# Joint Theater Trauma System (JTTS)
# Clinical Practice Guideline: Use of Recombinant Factor VIIa (rFVIIa)

1) Background: The most critically injured casualties present hypothermic (T<96°F) acidemic (BD < -6) and with a coagulopathy (INR > 1.5). All three conditions contribute to worsening bleeding. Interventions aimed at reversing the coagulopathy starting as soon after arrival as possible may improve survival.

2) Recombinant factor VIIa is FDA approved for use during critical bleeding or surgery in hemophilic patients with inhibitors to Factor VIII or IX. In a recent prospective randomized human trauma study, rFVIIa has been shown to be safe and decrease transfusion requirements in humans with life-threatening hemorrhage, including patients with hypothermia (30-33 degrees centigrade, pH > 7.1). However rFVIIa is 90% inactivated in patients with profound acidosis (pH < 7.1). In the forward surgical setting, rFVIIa should be considered for administration in patients that are
    a. hypotensive from blood loss
    b. have a base deficit > 6
    c. hypothermic (T<96°F)
    d. coagulopathic (clinically or an INR > 1.5)
    e. require damage control maneuvers
    f. require fresh whole blood
    g.. anticipated and actual transfusion of > 4 units of PRBC's

3) Mechanism: Recombinant factor VIIa is activated in combination with tissue factor at sites of endothelial injury. High doses of factor VIIa result in the accelerated generation of thrombin. The resulting clots are stronger and more resistant to fibrinolysis than normal clots. The potential effectiveness of rFVIIa degrades with time in the patient with poorly controlled hemorrhage due to fibrinogen, platelet and coagulation factor consumption and dilution. These patients may require clotting factors and platelet supplementation prior to administration of factor VIIa. In the forward surgical setting this supplementation is available by the early administration of fresh whole blood followed by rFVIIa.

4) Guidelines for administration:

    a) Indication for use (Patient exhibits one or more of the following):
        i) hypotensive from blood loss
        ii) have a base deficit > 6
        iii) have Coagulopathic bleeding or an INR > 1.5
        iv) require damage control maneuvers
        v) require fresh whole blood
        vi) anticipated and actual transfusion of > 4 units of PRBC's
        vii) Difficult to control bleeding associated with hypothermia (<96°F)
        viii) Anticipated significant operative hemorrhage.

    b) Protocol for use

i) Infuse rFVIIa at dose of 120 mcg/kg IV push.
ii) If coagulopathic bleeding continues 20 minutes after infusion
(1) Administer 2 additional units fresh whole blood or 4 units FFP, 10 pack cry and 6 pack platelets
(2) Redose rFVIa 120 mcg/kg rFVIIa IV push.

c) Administration Limits
i) 3 doses within a 6 hour period.
ii) If bleeding persists after 3 doses there should be attention to conservation of resources. Consult the senior surgeon at the MTF before administering more rFVIIa.

5) Storage:

a) Refrigeration at 4 degrees centigrade (range 2-8 degrees centigrade).
b) Reconstitution is with sterile water for injection at room temperature.
c) The reconstituted solution may be used up to 24 hours after reconstitution.

6) Relative Contraindications:
a) Patients with known atherosclerotic disease

7) Absolute Contraindications:
a) None

**References:**

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Novoseven Coagulation Factor VIIa (Recombinant) package insert. Novo Nordisk Pharmaceuticals Inc.