

**VANDERBILT UNIVERSITY MEDICAL CENTER  
DIVISION OF TRAUMA AND SURGICAL CRITICAL CARE**

**IVC Filter Placement**

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1. Indications for therapeutic IVC filter
  - a. Pulmonary embolectomy for PE
  - b. PE or lower extremity DVT with
    - i. Contra-indication to AC
    - ii. Failure of AC
    - iii. Complication of AC
  - c. Propagation of thrombus while on adequate AC
2. Relative indications for therapeutic IVCF
  - a. PE or lower extremity DVT with significantly diminished pulmonary reserve
    - i. i.e., unable to suffer further impairment
3. Considerations for prophylactic IVCF
  - a. Spinal cord injury (paraplegia or quadriplegia)
  - b. IVC, iliac, or femoral venous ligation or repair
  - c. Severe pelvis fracture with lower extremity long-bone fracture
  - d. AIS head  $\geq 3$  with contraindication to anticoagulation
  - e. High risk for VTE (but no evidence of PE or DVT) with
    - i. Contra-indication to AC
    - ii. Failure of AC
    - iii. Complication of AC
4. TICU IVCF Placement Protocol
  - a. Preoperative considerations
    - i. One of the above indications
    - ii. Patient on a fluoro compatible bed
    - iii. Informed consent of patient or surrogate
    - iv. No significant renal impairment
    - v. No significant venous anomaly on traumagram
    - vi. Infra-renal IVC diameter 28mm or less
  - b. Device selection
    - i. Historically, device of choice has been femoral Cook Günther-Tulip
    - ii. Other options include Greenfield (permanent) or Bard G2 (removable)
  - c. Insertion protocol (bedside)
    - i. Once decision to place IVCF made and verified with procedure support nurse, radiology technicians notified to bring DSA capable fluoroscopy machine to TICU
    - ii. Insertion sites in order of preference
      1. Right femoral vein (possible higher DVT risk)
      2. Right internal jugular vein (risk of PTX)
      3. Left femoral vein (potentially greater angulation and tilt)
      4. Left jugular (last resort)
      5. Smaller devices have been described as having been placed through brachial or axillary veins
    - iii. Traumagram reviewed by proceduralists to estimate location of renal veins, anomalies, and IVC diameter
    - iv. 2-D and color Doppler U/S highly recommended to rule out insertion site thrombus and guide needle/wire placement
      1. Patent vessel
      2. Normal flow by color Doppler
    - v. See bedside surgery protocol regarding sterile precautions, sedation, and pre-procedure timeout
    - vi. After sterile prep and drape, vein is cannulated and wire placed via Seldinger
    - vii. IVC cavagram is prerequisite for placement and provides anatomic landmark

1. 5 Fr pigtail catheter with 1cm markers
  2. 60cc Conray via Oz hand pump injection, visualized in real-time under digital subtraction angiography (during expiratory hold if ventilated)
  3. Notation made of location of renal veins with respect to lumbar vertebrae as well as thrombus or anatomic anomaly
- viii. Device deployed under fluoroscopic guidance in an infrarenal unless otherwise indicated
    1. Tip of device may be in the renal vein inflow
    2. Images saved of cavagram and post-deployment
  - ix. Pressure held on insertion site and dressing applied
  - x. Device lot numbers recorded in paper chart
  - xi. Star Forms note performed by proceduralist/housestaff
  - xii. Wire precautions followed for subsequent venous access procedures
    1. Straight wire preferred > J-tip
- d. Notes, troubleshooting
- i. Cavagram inadequate
    1. Repeat cavagram with the curled tip of the pigtail catheter just under estimated position of the renal veins
    2. Ensure that expiratory breath hold if patient ventilated
    3. DO NOT PROCEED IF CAVAGRAM IS UNINTERPRETABLE
  - ii. Filter does not open
    1. Exceedingly rare
    2. Likely in accessory vessel (e.g. lumbar or gonadal vein)
    3. Repeat cavagram or further imaging if any question
  - iii. Device malpositioned
    1. Consider consultation with interventional radiology or vascular surgery for assistance
    2. Suprarenal position typically does not require repositioning
  - iv. Provide follow-up for patients with removable IVCF and develop protocol for potential future removal, particularly for patients <50 yrs of age
  - v. Both Cook and Bard jugular filters are completely deployed once they are unsheathed. The Cook device ensnares the filter until released, however, and must be released prior to removing the deployment mechanism.