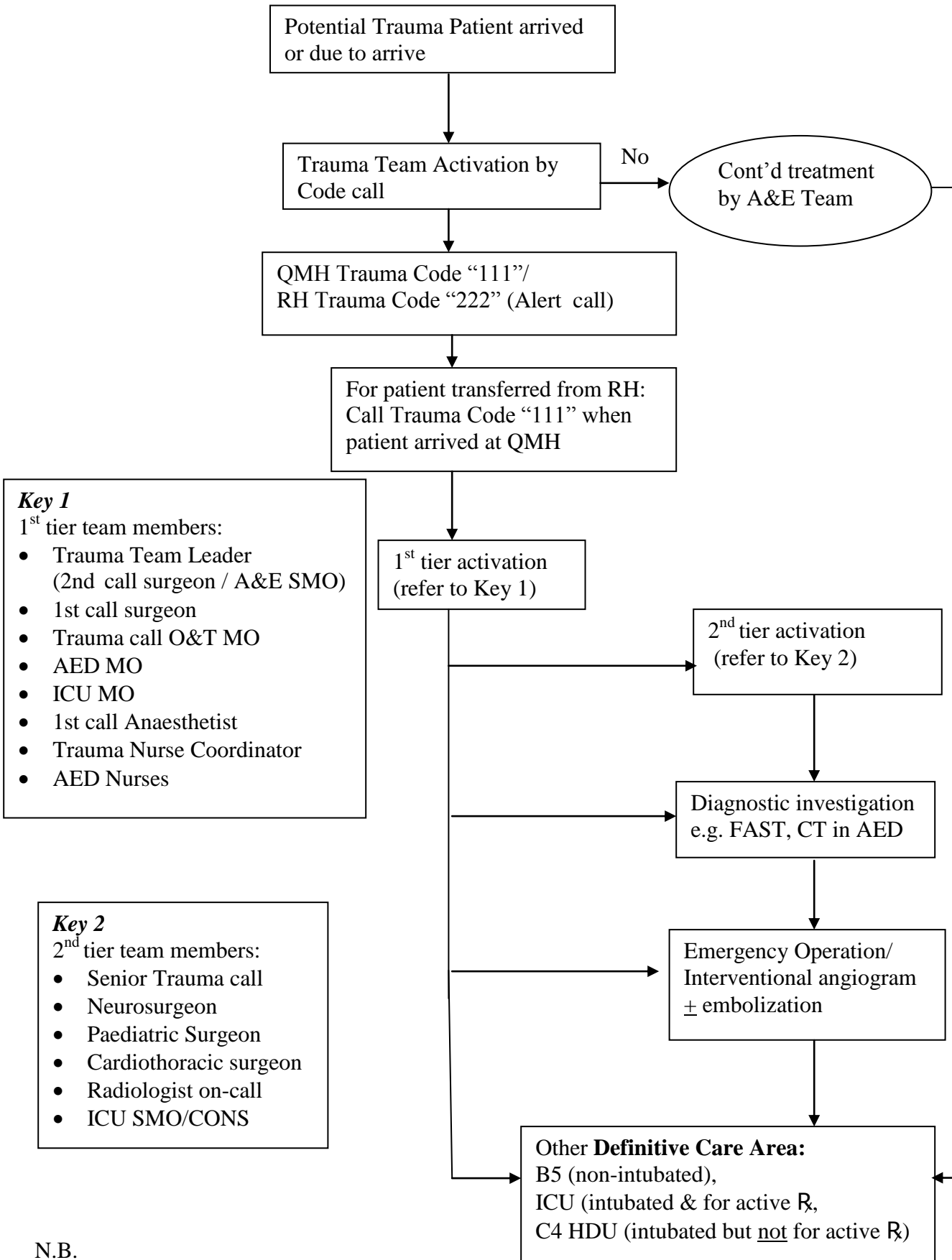
Role	Responsibilities	Who can fill	Mandatory Qualifications
Senior Trauma Call	<ul style="list-style-type: none"> • Clinical Support • Coordinate multidisciplinary care for multi-system injury 	As delegated by the Department of Surgery	ATLS certified DSTC certified (desirable)
Trauma Team Leader (TTL)	<ul style="list-style-type: none"> • Direct resuscitation, set priorities, oversee communication with specialists and families • Decide on the removal of spinal immobilization device 	2nd call surgeon/ SMO A&E if the former is not present	ATLS certified
A&E Doctor 1	<ul style="list-style-type: none"> • Trauma team activation • Provide info to TTL • Direct resuscitation before TT arrives • Airway and in-line immobilization of C-spine • Documentation in A&E record 	SMO A&E or A&E MO i/c	ATLS certified
A&E Doctor 2	<ul style="list-style-type: none"> • Primary & secondary survey & resus. before TT arrive • Blood for Ix & T&S • IV lines, foleys and thoracostomy 	MO A&E	
Surgery MO	<ul style="list-style-type: none"> • Performs primary & secondary survey • Provide info to TTL • Perform procedure at the direction of TTL e.g, IV, Foleys, DPL, thoracostomy • Logroll by holding upper body • Assist in documentation 	MO 1 st call	ATLS certified (desirable)

O&T MO	<ul style="list-style-type: none"> • Limbs, pelvis and spine condition in secondary survey • Supervise C-spine X-ray +/- pull shoulder • Assist resuscitation 	MO 1 st call	ATLS certified (desirable)
O&T MO	<ul style="list-style-type: none"> • Supervise and assist O&T MO 1st call 	MO 2 nd call	ATLS certified
Anaesthetist or ICU doctor	<ul style="list-style-type: none"> • Airways and ventilation • Advise on fluid management • Liaise with OT/ICU 	Anaes. on call/ ICU MO	ATLS certified (desirable)
Nursing leader (NL)	<ul style="list-style-type: none"> • Coordinate and direct nursing team activities • Liaise with the TTL and OT/ICU/DR/Security • Psychological support to the patient's relatives 	Trauma NS/ senior nurse	TNCC/ ATCN certified (desirable)
Nurse A	<ul style="list-style-type: none"> • Airway control, cricoid pressure & C-spine in-line immobilization • Escort patient to the designated care area 	RN/EN	
Nurse B	<ul style="list-style-type: none"> • Cut clothes • Assist in all non-airway procedures • Prepare equipment for transportation • Perform duties as directed by NL 	RN/EN	
Nurse C	<ul style="list-style-type: none"> • Documentation of vital signs, lab results, IV fluid and drug administration • Perform duties as directed by NL 	RN/EN	

Primary Trauma Diversion in Hospital Authority - 4 steps Approach



Trauma Team Response System



N.B.

- ~Senior trauma call may be summoned at any time
- ~Notify senior trauma call for all ICU admission

Calling System for Major Trauma in QMH

Calling Code	111 / 222	Paed – 111 / Pead - 222	TBI	Paed - TBI
Types of patient	Adult Major trauma	major trauma <18years old	Traumatic Brain Injury	Traumatic Brain Injury <18years old
Team Leader	2nd call Surgical MO		1st call Neuro-Surg MO	
	A&E SMO/AC act as Team Leader if 2nd call Surgical MO not ATLS qualified yet			
Members	1st call surgical MO 1st + 2nd call orthopaedic trauma call MO 1st call ANA MO		1st call ANA MO	
	AICU MO	2nd call / PICU MO	AICU MO	2nd call / PICU MO
		2nd call Paed-Surg MO		
	A&E SMO/AC + MO A&E Nurses			

Radiology Service

X-ray taking in the resuscitation room

- Alert the duty radiographer through the public address system or by phone to come immediately to the resuscitation room.
- Move the X-ray tube to the highest possible level in between shots. Return the tube to parking position immediately after each full examination.
- **Resuscitation should continue during X-ray taking.** Hence, trauma Team members are encouraged to put on lead aprons for protection, and have the protective side facing the X-ray tube during X-ray taking.
- Comments by radiologists could be obtained on consultation.
- Early notification of trauma case is required before/during meal breaks.

Emergency Ultrasonography

- Urgent ultrasonography is required to detect free fluids in emergency situations by the Trauma Team. It could reduce or avoid unnecessary diagnostic peritoneal lavage in trauma patients.
- During office hours, the radiologist on duty at K3 ultrasound (Ext. 4320) would be called upon to perform emergency ultrasonography for trauma patients in the Resuscitation Room.
- **Outside office hours, alert the radiographer on duty at the CT suite (Ext. 4643 or thro' Ext. 3005).** The on-call radiologist would be called upon when indicated.

Emergency CT Scan Service

- All trauma call emergency CT will be performed at AED CT on the ground floor of J block. From 9:00 - 23:00, contact AED CT on-duty radiographer (DECT phone 1579). From 23:00 - 9:00, contact AED on-call radiographer (Ext 3005).
- **Trauma Team doctor should accompany the patient during CT scan**, be responsible for patient monitoring, and to obtain first hand CT findings.
- The on-call/on-duty radiologist should be notified for IV contrast injection. The Trauma Team Leader may give IV contrast according to the DDR guidelines if the radiologist does not respond within 5 minutes of being called.
- Comments on urgent CT scan performed outside office hours may be requested through the radiographer on duty.

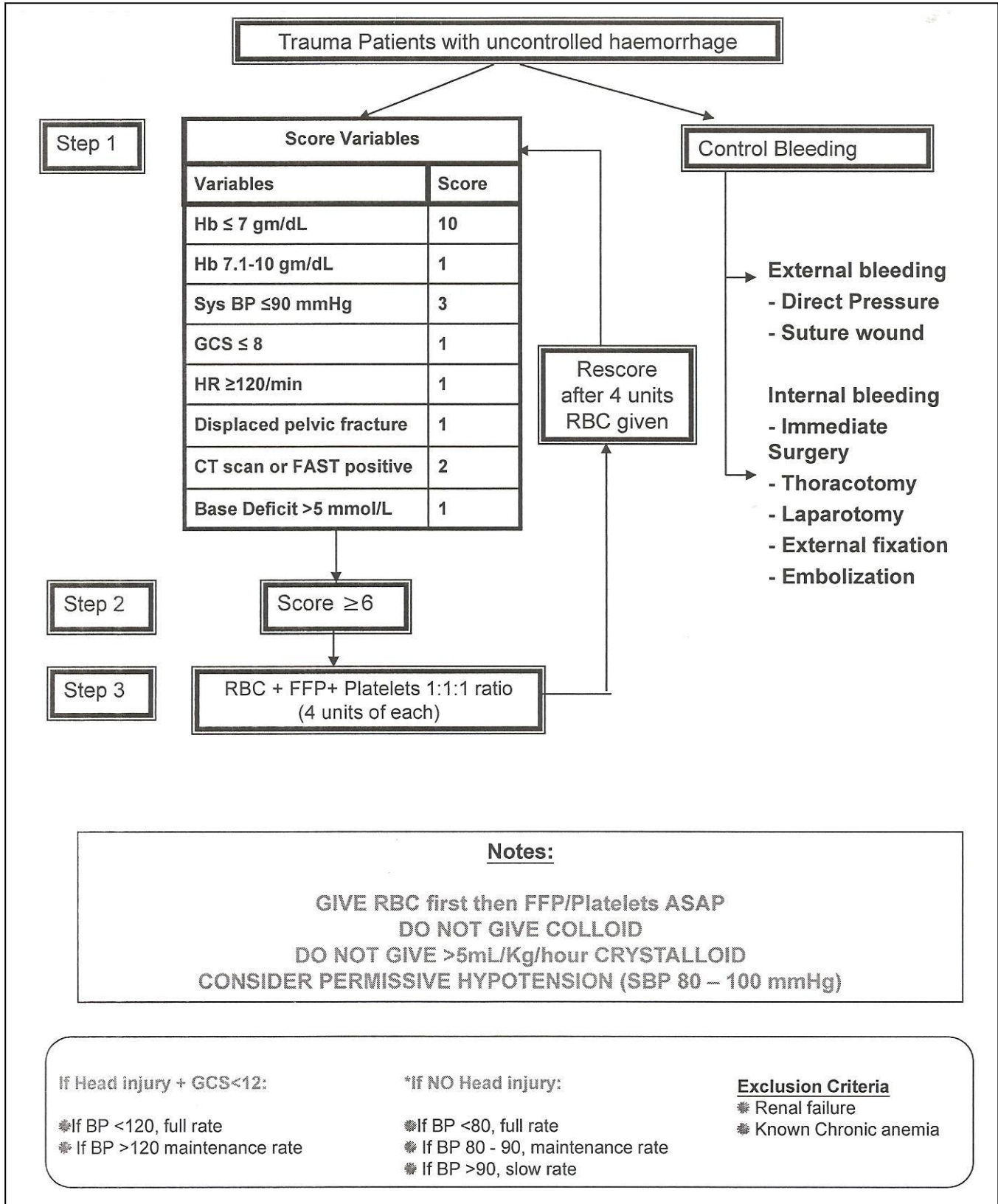
Emergency Angiogram

- During office hours, contact on-duty radiologist at angiogram room (Ext. 4615) for arrangement.
- Outside office hours, contact on-call radiologist at CT suite (Ext. 4643) for arrangement.

NB

- Inform the radiographer i/c for any cancellation.
- Refer to the QMH *'Manual for Clinical and Ward Staff'* for details.

QMH Trauma Transfusion Guidelines



Notes:

GIVE RBC first then FFP/Platelets ASAP
DO NOT GIVE COLLOID
DO NOT GIVE >5mL/Kg/hour CRYSTALLOID
CONSIDER PERMISSIVE HYPOTENSION (SBP 80 – 100 mmHg)

If Head injury + GCS<12:

- ✳ If BP <120, full rate
- ✳ If BP >120 maintenance rate

***If NO Head injury:**

- ✳ If BP <80, full rate
- ✳ If BP 80 - 90, maintenance rate
- ✳ If BP >90, slow rate

Exclusion Criteria

- ✳ Renal failure
- ✳ Known Chronic anemia

Adapted from the recommendation of the Hospital Authority Central Committee (Trauma Service), 2010.

Prothrombin complex concentrate (PCC) therapy for warfarin / new oral anticoagulants (NOAC) associated life-threatening bleeding in A&E

Affix patient's label if available

Patient Name	
Hospital Number	HKID No.
Sex/ Age	Ward/ Bed

Group the case notes from 1 to 5.
Group Special Procedures,
Anaesthetic, etc. in Group 2.

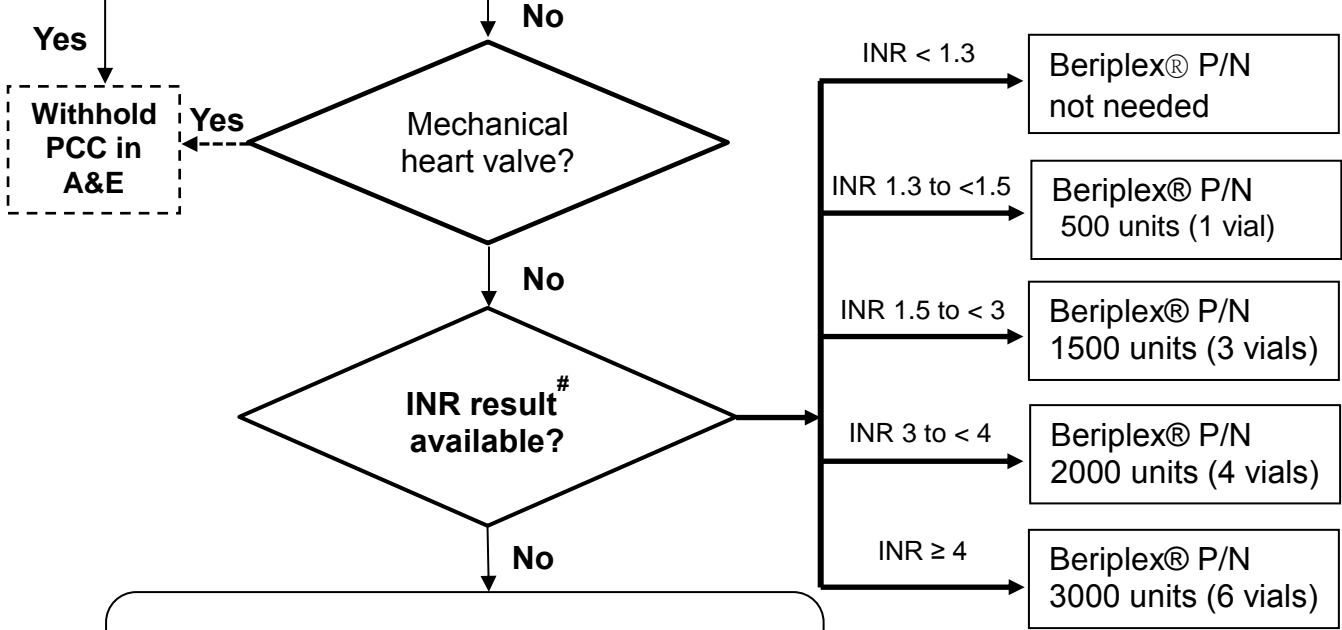
Patient on **Warfarin/ NOAC (other than Dabigatran)** associated life-threatening bleeding (poly-traumatic or non-traumatic)

Patient on **Dabigatran**, administer **Idarucizumab** (see Appendix)(Page 2)

Liaise with Trauma Team / NS / Surgery

Check clotting profile / Arrange FFP

Any contraindications for PCC (e.g. heparin allergy, HIT*, active thrombosis or DIC)



Beriplex® P/N 1000 units (2 vials)
Ordered by Dr. _____@_____:_____

INR result does not apply to NOAC HIT* = Heparin-induced thrombocytopenia

Beriplex® P/N Regime	Start at	Line	Check by	Given by
Administer Beriplex® P/N _____ vials Slow Intravenous injection at approximately 8ml/ min	_____:			
1. GCS after treatment	Refers to Resuscitation Record			
2. BP / P after treatment				

Copy to ward. Keep Original in A&E record.

Prothrombin complex concentrate (PCC) therapy for warfarin / new oral anticoagulants (NOAC) associated

Please refer to <http://hkwc.home/webapps/Dept/HIRO> for details of full version. Prepared by HIRO QMH

Form No.: PRF03111 (Rev. 3:18)
Last revision date: March 2018
Last review date: March 2018
Form owner: AED

Affix patient's label if available Patient Name	
Hospital Number	HKID No.
Sex/ Age	Ward/ Bed

Appendix: use of monoclonal antibody fragment to reverse dabigatran anticoagulant effect

- Specific antidotes for patient on **dabigatran** and having life-threatening bleeding is available
- 2 vials (2.5 gram each vial) of **Idarucizumab** can be mobilized from existing unregistered, named-patient stock for use by A&E
- Order 2 x 2.5 gram **Idarucizumab** vials from S1 Pharmacy (Ext. 5787 / 5775), fill in the pre-printed form and arrange staff to wait for the supply. It will be handled by the pharmacy immediately
- Give 5 grams as intravenous infusion; i.e. 1 vial over 5 mins. x 2
- Fill in the “Named-patient / Non-QMH Drug Request Form” and return to pharmacy for drug replenishment after use

Please refer to <http://hkwc.home.webapps/Dept/HIRO> for details of full version. Prepared by HIRO QMH.

Form No.: PRF03111 (Rev. 8.16)
Last revision date: March 2018
Last review date: March 2018
Form owner: AED

Guidelines for on-call surgical staff:
Acute Management of Facial and Head and Neck Trauma

Facial, Head and Neck Trauma patients are commonly encountered by on-call staff. The division of Plastic & Reconstructive Surgery would like to clarify points about the acute management.

*Facial / Head and Neck Trauma patients can be acutely managed by
the Division of Plastic and Reconstructive Surgery.*

Facial lacerations

1. Patients with facial lacerations admitted to the admission ward should be repaired promptly by the on-site 1st call.
2. The PRS team on call is available to provide support for situations such as:
 - 2.1. Soft tissue loss or severely devitalized and bruised tissue
 - 2.2. Lacerations with exposed ear or nose cartilage
 - 2.3. Deep eyelid lacerations involving the levator mechanism, tarsal plate, lid margin or lacrimal canaliculi
 - 2.4. Young patients that require sedation / GA for suturing
 - 2.5. The on call staff requires guidance on technique.
3. Scalp lacerations can bleed severely and should be repaired immediately

Facial bone fractures

1. Facial bone fractures (including orbital wall and mandibular fractures) are managed and operated on by the Division of Plastic and Reconstructive Surgery.
2. For suspected facial bone fractures, a “CT face, plain, axial + coronal view” is advised. This includes the region from the supraorbital bar (brow area), and includes full view of the mandible. The coronal view is required to visualize the orbital floor and mandibular condylar fractures. A regular CT brain most commonly ceases above the level of the orbital floor and is not adequate to diagnose and plan fracture operations. Likewise, a CT orbit misses the mandible and is inadequate for complete assessment.
3. For multiple trauma, life threatening conditions have priority. However, the following situations may require protection of the airway (by way of intubation or tracheostomy):
 - 3.1. Open mandibular fractures that are bleeding profusely
 - 3.2. Unstable LeFort fractures of the maxilla which may also be bleeding profusely or causing airway obstruction
4. In the severely acute situation, e.g. Trauma Call inside the “R” room at AED, the PRS team should be contacted directly for advice.

Neck trauma

1. For Deep neck lacerations (with or without exposed major vessels), which may require urgent intervention the PRS on-call staff can be contacted for advice.

Dr Gregory Lau, Chief of Residents
On behalf of Dr Jimmy YW Chan,
Division Chief,
Division of Plastic and Reconstructive Surgery

12 March 2018
27 April 2018 (updated)

Drugs used in Rapid Sequence Induction

A) Induction Agents. All agents may drop the BP and cardiac output in major trauma patients. Dosage **must** be decreased if patients are hypovolaemic or in shock. In “modified rapid sequence induction” the agent is titrated till loss of eyelash reflex occurs.

	Haemodynamics stable	Haemodynamics unstable
Etomidate (<i>Hypnovel</i>)	0.2-0.4 mg/kg	0.1-0.2 mg/kg
Midazolam (<i>Dormicum</i>)	0.1-0.3 mg/kg	0.05-0.1 mg/kg

B) Muscle Relaxants. Should only be used by those trained in airway management. Suxamethonium is contraindicated in hyperkalaemia, chronic muscle wasting, paraplegia, recent burns and other conditions. (Consult reference for full list). Rocuronium should be used only if the airway can be secured and suxamethonium is contraindicated.

Suxamethonium (<i>Scoline</i>)	2mg/kg	2mg/kg
Rocuronium (<i>Esmeron</i>)	1mg/kg	1mg/kg

*Other drugs like fentanyl, esmolol, thiopentone, propofol and ketamine may be selected by those trained and familiar with their use.

*Propofol or thiopentone may cause severe hypotension in unfamiliar hands whereas etomidate has good cardiovascular stability. Trauma patients who received etomidate have poorer outcome in some studies, but this is not fully established.

Analgesics for trauma patients in A&E

- Do not neglect pain relief in trauma.
- The attending physician should exercise clinical judgment in individual cases.
- Please consult relevant Specialists for those <2 yr or >70 yr of age, burns and obstetric patients.

Proper assessment

- Resuscitation should have top priority.
- Avoid giving opioids in unconscious patient and take special cautions for those who have airway or breathing problem.
- A proper pain assessment is crucial. Visual analog scale involves asking the patient to assign a number for their pain intensity from 0 (no pain) to 10 (worst imaginable). VRS involves asking the patient to describe their pain from mild, moderate to severe.
- Most trauma pain is related to musculoskeletal, visceral or nerve injury. Watch out for causes not directly related to the trauma such as angina or compartment syndrome.

Choice of analgesics and their contraindications

- Simple measures such as local ice for soft tissue injuries and immobilization for fractures.
- The choice of analgesics depends on the pain severity and contraindications.

1. Paracetamol (for mild to moderate pain, can be given with NSAID or opioids)

Contraindications: Liver disease or injury

Doses: Oral: 20mg/kg stat, then 15mg/kg q4h (max 4g/day)

Rectal: 40mg/kg stat, then 30mg/kg q6h (max 5g/day)

Child: usual daily max dose 90mg/kg for 48hr, then max 60mg/kg/day

2. NSAID (for moderate to severe pain)

Contraindications

1. Age >70 or <2 yr
2. ongoing blood loss or hemodynamic instability
3. GI ulcer, renal disease, asthma, allergy to NSAID, bleeding tendency or use of anticoagulants

Dosages of NSAID

1. Diclofenac (Voltaren)

Adult oral/rectal: 1mg/kg (50mg) q8-12h or SR 100mg daily

Pediatric oral/rectal: 1-2mg/kg/day in divided doses

2. Ketorolac (Toradol injectable)

Adult iv/im: 15mg q6h for 2 days

3. Indomethacin

Adult oral/rectal: 25-50mg tds

Pediatric oral/rectal: 2mg/kg/day

3. Opioids (for moderate to severe pain)

Contraindications

1. Neuro-trauma patients or those with GCS below 13
2. Airway obstruction or respiratory failure
3. Hypotension (<90mmHg for adults) or those hemodynamic instability

Dose of opioids highly variable, must be titrated according to individual responses.

For patients aged >10 and <60 yr

1. Moderate pain: Tramadol 2mg/kg (oral/ iv/ im) q8h
2. Severe pain: Morphine 0.1mg/kg (sc/ im) q4h prn (if not shocked)

Patients aged <10 or >60 yr, chronic renal or hepatic diseases: cut all doses by 50%

Monitoring

- If on strong opioids: 4 hourly SpO₂, BP/P, neurological status and any side effects.
- Resuscitation equipment, medications and personnel should be available.
- Avoid immediate transfer out of A&E after giving strong opioid in case hypotension or apnea develops during transfer. (allow 15 mins of close observation first).

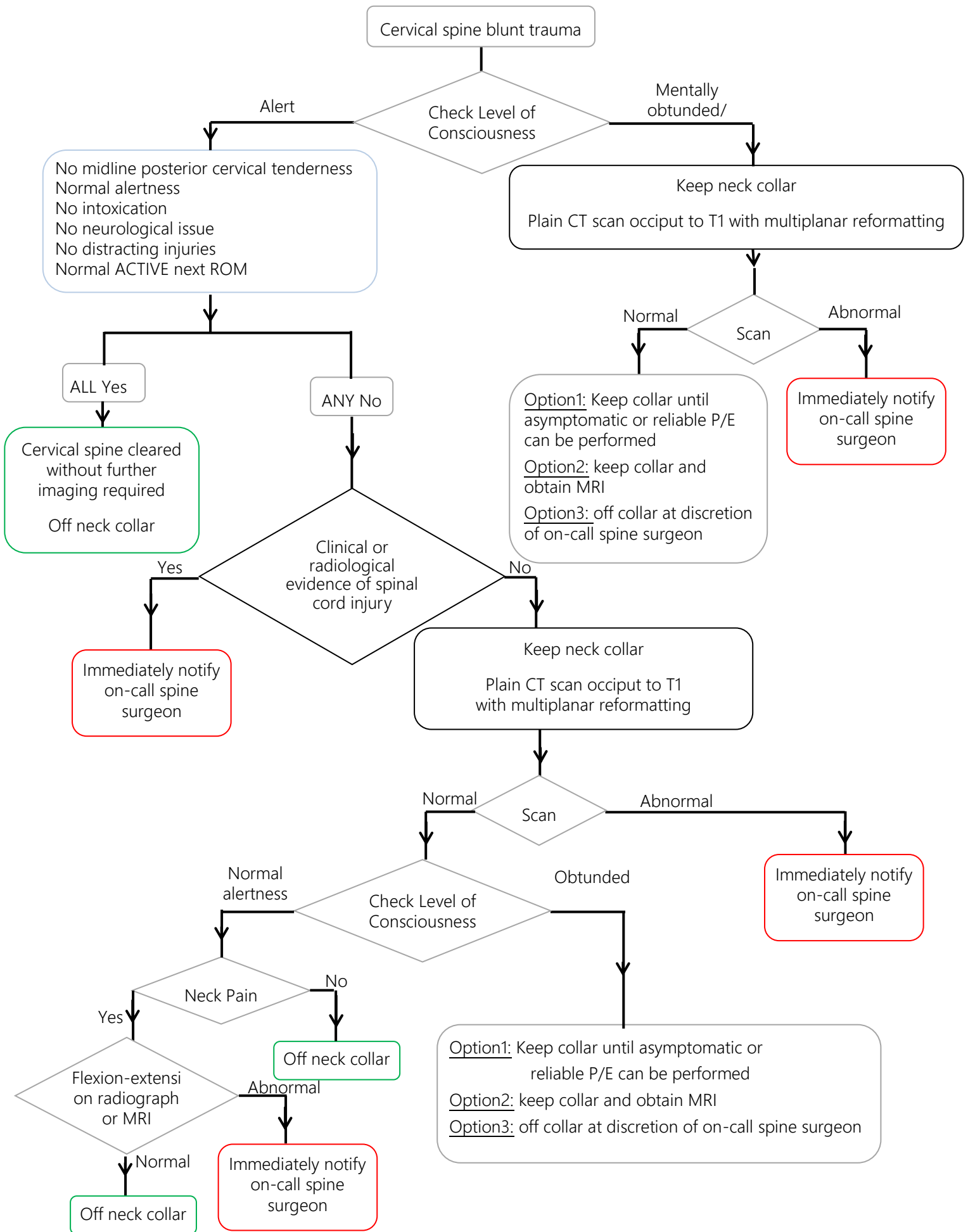
Look out for adverse effects and treat accordingly

- Sedation: stop further sedatives or opioids. Consider Naloxone 0.1mg (iv) bolus if other signs of opioid narcosis develops. Remember ABC: always assess the airway, breathing and circulation. Summon help if needed.
- Hypotension: Review general condition and volume status. Opioids rarely induce hypotension but the reduction in pain can unmask the hypovolaemia. Beware of anaphylaxis.

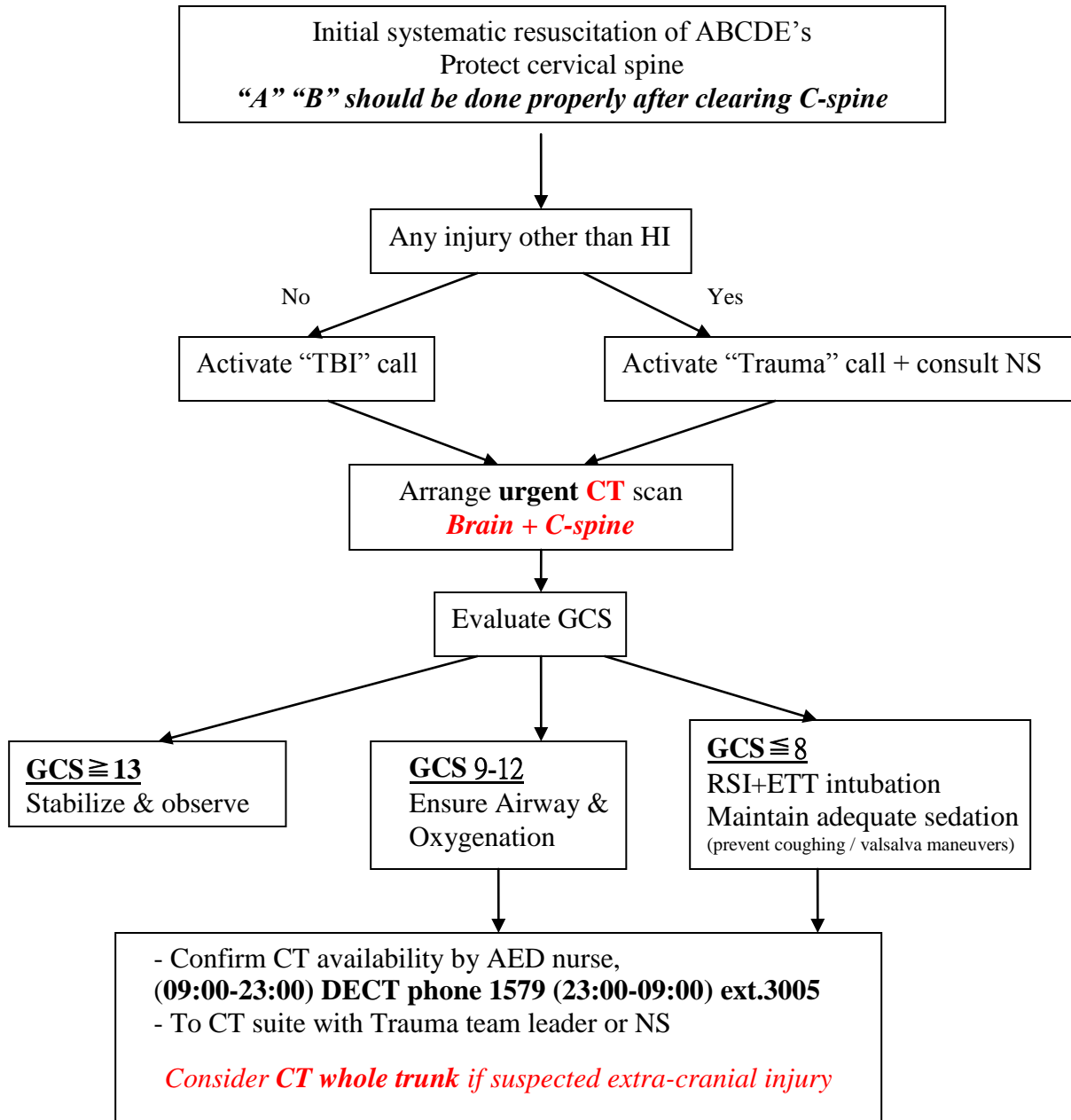
References:

1. Pain management and regional anaesthesia in the trauma patient. Davidson EM et al. Curr Opin Anaesthesiology 2005 Apr; 18(2):169-74
2. Joint Commission on Accreditation of Healthcare Organizations. Comprehensive accreditation manual for hospitals. Chicago, IL: JCAHO; 2001.
3. Drug doses Fourteenth Edition 2008 Collective P/L. Author: Frank Shann
4. Acute trauma pain guideline for the general ward. Trauma advisory Committee, NTE cluster, Hong Kong. Author: MC Chu.

Cervical Spine Clearance



Management for Traumatic Brain Injury



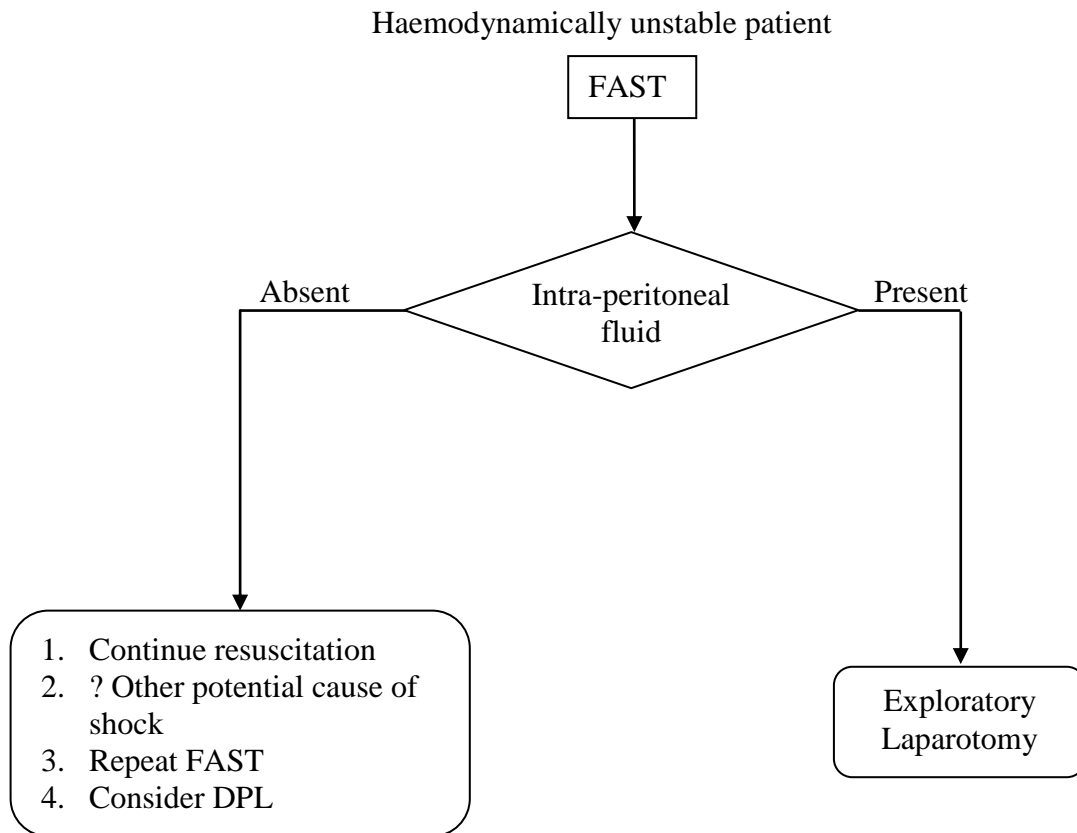
Standard of care for TBI patients

1. Head up 30 degree (keep neck collar unless c-spine cleared)
2. Maintain normal temperature; prevent / treat hypothermia
3. Ventilatory care
 - Prolonged prophylactic hyperventilation with partial pressure of carbon dioxide in arterial blood (PaCO₂) of 25 mm Hg or less is not recommended
 - Keep PaO₂ >60mmHg / 8 kPa
 - Keep PaCO₂ 35-40mmg / 4.5-5.5 kPa
 - Keep SaO₂ >95%
4. Blood pressure control
 - Maintaining SBP at ≥100 mm Hg for patients 50 to 69 years old
 - Maintaining SBP at ≥110 mm Hg or above for patients 15 to 49 or over 70 years old
5. Mannitol 1g/kg (20% 250ml) IV bolus over 30 mins if signs of raise ICP.
 - Not if unstable hemodynamics
6. Phenytoin (Dilantin) 10mg/kg IV infusion over 1 hour
7. Sedation : Midazolam 0.05mg/kg (2-3mg) IV bolus prn for transfer
8. Antibiotics:
 - a. Compound vault fracture
 - Ceftriaxone (Rocephin) 1gm IV Q12H
 - Metronidazole (Flagyl) 500mg IV Q8H
 - b. Skull base fracture with CSF leak
 - Augmentin 1.2gm IV Q8H
9. External ventricular drain
 - Use of CSF drainage to lower ICP in patients with an initial Glasgow Coma Scale (GCS) <6 during the first 12 hours after injury using an antimicrobial catheter

References

1. Guidelines for the Management of Severe Traumatic Brain Injury 2016. 4th Edition
Brain Trauma Foundation

Blunt Abdominal Trauma: Haemodynamically Unstable



FAST: Focused Abdominal Ultrasound for Trauma

DPL: Diagnostic Peritoneal Lavage

The choice of test depends on the Trauma Team experience and individual clinical situation. The clinical condition of transient responder may vary, the use of other investigations such as CT scan should be considered individually

References:

1. Eastern Association for the Surgery of Trauma Practice Management Guidelines
2. Washington State Department of Health Community Health System Office
3. Definitive Surgical Trauma Care Course Materials

Blunt Abdominal Trauma: Haemodynamically Stable

Haemodynamically stable patient

