Günther Tulip™ Vena Cava Filter Set
For Femoral and Jugular Vein Approach

Instructions for Use
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For Femoral and Jugular Vein Approach

CAUTION: U.S. federal law restricts this device to sale by or on the order of a physician (or properly licensed practitioner).

DEVICE DESCRIPTION
The Günther Tulip Vena Cava Filter Set consists of a non-magnetic filter (30 mm diameter, 50 mm long), preloaded on a femoral filter introducer, a jugular filter introducer, an 8.5 French coaxial introducer system (compatible with a .035 inch wire guide) and a hydrophilic coated dilator. The femoral and the jugular introducers are clearly marked at the hub.
INTENDED USE
The Günther Tulip Vena Cava Filter Set is intended for the prevention of recurrent pulmonary embolism (PE) via placement in the vena cava in the following situations:

- Pulmonary thromboembolism when anticoagulant therapy is contraindicated;
- Failure of anticoagulant therapy in thromboembolic diseases;
- Emergency treatment following massive pulmonary embolism where anticipated benefits of conventional therapy are reduced; and
- Chronic, recurrent pulmonary embolism where anticoagulant therapy has failed or is contraindicated.

The Günther Tulip Vena Cava Filter may be retrieved according to the instructions supplied in the section labeled “Optional Retrieval Procedure.”

The product is intended for percutaneous placement via a femoral or jugular vein for filtration of inferior vena cava (IVC) blood to prevent pulmonary embolism.

The product is intended for use by physicians trained and experienced in diagnostic and interventional techniques.

Standard techniques for placement of vascular access sheaths, angiographic catheters and wire guides should be employed.

CONTRAINDICATIONS

Filter Placement
- Megacava (diameter of the IVC > 30 mm).
- Vena Cava Filters should not be implanted in patients with risk of septic embolism.

Optional Filter Retrieval
- Retrieval of the filter with significant amounts of trapped thrombus (greater than 25% of the volume of the cone)
- Retrieval of the filter for patients with an on-going high risk for pulmonary embolism

WARNINGS

Filter Placement
- Manipulation of product requires fluoroscopic control.
- Excessive force should not be used to place the filter.

Optional Filter Retrieval
- Excessive force should not be used to retrieve the filter.
- An inferior vena cavagram evaluation for residual captured thrombus should be performed prior to attempted retrieval.
- Available data from retrievals in multicenter and single center studies demonstrate that the device can be safely retrieved. Please refer to the “Clinical Studies” section of this booklet for clinical study references to the retrieval of this filter.

PRECAUTIONS
Possible allergic reactions should be considered.

Femoral Filter Placement
- For placement of the filter, the right femoral vein is preferable. An approach via the left femoral vein is possible.
- The filter for femoral vein approach is supplied preloaded on the filter introducer. Do not separate the preloaded filter introducer assembly to view or examine the components.
- Any attempt to reload may damage the introducer or filter.
- Once the metal mount point is past the radiopaque marker, the secondary legs of the filter are ex-
The filter may be repositioned only by advancing the filter; retracting the filter could damage the secondary legs or caval wall.

- Use the radiopaque band of the sheath to ensure that the filter is completely out of the sheath before injecting contrast medium in vena cava. At the same time, ascertain that the sheath and the Tuohy-Borst sidearm adapter are withdrawn to the proximal marker on the filter introducer.

**Jugular Filter Placement**

- For placement of the filter, the right jugular vein is preferable. An approach via the left jugular vein is possible.
- Never pull back the loaded filter introducer. The barbed hooks of the filter might scratch off particles from the sheath.
- The filter may be repositioned prior to final deployment by advancing the sheath over the exposed filter, advancing or retracting the system to the desired location, and retracting the sheath to expose the filter.

**Optional Filter Retrieval**

- For filter retrieval, a right jugular vein approach is preferable. An approach via the left jugular vein is possible; however, there are no available data which demonstrate the safety or effectiveness of filter retrieval via the left jugular vein.
- The filter has been designed to be retrieved with the Günther Tulip Vena Cava Filter Retrieval Set (not included). Cook has not performed testing to evaluate the safety or effectiveness of filter retrieval using other retrieval systems.
- Never re-deploy a retrieved filter.

**MR COMPATIBILITY**

Non-clinical testing has demonstrated that the Günther Tulip Vena Cava Filter is MR Conditional. It can be scanned safely immediately after placement under the following conditions:

- Static magnetic field of 3.0 Tesla or less
- Spatial gradient field of 525 Gauss/cm or less
- Maximum whole body averaged specific absorption rate (SAR) of 3.0 W/kg for 15 minutes of scanning.

In non-clinical testing, the Günther Tulip Vena Cava Filter produced a temperature rise of less than 0.6 degrees C at a maximum whole body averaged specific absorption rate (SAR) of 3.0 W/kg for 15 minutes of MR scanning in a 3.0 Tesla MR system using a transmit/receive body coil (Excite, Software G3.0-052B, General Electric Healthcare, Milwaukee, WI) MR scanner.

MR image quality may be compromised if the area of interest is in the exact same area or relatively close to the position of the Günther Tulip Vena Cava Filter. Therefore, it may be necessary to optimize MR imaging parameters for the presence of this metallic implant.

**POTENTIAL ADVERSE EVENTS**

- Acute damage to the inferior vena cava
- Acute pulmonary embolism
- Extravasation of contrast material at time of vena cavagram
- Hematoma at vascular access site
- Hemorrhage
- Thrombosis or stenosis at implant site
- Wound infection at vascular access site
- Death

**CLINICAL STUDIES**

To evaluate the safety of retrieving the Günther Tulip Vena Cava Filter, a clinical study was conducted in which 41 patients [female (n=19); male (n=22)] were enrolled for possible retrieval of the filter. The results of this and
other published and presented sources listed below demonstrate that the Günther Tulip Vena Cava Filter may be safely retrieved:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Filters Inserted</th>
<th>Retrieval Attempts</th>
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<th>Range (Days)</th>
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<th>Adverse Events</th>
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<tbody>
<tr>
<td>Kachura JR. “Inferior vena cava filter removal after 475-day implantation.” JVIR 2005; 16: 1156-1158.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>475</td>
<td>475</td>
<td>None</td>
</tr>
<tr>
<td>Binkert CA, Bansal A, Gates JD. “Inferior vena cava filter removal after 317-day implantation.” JVIR 2005; 16: 1395-1398.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>317</td>
<td>317</td>
<td>Mild caval stenosis following 317-day retrieval; follow-up OK</td>
</tr>
<tr>
<td>Lyon SM. “Retrievable Günther Tulip Filter-Experience in 188 cases.” Paper. 2005 Annual Meeting Society of Interventional Radiology.</td>
<td>188</td>
<td>122</td>
<td>110</td>
<td>1–309</td>
<td>59.6</td>
<td>1) Mild IVC stenosis 2) Filter fractured during retrieval and small filter fragment embolized to lung</td>
</tr>
<tr>
<td>Piano G. “Retrievable VCFs in High Risk Surgical Patients: A Study in Safety and Efficacy” 2006 Manuscript submitted to Journal of Vascular Surgery.</td>
<td>60</td>
<td>54</td>
<td>52</td>
<td>32–162</td>
<td>63</td>
<td>One patient had non-fatal PE with filter in place. Three patients required second retrieval attempt. All three were successful.</td>
</tr>
</tbody>
</table>

1) The unsuccessful retrievals did not result in adverse events; the device was left in place as a permanent implant.
INSTRUCTIONS FOR USE

Femoral Approach

Preparation

1. Remove the filter protection tube. (Fig. 1)

Filter Placement

2. Puncture the femoral vein using the Seldinger technique.
3. Over the wire guide, dilate the puncture site with the dilator. Remove the dilator.
4. Advance the coaxial introducer sheath system over the wire guide.
5. Remove the wire guide and introducer dilator.
6. Using hand injection, perform cavography to verify position below (caudal to) the renal veins.
7. Place the filter introducer with the premounted filter into the hub of the introducer sheath and advance it into the sheath. (Fig. 2)
8. Advance the Tuohy-Borst sidearm adapter to connect it to the sheath. (Fig. 3) The Tuohy-Borst adapter can be tightened around the filter introducer to prevent loss of blood.
9. Advance the filter introducer until the distal marker reaches the Tuohy-Borst sidearm adapter. This will place the hook of the filter inside the sheath at the radiopaque band. Verify position of the hook inside the sheath (Fig. 4), still below the renal veins.
10. Stabilize the introducer, and withdraw the sheath and Tuohy-Borst sidearm adapter until it reaches the proximal marker on the filter introducer. Ensuring that the filter is completely free of the sheath,
tighten the Tuohy-Borst sidearm adapter to secure position. At this point the filter is expanded, still connected to the filter introducer. *(Fig. 5)* Proper position can now be verified by injection of contrast medium.

**WARNING:** The pre-exposed filter can be advanced, but never pulled back into the sheath. Doing so will damage the shape of the filter.

**CAUTION:** Do not release the filter or inject contrast medium unless the metal mount point is completely free of the sheath. Use the radiopaque band for positioning.

11. Loosen the red hub half a turn to prepare filter release. *(Fig. 6)*

12. Keep the filter introducer in position by holding the proximal pin vise. Check the proximal marker on the filter introducer and the radiopaque band to ensure that the metal mount point is completely free of the sheath before filter release.

13. To release the filter, in one quick controlled motion pull the red hub until it contacts the pin vise. Re-positioning of the filter is no longer possible. The filter is now released. *(Fig. 7)*

14. Perform a cavagram to verify filter position, and then withdraw the entire system.

**Jugular Approach**

**Preparation**
To prepare for jugular approach, the filter of the preloaded femoral filter introducer needs to be transferred to the jugular introducer.

1. Remove the filter protection tube on the femoral filter introducer. *(Fig. 8)*

2. Push the proximal metal knob, on the jugular filter introducer, to advance the grasping hook beyond the Peel-Away sheath. Catch the hook of the preloaded filter, on the femoral filter introducer, and release the knob to firmly grasp the filter. *(Fig. 9)*

3. To release the filter from the femoral introducer, loosen the red hub half a turn and pull the red hub towards the pin vise. The jugular filter introducer is now loaded and ready for use.
**WARNING:** Having loaded the filter, take care not to inadvertently push the metal knob before final filter positioning. Pushing the metal knob will release the filter.

4. Advance the Peel-Away sheath over the filter. (Fig. 10)

5. The anchors must remain outside the sheath. The product is now prepared for use. (Fig. 11)

**Filter Placement**

6. Puncture the jugular vein using the Seldinger technique.
7. Over the wire guide, dilate the puncture site with the dilator. Remove the dilator.
8. Advance the coaxial introducer sheath system over the wire guide.
9. Remove the wire guide and introducer dilator.
10. Using hand injection, perform cavography to verify position below (caudal to) the renal veins.

11. Place the filter introducer with the Peel-Away sheath containing the preloaded filter into the hub of the introducer sheath. Advance the filter introducer into the sheath. (Fig. 12)

12. Peel off the Peel-Away sheath. (Fig. 13)

13. Advance the Tuohy-Borst sidearm adapter to connect it to the sheath. (Fig. 14) The Tuohy-Borst adapter can be tightened around the filter introducer to prevent loss of blood.

**WARNING:** Do not pull back on the loaded filter introducer assembly. The barbed hooks on the filter may scratch off particles from the sheath.
14. Advance the introducer until the filter is at the radiopaque band of the introducer sheath, leaving the anchors of the filter inside the sheath. The hook of the filter should be below the renal veins. Verify the position by injection of contrast medium. (Fig. 15)

15. Stabilize the introducer, and withdraw the sheath and Tuohy-Borst sidearm adapter until the proximal part of the adapter reaches the marker on the filter introducer. Ensuring that the filter is completely free of the sheath, tighten the Tuohy-Borst sidearm adapter to secure position. At this point the filter is expanded, still connected to the filter introducer. (Fig. 16) Proper position can be verified by injection of contrast medium.

16. If the filter is not in the desired position, carefully advance the sheath over the filter only to the anchors. Reposition the system as desired, and again withdraw the sheath to the marker, completely exposing the filter.

**WARNING:** Do not advance the sheath over the anchors to avoid scratching particles off the sheath.

17. While keeping slight back tension on the introducer, push the metal knob completely to ensure proper release of the filter. (Fig. 17)

18. Perform cavography to verify filter position, then withdraw the entire system.

**Optional Retrieval Procedure**

**NOTE:** If filter retrieval is going to be performed, please refer to Instructions For Use provided with the Günther Tulip Vena Cava Filter Retrieval Set (not included) for device description and caution statement.

1. Hold the clear Y-fitting and pull back the plastic pin vise on the wire loop retriever to cover the loop. Tighten the screw of the clear Y-fitting to keep the loop inside the catheter. (Fig. 18)

2. Puncture the right jugular vein using the Seldinger technique.

3. Position a flush catheter inferior to the filter, and perform a diagnostic vena cavagram to identify any residual thrombus.
4. Exchange the flush catheter for the coaxial retrieval sheath system, advancing it over the wire guide. **WARNING:** If more than 25% of the cone is filled with thrombus, do not remove the filter.

![Fig. 19](image)

5. Remove the red inner dilator and the wire guide. Verify the position by injection of contrast medium. (Fig. 19)

![Fig. 20](image)

6. Introduce the retrieval loop system through the coaxial retrieval sheath system, advance and connect the white Tuohy-Borst sidearm adapter of the loop system to the sheath system. The Tuohy-Borst adapter can be tightened around the catheter to prevent loss of blood. (Fig. 20)

![Fig. 21](image)

7. Loosen the screw of the clear Y-fitting to advance the loop inside the catheter. Hold the clear Y-fitting and push forward the pin vise. Advance until the loop has fully expanded inside the vena cava and surrounds the filter. (Fig. 21)

![Fig. 22](image)

8. Pull back the loop until it engages the hook of the filter. (Fig. 22) **CAUTION:** Do not pull on the filter beyond what is required to keep tension on the loop. Doing so may cause damage to the caval wall.
9. Hold the loop wire steady with the pin vise, then push the clear Y-fitting with the catheter forward until it touches the hook. To snare the filter in this position make sure to firmly lock the screw of the clear Y-fitting on the wire loop. (Fig. 23)

**NOTE:** If the retrieval wire loop loses its shape during the attempt to engage the hook of the filter, it can be removed and gently reshaped. After reshaping, clean loop and proceed from step 6.

10. While holding steady the retrieval loop system with the clear Y-fitting, push forward the white Tuohy-Borst sidearm adapter with the coaxial retrieval system. The filter collapses and the anchors disengage from the caval wall. (Fig. 24)

11. When the tip of the coaxial retrieval system is at the anchors, loosen the hub of the outer sheath, and advance the outer sheath forward to cover the whole filter, and retrieve the complete assembly. (Fig. 25)

**POST-RETRIEVAL CARE**

After retrieval of filter, hospital standard of care should be followed for removing the sheath and providing hemostasis to prevent bleeding at the vascular access site.

**HOW SUPPLIED**

Supplied sterilized by ethylene oxide gas in peel-open packages. Intended for one-time use. Sterile if package is unopened or undamaged. Do not use the product if there is doubt as to whether the product is sterile. Store in a dark, dry, cool place. Avoid extended exposure to light. Upon removal from package, inspect the product to ensure no damage has occurred.

**REFERENCES**

These instructions for use are based on experience from physicians and (or) their published literature. Refer to your local Cook sales representative for information on available literature.
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