Bon Secours Richmond Dept. of Pharmacy Fondaparinux Pharmacokinetic Dosing Service

Patient_____ **MR#**_____ **Room#**_____
Physician_____ **Admission Date** _____
Drug_____
Age_____ **Gender: M / F Height**_____ **LBW**_____ **Actual Weight**_____ **DosingWt.** _____
Allergies_____
Treatment Indication_____
Other Diagnoses _____
PMH_____
Surgeries this adm._____
Clinical Outcome: DVT/PE improved - Yes / No VTE occurred after start of therapy – Yes / No
Major Bleeding - Yes / No Adverse Drug Reaction - Yes / No
Definition of Major Bleeding: fatal, retroperitoneal, intracranial, involves any critical organ, requires 2 units of blood, Hgb drop of 2 g/dl or more

Causes of decreased creatinine production: chronically bedridden/ debilitated / quadraplegia / muscular dystrophy / liver disease/ malnutrition
Causes of increased creatinine production: exercise enthusiast Lab interference with creatinine assay (false positive): cefoxitin, cefotetan

Date							
Dose (mg)							
Dose (mg/kg)							
Interval (hr)							
Admin Times (verify that dose was given)							
Serum Creatinine							
BUN							
CrCl estimate (ml/min)							
Other anticoagulants or antiplatelet Dose/route/start & stop date							
T1/2 (hr) estimate / actual							
Predicted midpoint level							
Measured midpoint level & Time Drawn							
Weight							
Hgb							
Platelets							
Transfusions							
Fresh Frozen Plasma							
Factor VIIa							
Pharmacotherapy Notes **Please order a fondaparinux anti-Xa level 12 hours after the third dose.**							
Initials							

Initial Dosing

1. Calculate the patient's lean body weight.
   Males (kg) = 50 kg + 2.3 (height in inches > 60 inches)
   Female (kg) = 45.5 kg +2.3 (height in inches > 60 inches)

2. Calculate the patient's individualized creatinine clearance (ml/min).
   Males = $\frac{\text{(140-age) x (Lean body weight or actual weight which ever is less)}}{\text{Scr mg/dl x 72}}$
   Females = 0.85 x above
   - Patients will not receive fondaparinux unless a recent serum creatinine has been determined and the calculated creatinine clearance calculated.
   - Fondaparinux prophylaxis should not be given to patients weighing < 50 kg following orthopedic surgery.
   - Fondaparinux is contraindicated in patients with bacterial endocarditis
   - Patients receiving fondaparinux will have a serum creatinine and BUN determined every other day during therapy.

3. Using the Fondaparinux Dosing Chart Based on Dosing Weight select a daily maintenance dose based on the patients creatinine clearance and dosing weight. The goal 12 hour post dose level is 1 mcg/ml. The doses in the chart have been rounded to the nearest 0.625 mg (0.05ml) as this is a measurable dose/volume in a 1 ml or 3 ml syringe. Dosing weight is lean body weight or actual weight which ever is less.

DO NOT USE DAILY DOSES ABOVE 10 mg WITHOUT FONDAPARINUX ANTI-Xa LEVELS TO CONFIRM THE NEED FOR HIGHER DOSES.

OR

4. Using the Fondaparinux Dosing Chart Based on Levels, find the patient's creatinine clearance on the chart. Go down the column under the patient's creatinine clearance, changing the mg/kg dose, until you find a 12 hour post dose level of approximately 1 mcg/ml. The daily dose in mg/kg is in the first column of the row. Calculate the mg dose= Lean Body Weight * dose (mg/kg). Round the dose to the nearest 0.625 mg (0.05ml) as this is a measurable dose/volume in a 1 ml or 3 ml syringe.

0.625	1.25	1.875	2.5	3.125	3.75	4.375	5	5.625	6.25	6.875	7.5	8.125	8.75	9.375	10

DO NOT USE DAILY DOSES ABOVE 10 mg WITHOUT FONDAPARINUX ANTI-Xa LEVELS TO CONFIRM THE NEED FOR HIGHER DOSES.

5. Record the following on the kinetic monitoring form: dosage in mg/kg of lean body weight, calculated creatinine clearance, patient's age, actual weight, lean body weight, height, treatment indication, renal function monitoring parameters (serum creatinine, BUN), Hgb, platelets, transfusions, fresh frozen plasma, factor VIIa, bleeding, VTE . Please return all monitoring forms to me so I may analyze the data.

6. All patients are to have a 12 hour post dose fondaparinux anti-Xa level drawn after 3 doses. Blood should be drawn in a blue top tube (sodium citrate). The order in invision is a heparin anti-Xa level. Fondaparinux should be noted on the order/sample as the generic order can also apply to heparin or enoxaparin. This data will be analyzed for future refinements in the dosing protocol.

Retrospective Dosing: Dosage Adjustments Using Steady State 12 Hour Post Dose Fondaparinux Anti-Xa Serum Levels

1. Use the Fondaparinux Dosing Chart Based on Levels. Find the patient's current dosage (mg/kg) row on the chart. Go across the row until you find the column with the closest level to the patient's actual level.

2. Now go up or down this column and select a dose that gives a 12 hour post dose level of approximately 1 mcg/ml. Look across the row to the left to determine the dosage in mg/kg of LBW. Calculate the mg dose = Dosing Weight * dose (mg/kg). Round the dose to the nearest 0.625 mg (0.05ml) as this is a measurable dose/volume in a 1 ml or 3 ml syringe.

0.625	1.25	1.875	2.5	3.125	3.75	4.375	5	5.625	6.25	6.875	7.5	8.125	8.75	9.375	10

How the Chart Works

1. The chart predicts steady state fondaparinux levels using standard one compartment pharmacokinetic equations and pharmacokinetic information from the package insert.

$$C_{\text{12 hour post dose steady state}} = \frac{Dose_{mg/kg}\,(1-e^{-KT'})\,e^{-K(12-T')}}{Vd_{0.1l/kg}\,K\,T'\,(1-e^{-K\,Tau})}$$

$K = 0.0002\,(Clcr_{individualized}) + 0.0175$

Vd = 0.1 l/kg (lean body weight)
T' = 2, as the peak is 2 hours post subcutaneous dose

2. As you move across a row to the right the creatinine clearance decreases along with the calculated K, which causes the predicted level to increase.

3. As you move down a column, decrease the dose (mg/kg), the predicted trough decreases.

4. The midpoint level is affected by the clearance. The peak is mainly determined by Vd. Using the midpoint level, the K (or Cl) is varied until the predicted level converges on the actual level. This is what you are doing when moving across a dose (mg/kg) row until you get as close as possible to the actual level. Once the K (or Cl) is known the dosage (mg/kg) may be changed to achieve the desired 12 hour post dose level.