# Targeted Hemostasis Guidance and Blood Management in the Bleeding Patient

## What You Need to Know

This guideline is developed to treat the hemodynamically stable bleeding patient who is not in hemorrhagic shock, liver transplant patients and cardiac surgery patients, how to respond to ROTEM values, and guide hemostasis management.

## Blood Conservation

- Transfusion Therapy: Indications for Ordering
- Lab ordering should be assessed daily and limited as able
  - Hospital acquired anemia has been demonstrated in ~20-30% of patients[1,2]
  - Average daily blood volume lost due to phlebotomy in the ICU is estimated at 40 mL.[3]
- Use of O negative blood should be limited to patients without an available type and screen. A type and screen should be ordered as soon as possible, and transfusion should be switched once appropriate.

## Patient Blood Management Strategies

### Anemia Management in the Critically Ill Patient

- In the absence of active bleeding, PRBCs should only be ordered 1 unit at a time and response reassessed prior to ordering of additional units.
- Empiric use of folic acid 1 mg daily and cyanocobalamin 100 mcg daily is recommended.
  - Oral route is preferred when appropriate.[4,5]

| Symptomatic Anemia | Asymptomatic Anemia |
|---|---|
| • No hemoglobin threshold exists in the setting of symptomatic, otherwise unexplained anemia. If patient is actively bleeding refer to Appendices A, B or C. | • Only consider the need for transfusion if hemoglobin is less than 7 g/dL.<br>• Transfusion should not be solely based on hemoglobin level in patients who are asymptomatic |

- Screening for **iron deficiency anemia** in patients without active infection and hemoglobin < 10 g/L should be considered.
- Replace with IV iron or ferrous gluconate 650 mg TID in patients with ferritin < 800 and transferrin saturation < 50% ([serum iron/TIBC] x 100).
  - Iron received from blood products should be considered when replacing with IV iron.
    - 1 unit of PRBCs contains approximately 250 mg of elemental iron.
  - Patients with ESRD
    - Assess iron studies and replace if indicated per Iron Management Guideline for Chronic Kidney Disease Patients
    - Discuss erythropoietin stimulating therapy with nephrology early

### Thrombocytopenia Management

- In the absence of active bleeding, platelets should only be ordered as 1 unit at a time and response reassessed prior to ordering of additional units.
- Empiric transfusion in the absence of active bleeding is not recommended if platelets are > 10,000 u/L
- Platelet transfusion should be considered if platelets are < 10,000 u/L

## Considerations for Patients with Significant Bleeding

The following fundamentals should be addressed for a patient with significant bleeding to optimize effectiveness of intrinsic coagulation and adjunct agent use

- Achieve normal body temperature
- Correct severe acid-base disturbances
- Aggressively replace ionized calcium
- Correct any overt or underlying causes of hemorrhage as able (e.g., discontinuation or reversal of contributing medications, or correction of a surgical bleed)

### Reversal of anticoagulation if applicable

- Anticoagulation Reversal: Unfractionated Heparin (UFH) and Low Molecular Weight Heparin (LMWH)
- Warfarin management of Elevated INR and Reversal
- Anticoagulation Reversal: Factor Xa Inhibitors – Rivaroxaban (Xarelto®), Apixaban (Eliquis®), Edoxaban (Savaysa®)
- Anticoagulation Reversal: Dabigatran

### ROTEM

**Consider a targeted transfusion approach for resuscitation with ROTEM as needed for the hemodynamically stable patient**

- Refer to **Appendix A** for transfusion guidance **excluding** cardiac surgery and patients undergoing liver transplant
- Refer to **Appendix B** for transfusion guidance in patients undergoing cardiac surgery
- Refer to **Appendix C** for transfusion guidance in patients undergoing liver transplant
- Due to short stability, factor products should be ordered as STAT immediately prior to intended use

### Trauma Specific Considerations

- Consider use of tranexamic acid 1g bolus followed by 1g infusion over 8 hours in patients presenting within 3 hours of injury
- A type and screen should be sent as soon as possible to avoid unnecessary use of O negative blood
- Utilize hemorrhage control adjuncts whenever possible

**Abbreviations:**

**CT** – Clotting Time
**DDAVP –** Desmopressin
**FFP** – Fresh Frozen Plasma
**Hgb** – Hemoglobin
**INR** – International Normalized Ratio
**MCF** – Maximum Clot Firmness
**MTP** – Massive Transfusion Protocol
**Plt** – Platelet
**PRBC** – Packed Red Blood Cells
**PTT** – Partial Thromboplastin Time
**TRALI** – Transfusion Related Acute Lung Injury

## References


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## OSUWMC Resources

- Transfusion Therapy: Indications for Ordering Guideline
- Massive transfusion protocol
- Anticoagulation Reversal Guidelines

## Quality Measures

- Number of blood products used

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## Guideline Approved

[Approval Date] First Edition.

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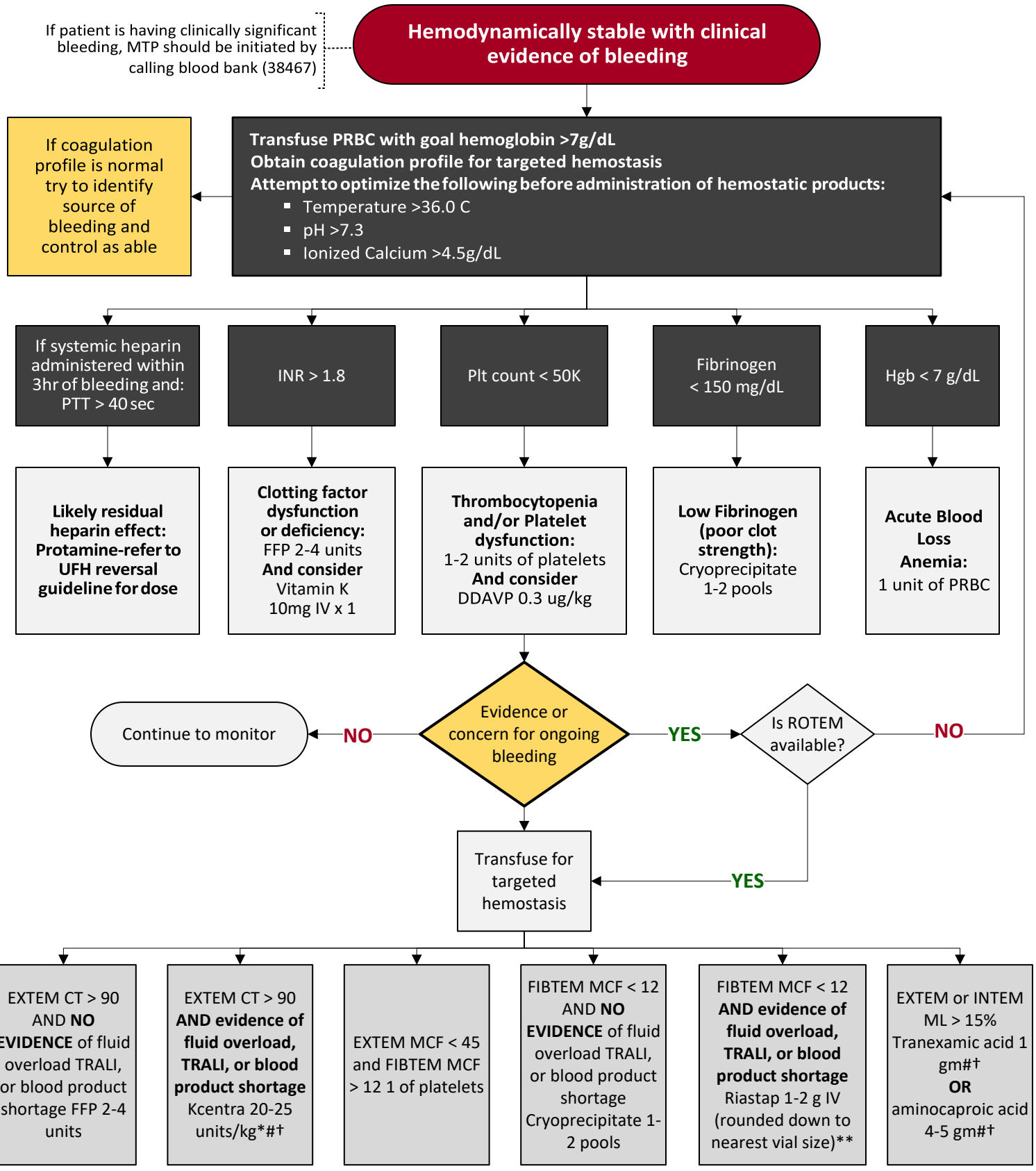
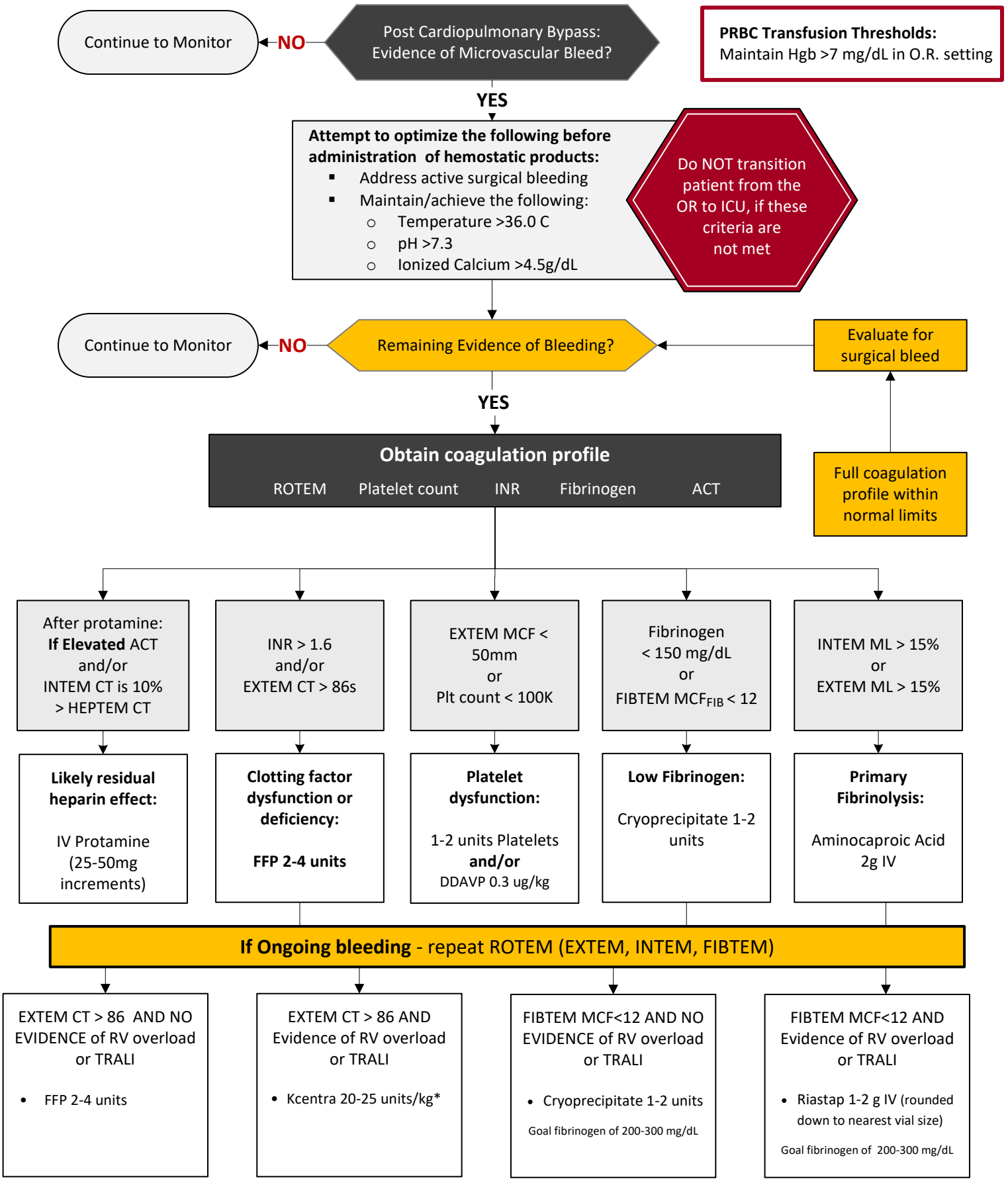
## Appendix A: Targeted Hemostasis Guidance




* Dosing of factor products should be based upon actual weight. Max single dose of 2500 units with daily max of 5000 units
**One gram of Riastap correlates to roughly 1 pool of cryoprecipitate
# Patients with disseminated intravascular coagulation (DIC), use of prothrombin complex concentrate (PCC), tranexamic acid, aminocaproic acid and recombinant factor VII should be avoided
†Attending approval required for the administration of PCC or antifibrinolytic for patients on mechanical circulatory support

## Appendix B: Intraoperative Hemostasis and Transfusion Guidance for Cardiac Surgery




* Dosing of factor products should be based upon **Actual Body Weight** up to but not exceeding 100kg and rounded ***down*** to the nearest vial size

## Appendix C: Transfusion for Liver Transplant