Goal-directed coagulation and transfusion algorithm of the Institute of Anesthesiology, Kantonsspital Lucerne

Basic conditions:
**Volume:** Fluid therapy with balanced crystalloid solution (balanced Gelatin solution may be considered)
**Always:** Temperature ≥ 35°C + pH ≥ 7.2 + Ionized Calcium ≥ 1.15mmol/L + Hematocrit ≥ 0.21
**Patient history:** something known about medication or coagulation disorders? Consider Desmopressin 0.3µg/kg in case of platelet-inhibitors intake. Antagonize heparin with protamine 1:1.

Diffuse microvascular bleeding (> 50% Bloodvolume):

- **Extem spindle-shaped + Apter normal:** Hyperfibrinolysis → 2g Tranexamic acid (15-30mg/kg)
- **Fibtem-MCF ≤ 7mm:** 1-2g Fibrinogen (max. 3x2g, after that factor XIII 15U/kg); Target value: MCF ≥ 7mm (fibrinogen ≥1.5-2.0 g/L)

Laboratory:
Hematocrit, platelet count, prothrombin time, INR, activated partial thromboplastin time, fibrinogen concentration, Rotem (Extem, Intem, Fibtem, Apter), factor XIII, Anti-Xa, thrombin time

Ongoing bleeding (5-10 Liters)

- **Extem/Intem:** CT prolonged (Extem >80s, Intem >240s): Prothrombin complex concentrate 500-2'000U (according to bodyweight and INR)
- **Extem/Intem:** CT normal (Extem <80s, Intem <240s) + MCF <40mm: Factor XIII 1250U (15U/kg) if Fibtem-MCF stays ≤ 7mm despite fibrinogen administration. Target value factor XIII ≥ 60% (if ≤ 40% → 20U/kg / if ≤ 50% → 15U/kg). Further administration of fibrinogen, as long as Fibtem-MCF ≤ 7mm
- **Extem/Intem:** MCF < 40mm although Fibtem-MCF >10mm + Tc < 50'000/mm³: 1 Platelet concentrate

Other potential measures:
Arterial ligation, cloths compression, aorta clamping, embolization, hysterectomy

Further ongoing bleeding (>10 Liters)

- **FFP:** 15ml/kg (∼ 4U) → for faktors XI and V
- If prognosis isn't infaust and temperature, pH, platelet count and fibrinogen target-values are achieved: rFVIIa: 90µg/kg (≈ 7.2mg) – once repeatable after 30min.
- If further ongoing diffuse bleeding, contemplate von Willebrand factor concentrate 2000U (20-30U/kg factor VIII)

**Trauma patient (age <50yrs + not infaust prognosis + Temperature >35°C + diffuse bleeding) or uterine atony** (Extem-MCF <25mm + Fibtem-MCF <4mm + Extem-CT >90s or at the extreme, possible to give without laboratory):
2g Tranexamic acid + 4g Fibrinogen + 1'000U Prothrombin complex concentrate + 4 erythrocytes concentrates (blood group 0 negative) + 1250U factor XIII