**Hemofilration on ECLS:**

PURPOSE:

To outline the ECLS team responsibilities when priming and installing the hemofilter.

SUPPORTIVE DATA:

The Hemofilter will be installed to regulate fluid balance in the ECLS patient with any of the following: 1) acute renal failure when diuretics alone are insufficient; 2) need to remove extra fluid in order to provide better nutrition; 3) to mobilize excessive edema.

During hemofiltration, plasma water and non-protein bound plasma solutes are removed from the blood by ultrafiltration, while cellular elements and proteins are returned to the patient. The plasma water and solutes removed from the blood are called ultrafiltrate (UF).

Priming the hemofilter unit to remove all air is required prior to use. The Hemofilter is connected to the Cardiohelp with **flow from the pre-oxygenator/post-pump luer to the venous access luer.**

Flow through hemofilter varies with the pressure gradient across the hemofilter and is approximately 15% of pump flow.

Installation and priming of the hemofilter will be done by the ECLS primers. Eye and mucus membrane protection must be worn when accessing the positive pressure side of the circuit.

EQUIPMENT LIST:

* Hemofilter – Hemocor Junior
* Hemofilter Kit (from Pedi Supplemental Pack)
	+ - (2) 12-inch pigtails
		- Filtrate line (with yellow clamp)
		- (2) 3-way stopcocks
		- ¼” male luer connector
* (2) 500 ml Normal Saline bags with 2500 units Heparin
	+ - **(5 units heparin/ml) - must order from pharmacy**
* (2) Baxter spike Continue Flow infusion sets
* (3) pigtail clamps.
* Grey Collection basin.
* Urine collection system (tubing cut ~6” from box)
* Rubber reflex mallet
* Baxter infusion pump – nurses will have at ECLS bedside.

ASSEMBLY:

1. Remove hemofilter from package and note “venous” and “arterial” sides.
2. Attach filtrate line (with yellow clamp) to the uncapped filtrate **side port** on the **VENOUS** side of hemofilter. Clamp filtrate line with yellow clamp.
3. The ARTERIAL side port is used only for hemodiafiltration. **DO NOT** remove the white luer cap. Be sure the white luer cap is screwed securely in place.
4. Attach distal end of filtrate line to Baxter infusion set using the spike.
5. Attach other end of Baxter tubing to a 3-way stopcock. Attach ¼” male luer connector to side of stopcock.
6. Insert male leur connector into the cut tubing of urine drainage set.
7. Attach (1) 12-inch pigtail to both the ARTERIAL and VENOUS ENDS of hemofilter.
8. Attach a 3-way stopcock to the distal end of the 12-inch ARTERIAL pigtail.
9. Spike the NS bag with the second spike infusion set and prime the tubing. Clamp the distal end using a pigtail clamp.
10. Attach the distal end of the primed tubing to the stopcock on ARTERIAL pigtail.
11. Invert hemofilter **(ARTERIAL end down)** and mount to cart. (Use tape if mount unavailable.)
12. Direct the end of the VENOUS pigtail line such that it will flow freely into the basin but not touch it.
13. Open pigtail clamp on the NS primed ARTERIAL line, allowing fluid to flow through the hemofilter and out the VENOUS pigtail.
14. Flow 500ml of NS with heparin through the ARTERIAL line
15. Clamp the VENOUS line. Attach the second NS bag to the spike.
16. Open the FILTRATION line and flow 250ml NS through. De-air filter phase of the hemofilter through the filtration line by turning hemofilter side-to-side. *(It will be impossible to removal all air bubbles from the filtrate phase of the hemofilter, but try to clear all bubbles from the filtrate line itself.)*
17. Clamp the FILTRATION line and open the VENOUS line again. Flow another 250ml through the VENOUS line. Tap the filter with the rubber reflex hammer to assist in removing additional bubbles. *(Expect that some tiny bubbles may come out the blood phase of the hemofilter when blood flow through the filter starts.)*
18. Clamp both VENOUS and ARTERIAL pigtails with pigtail clamps.
19. Remove infusion set and 3-way stopcock from ARTERIAL pigtail. (Keep ends sterile.)
20. Bring primed hemofilter and filtrate (urine) collection bag to ECLS bedside. Mount the hemofilter in vertical position onto the hemofilter clamp apparatus with **ARTERIAL side up**. Hook ultrafiltrate/urine collector to the ECMO cart below the hemofilter.
21. Attach the **ARTERIAL** side pigtail of the hemofilter to the **pre-oxygenator/post-pump** pigtail stopcock.
22. Attach the **VENOUS** side pigtail of to a 3-way stopcock at the distal end of the **venous luer** pigtail (with bridge open).
23. Confirm that Transonic flowmeter is in place on the arterial limb of the ECLS circuit and record flow prior to beginning hemofiltration.
24. Have ECLS Specialist place Baxter tubing into Baxter pump. Set pump rate, but do not turn on pump.
25. Remove the yellow cap from the de-airing port
26. To begin filtration, unclamp the **ARTERIAL** pigtail, and then unclamp the **VENOUS** pigtail.
27. Increase ECLS pump flow until Transonic flowmeter (flow to the patient) is at the same flow rate as before the hemofilter was installed.
28. After 3-5 minutes of blood flow through the hemofilter, unclamp the filtrate line, turn on Baxter pump at desired ultrafiltration rate and begin ultrafiltration.
29. Replace yellow cap loosely 10 minutes after flowing blood through the hemofilter.

CAUTION: A significant drop in the ultrafiltration rate may signify clotting in the system. The appearance of red blood cells in the ultrafiltrate signifies a fiber leak. Remove the hemofilter and ultrafiltrate line and replace with a newly primed system.

DOCUMENTATION:

A procedure note in the Progress section of the medical record is made by the individual who primed and installed the hemofilter. Hemofilter inspection and hourly filtrate output is recorded by the ECMO Specialist. The ECMO bedside nurse is informed of hourly totals.