

Günther Tulip Filter

1

. 2 . 2 . 2 . 3

:

Günther Tulip

:

가 6

Günther Tulip

(immobilization)

2 ,

1 , May - Thurner

2 ,

1 .

Urokinase

(computed tomography, CT)

:

, 11 (; 7 - 25) . 2 May - Thurner
Urokinase

4

. 6 5

(3 - 20)

, 1

10

CT

15

:

가

Günther Tulip

Urokinase

Greenfield (2)

가

가

24%

(stalk)

가

가

(1).

가

1

2

3

가

2005 1 17

2005 3 30

1986 Darcy (3) Amplatz
가 (retrievability)

가

(retrievable filter) 가

Günther Tulip 1998 3

가

가 (4-6). 가 CT

가 가

가

Günther Tulip

2003 5 2004 11 6 (3 , 3)

가

47 (23-67)

2 ,

1 , May - Turner

2 ,

1

1 CT

가 Günther Tulip

(William Cook Europe, Bjaeverskov, Denmark)

Günther Tulip 가 45 mm, 30 mm

가 가

가

(Fig. 1).

5 가

3 cm

, 1 가

5 cm

2 cm 가

20

(4).

3 2

1

(aspiration thrombectomy)

3

Urokinase (Green Cross, Seoul, Korea)

May - Turner 2

12 mm, 6-8 cm (Niti - S stent,

Taewoong, Seoul, Korea)

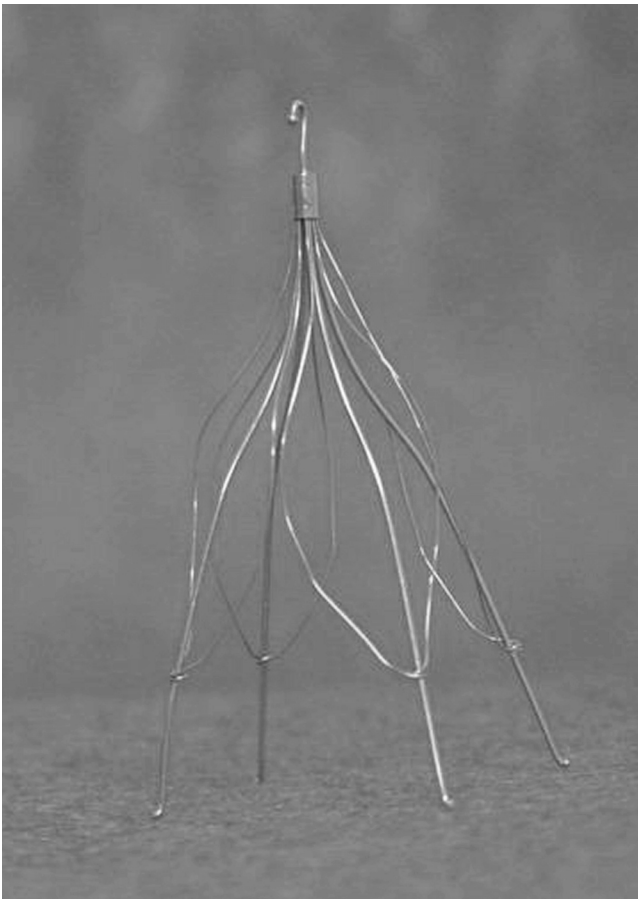


Fig. 1. The Günther Tulip filter.

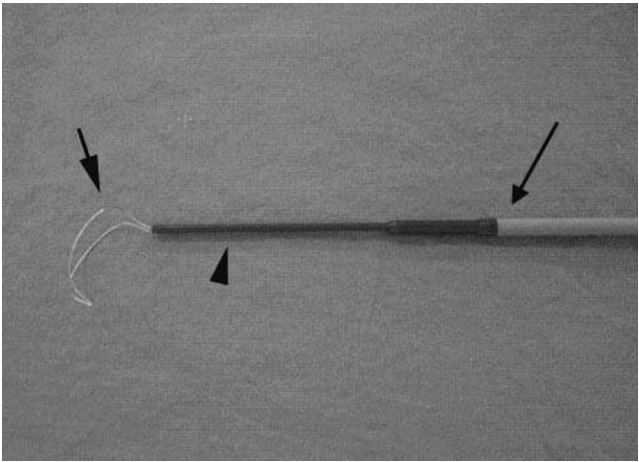


Fig. 2. The retrieval set is composed of braided platinum loop snare (short arrow), 6.3-F retrieval catheter (arrowhead) and coaxial retrieval sheath (long arrow).

CT 3 mm, 20 mm, (retrieval catheter), (outer sheath), (inner sheath) (Fig. 2). (retrieval set)

. Günther - Tulip filter retrieval set 가 (loop snare)

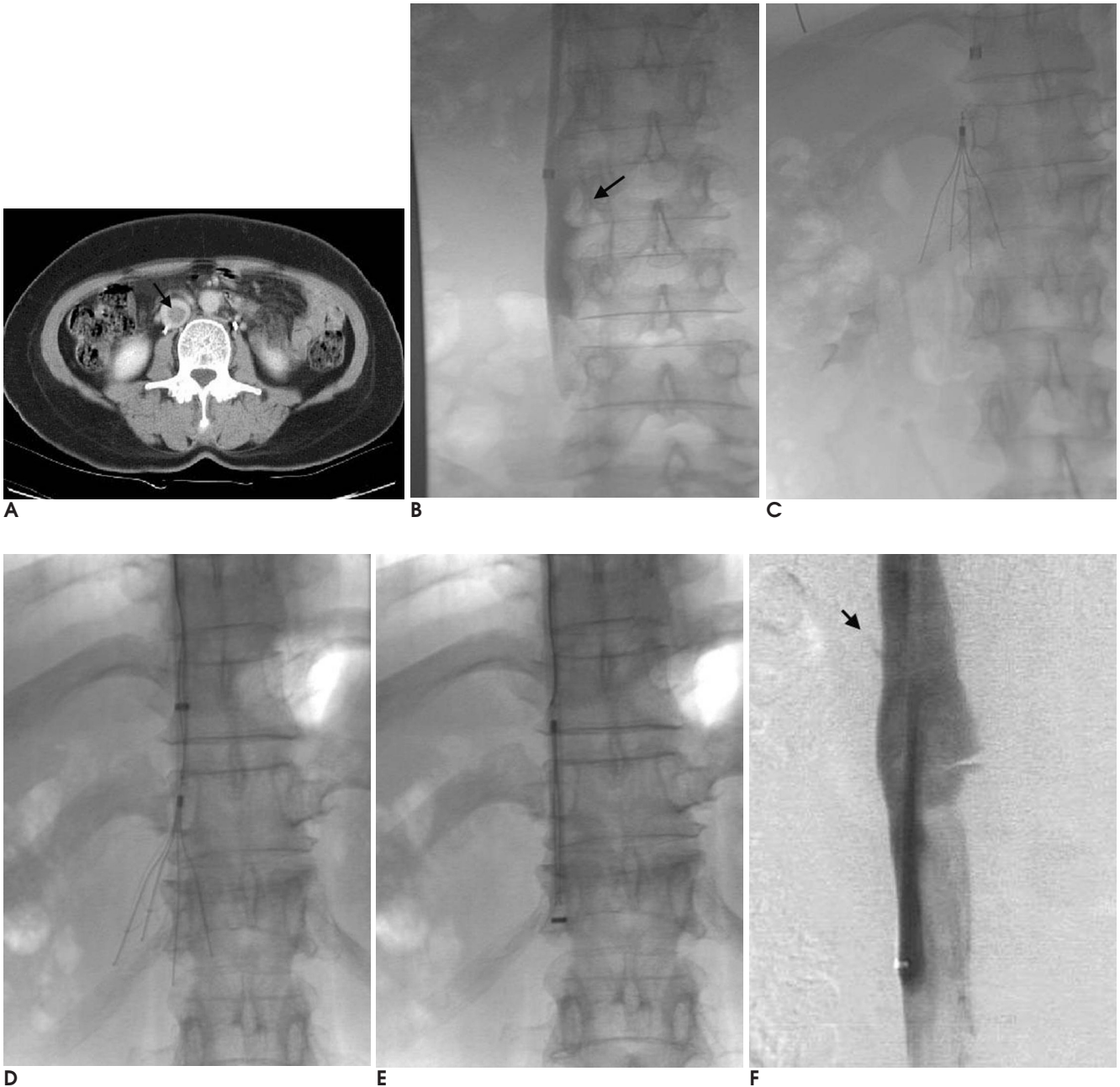


Fig. 3. A 43-year-old female with traumatic liver injury.
A, B. Contrast enhanced CT scan and vena cavogram show free floating thrombus in the IVC (arrow).
C. Digital radiograph demonstrates deployed Günther Tulip filter at the level of suprarenal IVC.
D. The hook of the Günther Tulip filter is successfully snared with use of wire loop.
E. The coaxial retrieval sheaths are then advanced so that the inner sheath collapses the filter and is advanced to the level of the hooks. Finally, the outer retrieval sheath is advanced over the entire assembly, which can then be removed through the outer sheath which is left in situ.
F. Inferior vena cavogram obtained immediately after filter retrieval reveals slight contrast extravasation (arrow) at the level of IVC incorporation of the filter hook.

가 (Fig. 3D) 4 (Fig. 3E). 3 1 가 CT 1 가 2 CT 1 25



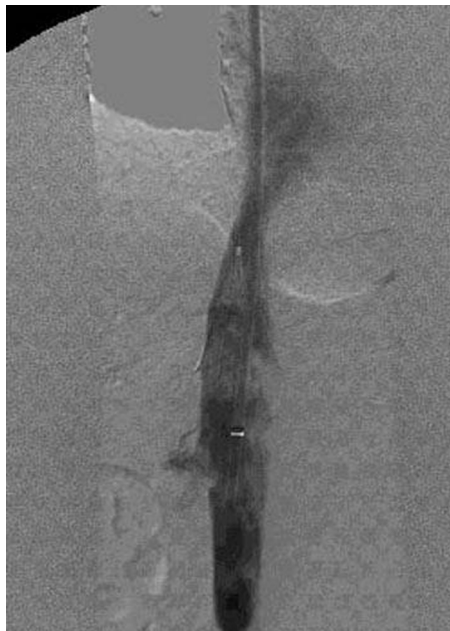
A



B



C



D

Fig. 4. A 67-year-old man presented with left lower leg edema

A. Venogram shows free floating thrombus (arrow head) in the IVC and common iliac vein stenosis (arrow). Günther Tulip filter was placed in the suprarenal IVC via transjugular approach before thrombolytic therapy (not shown).

B. Venogram obtained after overnight Urokinase therapy reveals captured thrombus (arrow) in the filter by detachment of free floating thrombus.

C. Venogram obtained after deployment of left iliac stent shows patent iliac vein and IVC.

D. Vena cavogram obtained 7 days after anticoagulation shows marked resolution of captured thrombus in the filter.

11 (7-25) . 가 .

3 Urokinase (8).

May - Thurner (8).

2 가 (Fig. 4A, C). Radomski (1)

1 가 가 15% 50%

가 가 가

Urokinase 4 (27%) 가

(Fig. 4B) 2

Urokinase . 2

가

. 4 Ferris (9) 320

(Fig. 4D). 3 10 (6%) (2%), (19%), (9%)

2 , 1 , 1 , 12

14 CT 가

20 2

25 CT 가 가

CT . 6 5 가 가

1 10 (8, 11).

15 (trapping)

CT 3 (8).

1 CT (caval patency)

가 가 가

3 가

가

(temporary filter) 가 (gooseneck 가

wire) 가 가

(retrievable filter) 가 가

(7). 가 가

가 가

가 가

Günther Tulip (William

Cook Europe, Bjaeverskov, Denmark), Recovery Nitinol (NMT Medical, Boston, Mass), Opt - Ease (Cordis J&J, Roden, The Netherlands) (8, 12, 13). Günther Tulip

Tulip

Günther

가 Günther Tulip

가 . Millward (4)
가 3 mm, 20 mm
Günther Tulip

Urokinase

가
. Gü

nther Tulip (14) 3

10
(4) 3
1 3
Tay (16) 가

. Millward (4)
90 91 Günther Tulip
52
51 2 - 25
(9) . 51 37 5 - 420
4

1 230
S
6

Günther Tulip
. 5 11
1 20 CT
25 4

가
Radomski (1)

가 6 4
Urokinase 가

May - Thurner

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Placement and Retrieval of a Günther Tulip Filter in Patients with a Free Floating Thrombus in Inferior Vena Cava¹

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Purpose: We wanted to assess the technical feasibility and clinical efficacy of the placement and retrieval of a Günther Tulip filter for the prevention of fatal pulmonary embolism during the management of patients with a free floating thrombus in their inferior vena cava (IVC).

Materials and Methods: Six patients having a free floating thrombus in their IVC (three patients with an isolated free floating thrombus in the IVC that resulted from immobilization due to traumatic liver injury or cerebral infarction, two patients with coexisting deep vein thrombosis in the left lower extremity that was caused by May-Thurner syndrome, and one patient with coexisting deep vein thrombosis in the right lower extremity that was due to nephrotic syndrome and immobilization after hip joint replacement) underwent placement and retrieval of a Günther Tulip filter. The placement of the filter was performed through the right internal jugular vein to prevent the risk of detachment of the thrombus during the procedure. Retrieval of filter was performed after the free floating thrombus of the IVC had disappeared on follow-up CT because of anticoagulation therapy, aspiration thrombectomy or catheter directed Urokinase thrombolysis.

Results: The Günther Tulip filter was successfully placed in the IVC in all six patients and it was retrieved after the management of the free floating thrombus. The mean duration of the placement of the filter was 11 days (range: 7 - 25 days). Two patients underwent placement of an iliac vein stent for the management of May-Thurner syndrome. Detachment of the free floating thrombus in the IVC and the subsequent thrombus entrapment in the filter were documented during aspiration thrombectomy or Urokinase thrombolysis in four patients. Recurrent thrombus didn't occur during the follow-up period (range: 3 - 20 months) in five of the six patients. In one patient, a recurrent thrombus due to the discontinuance of anticoagulation therapy was identified at the filter detachment site of the IVC on the follow-up CT 10 days after the filter retrieval, but it disappeared 15 days after proper anticoagulation therapy was done.

Conclusion: Temporary Günther Tulip filter placement is technically feasible and efficacious for the prophylaxis of pulmonary embolism in those patients with a free floating thrombus in the IVC, and particularly in those patients who will have subsequent aspiration thrombectomy or catheter directed Urokinase thrombolysis performed.

Index words : Thrombosis

Vena cava, filter retrieval

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