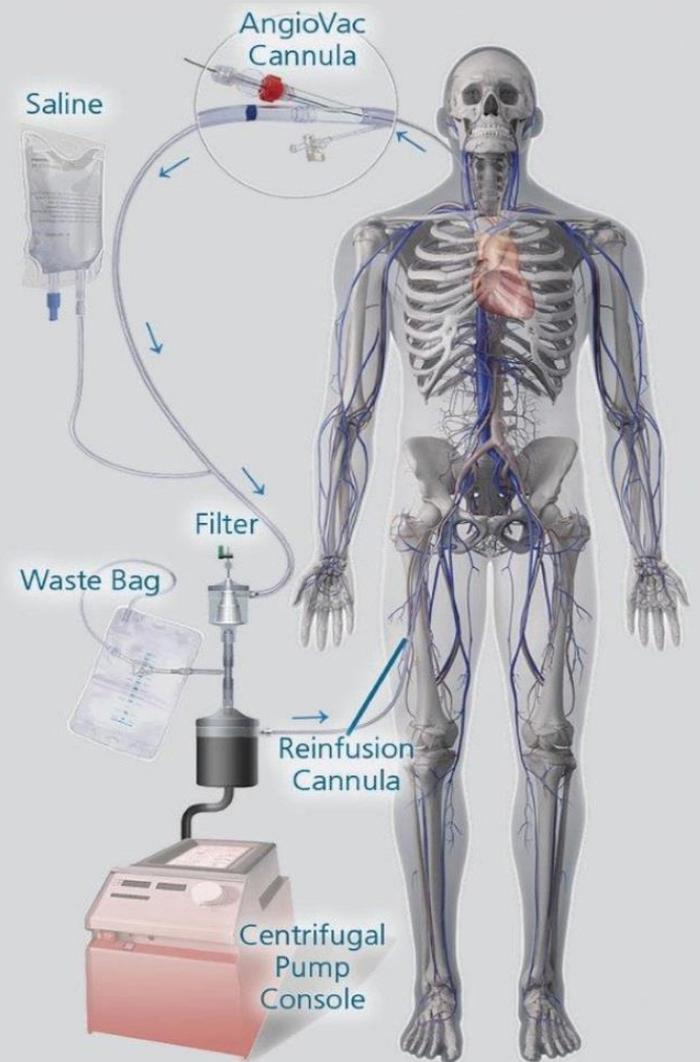


# Performance of Extracorporeal Circulatory Filtration

ICD-10 Coordination and Maintenance  
Committee Meeting  
March 19, 2024

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President  
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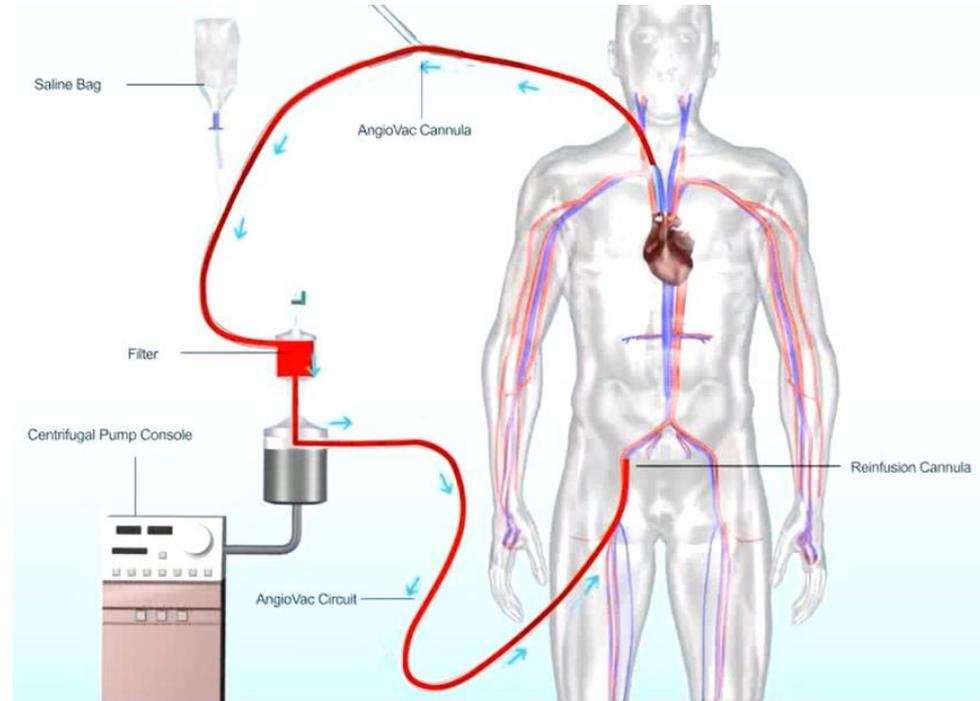
# Definition of Circulatory Filtration

Circulatory filtration is the process of removing undesirable intravascular material (UIM) from the blood using a filtration circuit.

UIM can be:

- Fresh, soft thrombi or emboli
- Endocarditis vegetation
- Infective material or exudate

This is an additional objective which follows extirpation of the UIM.



Source on YouTube

<https://www.youtube.com/watch?v=MMEi908q4Q0>

# Filtration Treats Venous Thromboembolism (VTE)



[https://www.youtube.com/watch?v=FvJK-auAF\\_4](https://www.youtube.com/watch?v=FvJK-auAF_4)

**900,000**

Cases of venous thromboembolism per year in US

**100,000**

Deaths per year in US due to venous thromboembolism

**40,000**

Deaths per year in US due to complication of pulmonary embolism

# Why Is Filtration Needed?

**Large UIM must be removed en bloc**

→ If not removed in one piece, there is risk of complications such as pulmonary embolism from floating fragments.

**Requires a large bore cannula with suction**

→ To remove the UIM en bloc requires a large bore cannula, such as the AngioVac® 22F cannula for suction.

**Suction removes a large volume of blood**

→ A large volume of blood is suctioned along with the UIM because of the large bore cannula that is required.

**Replacement or Re-infusion required**

→ If the blood is not returned to the body through re-infusion, transfusion of multiple units of blood may be required, which increases the risks.

# Basic Steps



## Mechanical Suction Thrombectomy

AngioVac<sup>®</sup> cannula used to extirpate the UIM from the:

- Right atrium
- Superior vena cava
- Inferior vena cava
- Iliofemoral veins



## Veno-venous Circuit with Filter

The suction catheter is connected to a veno-venous bypass that contains an emboli filter with trap, centrifugal pump, and re-infusion cannula.



## Re-Infusion of Blood

Simultaneous re-infusion returns blood to the internal jugular vein or femoral vein to recirculate with a 1:1 return ratio.

# Cannula Locations

## Outflow (Suction)

Right atrium

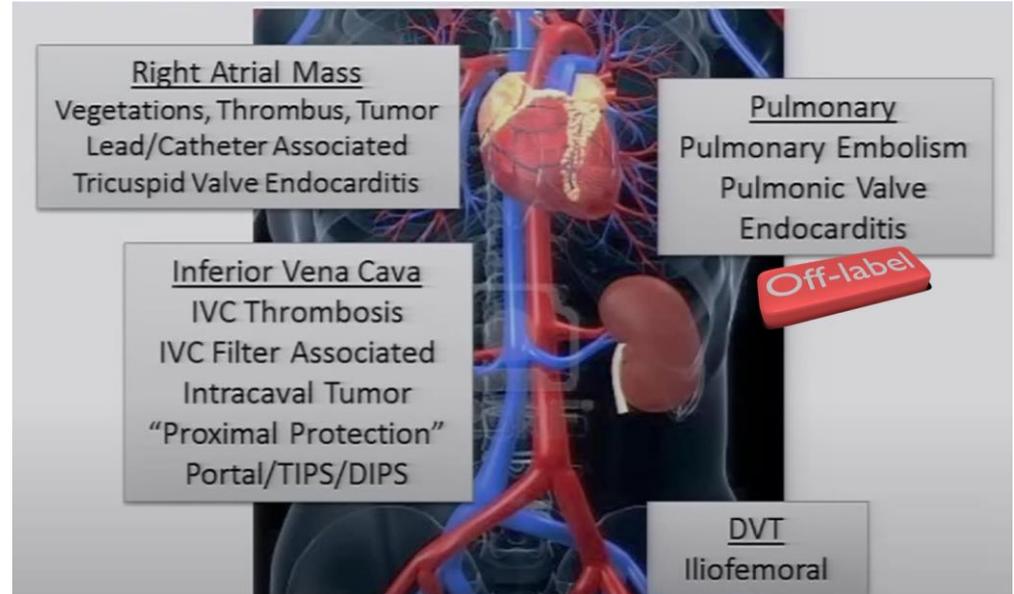
Superior/Inferior Vena Cava

Iliofemoral veins

## Inflow (Reinfusion)

Internal jugular vein

Femoral vein



Source on YouTube

[https://www.youtube.com/watch?v=FvJK-auAF\\_4](https://www.youtube.com/watch?v=FvJK-auAF_4)

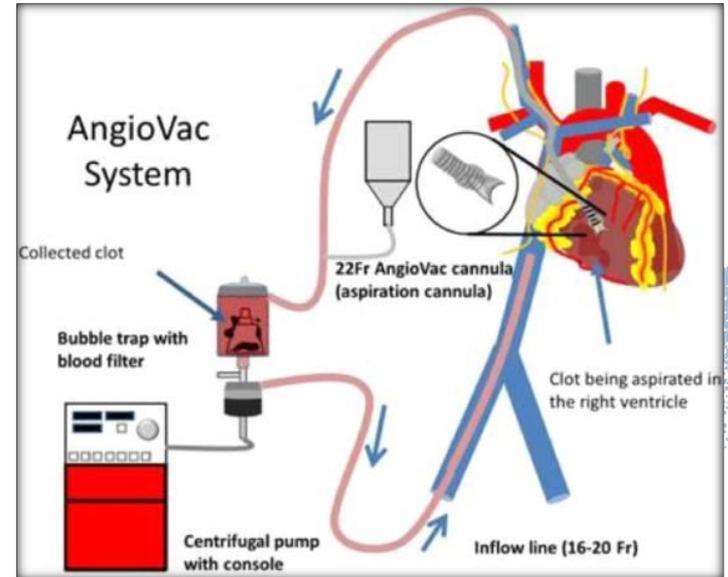
# Cannula Made to Capture Large Clots

The cannula enters the vein unexpanded. As it approaches the clot or UIM, the funnel is opened and the suction is activated. The UIM is pulled into the cannula and moved through the filtration circuit.



# Detailed Steps

1. Guidewire access is obtained
2. Angiogram and/or TEE performed
3. AngioVac® cannula inserted
4. Reinfusion cannula inserted
5. Cannulae connected to the circuit containing outflow tubing, filter, centrifugal pump and reinfusion tubing
6. AngioVac® is positioned near the UIM
7. The funnel is deployed
8. Flow is initiated
9. The filter is flushed of UIM
10. Imaging is repeated
11. Flow is reinitiated, if necessary
12. AngioVac® cannula is removed
13. Reinfusion cannula is removed



*Perioperative Outcomes of Thrombectomy Patients Using Venovenous Bypass and Suction Filtration With General Anesthesia*  
Journal of Cardiothoracic and Vascular Anesthesia Vol 35:4 pp 1040-1045 in April 2021

# Inpatient and Outpatient Settings

Used in the inpatient setting for UIM in all sites for patients meet inpatient criteria

Used in the outpatient setting for UIM in iliofemoral veins or inferior vena cava

# Where Performed?

This procedure will likely be performed in:

- The operating room
- Catheterization lab
- A hybrid vascular/interventional radiology suite

The physician team typically includes:

- Vascular surgeon
- Interventional Radiologist



# Documentation

Consistent terminology for the circuit has been a challenge, but will likely include terminology such as:

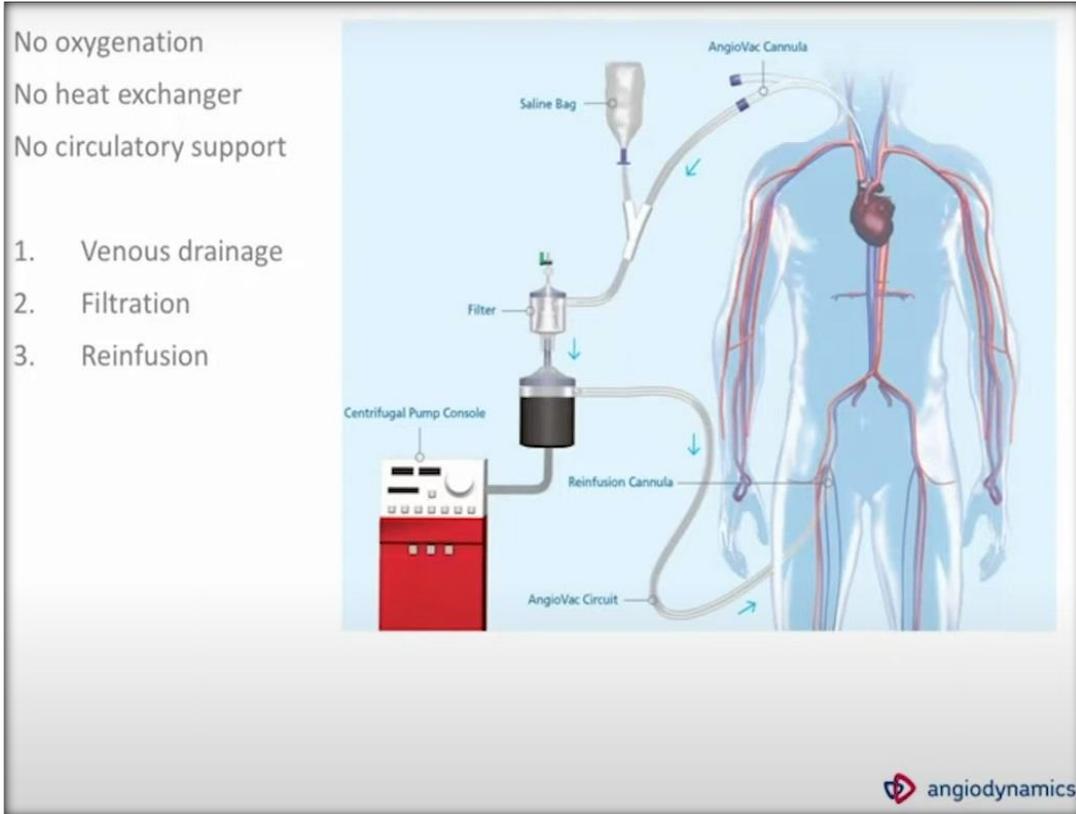
- Extracorporeal filter circuit
- Extracorporeal return
- Venovenous circuit
- Venovenous bypass
- Filtration circuit
- Debris collection circuit
- Emboli trap circuit

# What This Isn't ...

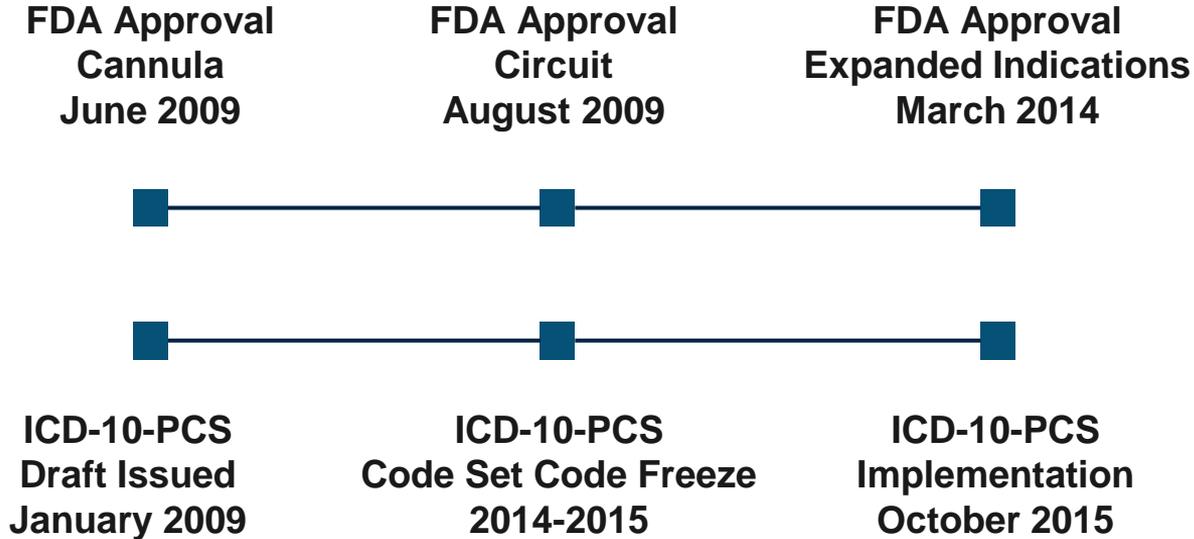
Not a basic autologous transfusion: Filtration required first

Not ECMO: No oxygenator in the circuit

Not CP Bypass: No heat exchanger or circulatory support. Heart and lungs are performing their functions normally.



# Why Is There No Code?



# Codes Requested

Therefore, we are asking for a new code that describes intraoperative performance of the extracorporeal circulatory filtration performed during an inpatient admission.

These new codes would be assigned in addition to the code for the percutaneous Extirpation procedure.