

Procedure for anticoagulation with **Heparin**  
For patients with an **IMPELLA Device** (but NOT on ECMO)

1. An ACT will be obtained at the end of the procedure in the cath lab or the operating room. If the ACT is subtherapeutic (defined as an ACT less than 250 seconds on heparin or less than 300 seconds on bivalirudin), the patient will receive a heparin bolus of 30 units/kg IVP (5000 unit maximum) prior to transfer.
2. Upon notification of IMPELLA patient admission, the IMPELLA heparinized purge (heparin 25,000 units in 500 mL D5W) will be ordered via the IMPELLA heparinized purge Care Set.
3. For **Left-sided** Impella: When the patient arrives in the CCU or CTICU, the nurse will immediately switch the IMPELLA pump to "Standard Configuration" which sets the P-level to a more stable (usually lower) purge rate. A normal saline pressure bag is administered through the red sidearm of the device. As soon as the heparinized purge is received from pharmacy, it will replace the non-heparinized purge solution flowing through the IMPELLA pump (yellow sidearm). (Please note: Only dextrose solutions may be used as a purge solution in the IMPELLA pump; solutions containing sodium chloride will damage the pump). For **Right-sided** Impella: the pump does not get switched to standard configuration.
4. The "Heparin for Impella Pump PowerPlan" will be ordered when the hourly purge rate is known.
5. The systemic heparin infusion of 25,000 units/250 mL D5W (or in 250 mL 0.45 % sodium chloride if D5W premixed infusion is unavailable) will be started at an initial combined (purge plus systemic heparin) rate of 12 units/kg/hr (based on actual body weight). In other words, the systemic heparin infusion will be started at a rate of 12 units/kg/hr **minus** the hourly volume of the IMPELLA purge. The hourly rate of the IMPELLA purge must be estimated from the past 30 minutes of purge flow in ml/hr. (It is assumed that the hourly volume of the plain D5 purge will be the same as the hourly volume of the heparin purge solution when it is initiated, therefore the hourly rate of the plain solution can be used to estimate the amount of heparin that will be contributed by the heparin purge.) The starting rate of the combined total amount of heparin infusion (purge heparin plus the systemic heparin) will be capped off at a maximum of 1800 units/hr, as an initial rate. The systemic heparin will be adjusted to achieve anticoagulation goals.
6. Please note: if the heparin purge delivers 12 units/kg/hr or more of heparin, the systemic infusion is held initially. It will only be started if the aPTT after 4 hours on the heparin purge is subtherapeutic.
7. In cases where the purge solution itself results in the administration of an amount of heparin that exceeds 12 units per kg, a half strength purge will be ordered (heparin 12,500 units/500 mL D5W). If this half-concentration solution then results in a subtherapeutic aPTT, the "Heparin for Impella Pump PowerPlan" will be ordered to supplement the heparin purge, with the prescriber ordering a systemic rate that takes the amount of heparin infused from the purge solution into consideration. (Subtract the amount of purge solution heparin being administered from the total combined amount of heparin to be ordered to determine the systemic heparin rate.).
8. Once the infusions have been infusing at a rate that delivers 12 units/kg for 4 hours, an aPTT will be drawn. These results will be used to adjust the systemic heparin as per the "Heparin for IMPELLA Pump PowerPlan" nomogram. The nomogram will be used thereafter to adjust the heparin. All aPTTs that are below 64 seconds or above 130 seconds will be reported to the CCU or CTICU fellow by the RN. All subtherapeutic aPTTs will be reported to the attending interventionalist by the RN.
9. The IMPELLA purge rate is not expected to vary substantially. However if the purge volume per hour changes significantly (if the rate doubles or halves), notify the interventionalist fellow or attending for the CCU and the surgeon or PA for CTICU. The systemic heparin infusion may need to be adjusted accordingly.



PH2C598

Stony Brook  
Medicine

Stony Brook, NY 11794

## IV SYSTEMIC HEPARIN ORDER SHEET

### For patients with an Impella IMPELLA PUMP (Downtime)

#### SECTION 1: Initiation of Heparin Protocol (Systemic Heparin in combination with purge)

To initiate the following orders:

- Specify patient's weight
- Calculate bolus
- Calculate initial maintenance rate
- Time, date and sign at bottom

**PATIENT WEIGHT = \_\_\_\_\_ kg**  
(Actual body weight)

**BEGIN PROTOCOL**

#### SECTION 2: Protocol Steps

Calculate bolus of 60 units/kg using 1000 units/mL heparin to be used in adjustment nomogram below.

**Bolus dose\* calculation:**

**60 units X \_\_\_\_\_ kg = \_\_\_\_\_ units**  
Maximum 5,000 units  
(round to nearest 100 units)

**Infusion** (choose one box below):

**Heparin 25,000 units in 250 mL D5W at 12 units/kg/hr** (total combined rate which includes this systemic heparin infusion rate plus hourly IMPELLA purge)

or

**Heparin 25,000 units in 250 mL 0.45% sodium chloride at 12 units/kg/hr** (total combined rate which includes this systemic heparin infusion rate plus hourly IMPELLA purge)

- Calculate initial infusion rate: **12 units/kg X \_\_\_\_\_ kg = \_\_\_\_\_ units/hr** (combined rate) (1800 max\*\*) then subtract IMPELLA purge rate: \_\_\_\_\_ mL/hr x 50 = \_\_\_\_\_ units/hr (IMPELLA purge)  
(Purge rate is determined retrospectively; use the volume that infused through the pump in the past hour.)

Systemic Heparin Infusion Rate (subtract purge rate from the combined rate) = \_\_\_\_\_ **units/hr**

*\*\*Do not exceed the maximum of 1800 units/hr combined rates as the initial infusion rate (round final rate to the nearest 50 units.)  
Purge rate calculation assumes pump use of 50 unit/mL heparin*

- Platelets Every 48 hours
- Draw aPTT 4 hours after start of heparin infusion(s) and then as indicated by adjustment nomogram below:

aPTT (seconds)	Special Instructions	Infusion	Next aPTT
< 43	Bolus with full bolus as calculated and inform fellow	Increase rate by 100 units/hr	6 hrs
43-64	Bolus with half the bolus calculated above (max 2500 units) and inform interventional attending & fellow	Increase rate by 50 units/hr	6 hrs
<b>65-85</b>		<b>No change</b>	6 hrs
86-100		Decrease rate by 50 units/hr	6 hrs
101-130		Decrease rate by 100 units/hr	6 hrs
131-160	Hold infusion 1 hour and inform the fellow	Decrease rate by 150 units/hr	6 hrs
161-190	Hold infusion 1 hour and inform the fellow	Decrease rate by 200 units/hr	6 hrs
> 190	Hold infusion 1 1/2 hour and inform the fellow	Decrease rate by 200 units/hr	6 hrs

**Physician/LIP/PA Signature: X**

**ID#:**

**Time:**

**Date:**

**Nurse Signature: X**

**ID#:**

**Time:**

**Date:**

**SCAN TO PHARMACY AND PLACE IN PATIENT CHART**

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