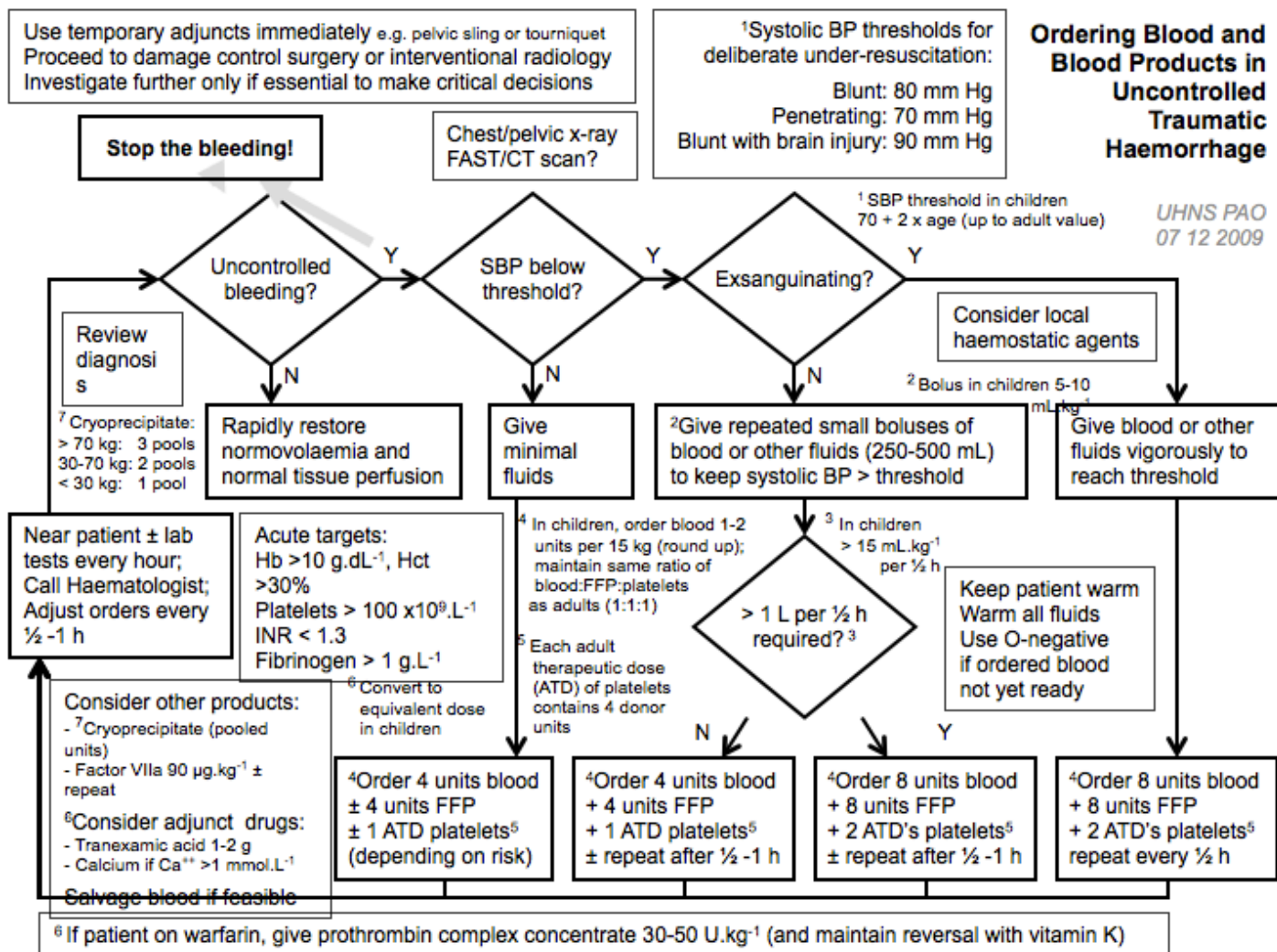


## Ordering Blood and Blood Products in Uncontrolled Traumatic Haemorrhage

UHNS PAO  
07 12 2009



### FURTHER INVESTIGATIONS

Rapidly confirm (or exclude) uncontrolled bleeding (e.g. using immediate chest x-ray, pelvic x-ray and FAST scan), so that permissive hypotension (deliberate under-resuscitation) is not applied inappropriately. Consider further investigations only if feasible and necessary – there may not be time and the patient may be too sick. In specific circumstances, under senior control, it may be appropriate to undergo rapid CT scan while still shocked. If not responding, reconsider the cause of shock (e.g. tamponade) or the source of bleeding (e.g. retroperitoneal). Obtain blood for near-patient testing (e.g. blood gas, TEG) and laboratory tests (e.g. FBC, INR, APTT, fibrinogen) hourly.

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### PHYSICALLY STOPPING THE BLEEDING

Alert and mobilise surgical, anaesthetic and/or interventional radiology teams immediately. Employ immediate, temporary measures to help reduce bleeding (e.g. pelvic sling, tourniquet). Transfer the patient to the Operating Theatre or Radiology Intervention Suite.

### CORRECTING/PREVENTING COAGULOPATHY AND GENERAL SUPPORTIVE MEASURES

Keep the patient warm. Warm all intravenous blood and fluids. Give blood and other intravenous fluids in aliquots of 250-500 mL if SBP is below threshold. (80 mmHg in blunt trauma; 90 mmHg in blunt trauma with a serious head injury; 70 mmHg in penetrating trauma). Give units of blood, FFP and platelets in the ratio 1:1:1. Note that 1 Adult Therapeutic Dose (ATD) of platelets contains 4 donor units. Consider O-Rhesus negative blood if type-specific or cross-matched is not yet available. Consider blood salvage. Consider deliberate hypotension in contained major arterial disruption. Give prothrombin complex concentrate if the patient is on warfarin and serious bleeding has been confirmed. Also give vitamin K to maintain reversal. Consider activated factor VII and tranexamic acid in specific situations. As soon as the haemorrhage stops and haemodynamic control has been regained (or if the situation becomes futile), abort unnecessary requests in progress and return surplus blood or products.

Apply uncontrolled bleeding targets: Hb > 10 g.dL<sup>-1</sup> or haematocrit > 30%, platelets > 100 x10<sup>9</sup>.L<sup>-1</sup>, INR and APTT < 1.3, fibrinogen > 1 g.L<sup>-1</sup>, ionised calcium > 1 mmol.L<sup>-1</sup>. When bleeding is controlled, give iv fluids more liberally to restore tissue perfusion and achieve a lactate of < 2 g.L<sup>-1</sup>. When further bleeding is no longer a high risk, accept Hb > 7, platelets > 30, INR and APTT < 1.5.

### MODIFICATION IN CHILDREN

General systolic blood pressure threshold for permissive hypotension  $70 + 2 \times \text{age}$  (up to adult value)

Bolus in permissive hypotension 5-10 mL.kg<sup>-1</sup>

If blood or other fluid replacement needs to maintain SBP at threshold is less than 15 mL.kg<sup>-1</sup> per ½ h, then order 1 unit per 15 kg (rounded up) of blood, FFP and platelet donor units

If more than 15 mL.kg<sup>-1</sup> per ½ h are needed, then order 2 units per 15 kg of blood, FFP and platelet donor units

Haemodynamic State	Blood (/R1)	FFP (/E5)	Platelets (/P4)	Repeat or give extra products at ½ - 1 h intervals
No shock but evidence of uncontrolled bleeding	4 units	± 4 units	Make available in Blood Bank	(Use to meet near-patient or laboratory test targets)
Shock but blood pressure above threshold	4 units	4 units	± 1 ATD = 4 donor units	(Request more to meet near-patient or laboratory test targets)
Shock needing < 1L per ½ hr to keep above threshold	4 units	4 units	1 ATD = 4 donor units	Request repeat every ½ - 1 hour
Shock needing > 1L per ½ hr to keep above threshold	8 units	8 units	2 ATD's = 8 donor units	Request repeat every ½ - 1 hour
Exsanguinating	8 units	8 units	2 ATD's = 8 donor units	Automatically repeat every ½ hour + cryo (C4) + factor VIIa