



: 2 1

2 2 3

2

1/1,000

1/20,000

(1, 2).

(Fig. 1A).

가

(2).

6 Fr. side-arm

sheath (Cook, Bloomington, IN, U.S.A.)

(post-thrombotic syndrome)

(3), 3 2

(venous

(Fig. 1B). 5-Fr.

(5 Fr, multi-sideport

valve insufficiency)

(4).

catheter infusion set, Cook, Bloomington, IN, U.S.A.)

( , ,

2

) 2 50 IU ( 6

IU 150 IU

3 IU

220 IU

1  
29

5

(Fig. 1C).

12 mm x 8 cm Nitis

( , , ) 12 mm

(Ultra Thin Diamond, Boston Scientific, galway, Ireland)

8

3

3

(Fig. 1D).

4

7

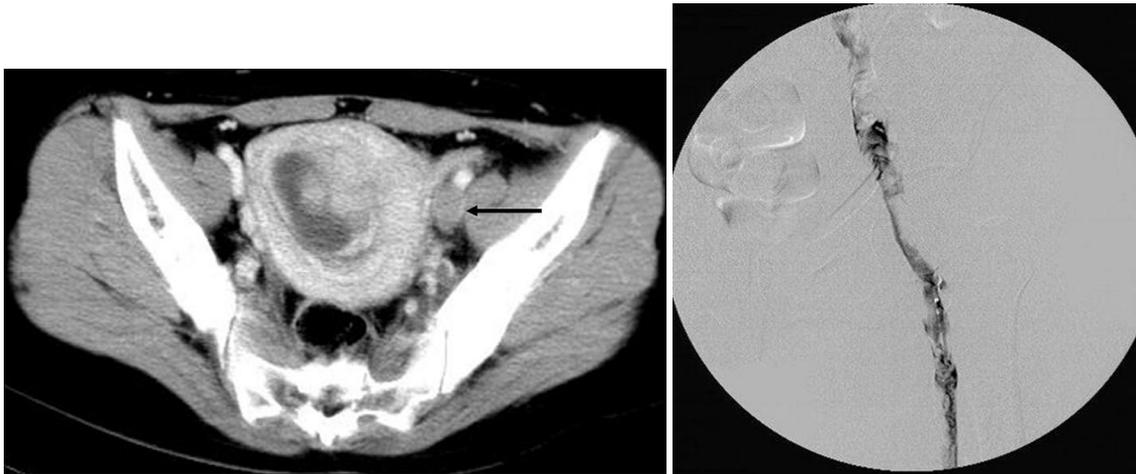
18

4

가

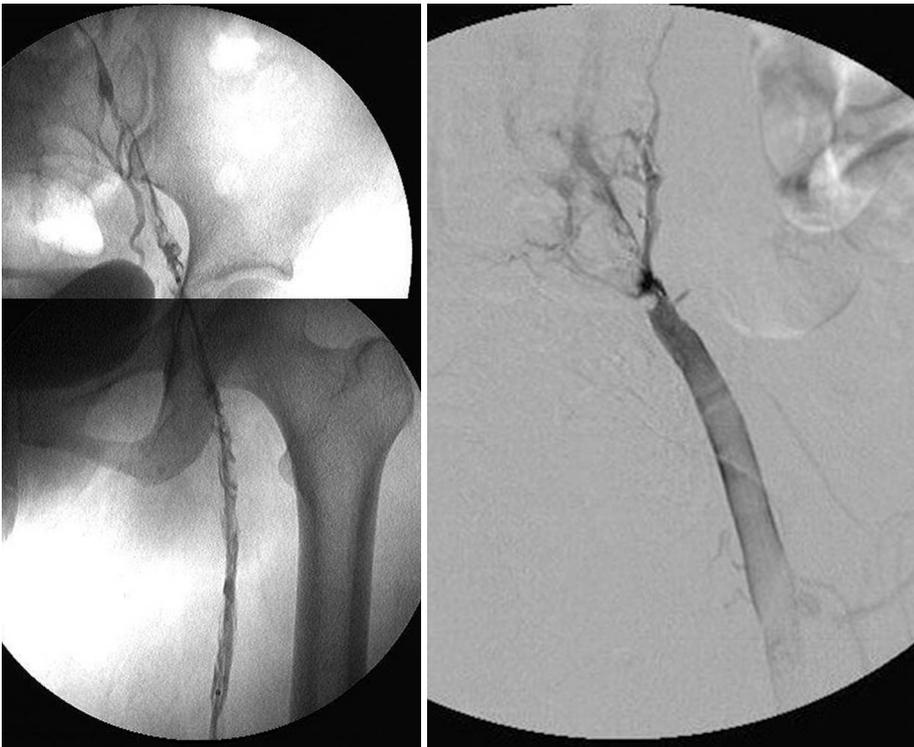
가

1  
2  
3



**Fig. 1.** 29-year-old early pregnant women with acute deep vein thrombosis in iliac vein compression syndrome.  
**A.** Initial CT shows enlarged uterus with gestational sac and acute deep vein thrombosis in left iliac vein (arrow). The left iliac vein was more enlarged than right side.  
**B.** Initial venogram reveals extensive thrombus in iliofemoral vein.  
**C.** Follow-up venogram after catheter directed thrombolysis with 2,200,000 unit urokinase infusion shows nearly total lysis and severe stenosis of left common iliac vein. IVC was well opacified with contrast media by collateral flows.  
**D.** Final venogram after aspiration thrombectomy, stent placement, and balloon dilatation shows complete restoration of venous lumen and flow.

1 . 180 IU coumadin .  
 9 Fr. guiding catheter (Vista brite tip, Cordis, Miami, FL, U.S.A.) . 57  
 (Fig. 2A).  
 5 cm 12 mm x 8 cm Nitis (Fig. 2C).  
 ( , , ) 12 mm  
 (Ultra Thin Diamond, Boston Scientific, Galway, Ireland)  
 (Fig. 2B). 4 12  
 III (Antithrombin III deficiency), C III (Protein C deficiency), S



A B



C D

**Fig. 2.** 35-year-old early pregnant women with acute deep vein thrombosis in iliac vein compression syndrome.

**A.** Transpopliteal venography shows extensive thrombus in iliofemoral vein.

**B.** Follow-up venogram after catheter directed thrombolysis with 1,800,000 unit urokinase infusion and aspiration thrombectomy with 9 Fr. guiding sheath shows complete lysis and occlusion of left common iliac vein.

**C.** Venogram after placement of Niti-S stent (12 mm x 8 cm) in left iliac vein shows normal venous flow patency of left iliac vein.

**D.** Reformated image of 57 months follow-up CT venogram after catheter directed thrombolysis and stent placement show good venous flow and stent patency of left iliac vein.

(Protein S deficiency)

, Krishnamurthy

(5).

(8)

(가 )  
(2, 6).

가

(2),

가

가

(5).

(2).

Vora

(2)

34,729

32 (0.1%)

3 (8)

2

가

5 2 (7)

24 (75%) 가

1 가 17 (53%) 가

가

2 가 6 , 3

가 9

9

가

가

3

가

가

sheath

가

(5).

(7, 8).

5 ( 4 ,

1 )

4

2

가

(7). Krishnamurthy (8)

3

26 28

( 2 , 1 )

( 2 )

. Acharya (7)

가

1. Drife J, Lewis G, eds. *Why Mothers Die 1997-1999. Fifth Report of the Confidential Enquiries into Maternal Deaths in the United Kingdom*, London: RCOG press, 2001
2. Vora S, Ghosh K, Shetty S, Salvi V, Satoskar P. Deep venous thrombosis in the antenatal period in a large cohort of pregnancies from western India. *Thromb J* 2007;4:5-9
3. Strandness DE Jr, Langlois Y, Cramer M, Randlett A, Thiele BL. Long-term sequelae of acute venous thrombosis. *JAMA* 1983;250:1289-1292
4. Lindhagen A, Bergqvist A, Bergqvist D, Hallbook T. Late venous function in the leg after deep vein thrombosis occurring in relation to pregnancy. *Br J Obstet Gynaecol* 1986;93:348-352

5. . . . . In . . . . . , 2007:642-661
6. Greer IA. *Haemostasis and thrombosis in pregnancy*. In Bloom AL, Forbes CD, Thomas DP, Tuddenham EGD. *Haemostasis and thrombosis Vol 2*. 3rd ed. Edinburgh, Scotland: Churchill Livingstone, 1994:987-1015
7. Acharya G, Singh K, Hansen JB, Kumar S, Maltau M. Catheter-directed thrombolysis for the management of postpartum deep venous thrombosis. *Acta Obstet Gynecol Scand* 2005;84:155-158
8. Krishnamurthy P, Martin CB, Kay HH, Diesner J, Friday RO, Weber CA, et al. Catheter-directed thrombolysis for thromboembolic disease during pregnancy: a viable option. *J Matern Fetal Med* 1999;8:24-27

## Catheter Directed Thrombolysis for Deep Vein Thrombosis during the First Trimester of Pregnancy: Two Case Reports<sup>1</sup>

Kum Rae Kim, M.D., Won Kyu Park, M.D., Jae Woon Kim, M.D.<sup>2</sup>,  
Woo Hyung Kwun, M.D.<sup>2</sup>, Bo Yang Suh, M.D., Kyeong Seok Park<sup>3</sup>

<sup>1</sup>Department of Radiology, College of Medicine, Yeungnam University

<sup>2</sup>Department of Surgery, College of Medicine, Yeungnam University

<sup>3</sup>Department of Radiology, Yeungnam University Medical Center

Anticoagulation with heparin has been the standard management therapy of deep vein thrombosis during pregnancy. Pregnancy is generally considered as a contraindication for thrombolysis. However, anticoagulation therapy alone does not protect the limbs from post-thrombotic syndrome and venous valve insufficiency. Catheter-directed thrombolysis, combined with angioplasty and stenting, can remove the thrombus and restore patency of the veins, resulting in prevention of post-thrombotic syndrome and valve insufficiency. We report successful catheter-directed thrombolysis and stenting in two early gestation patients with a deep vein thrombosis of the left lower extremity.

**Index words :** Pregnancy  
Venous thrombosis  
Thrombolytic therapy  
Pregnancy complications, cardiovascular

Address reprint requests to : Won Kyu Park, M.D., Department of Radiology, College of Medicine, Yeungnam University,  
317-1, Daemyungdong, Namgu, Daegu 705-717, Korea.  
Tel. 82-53-620-3048 Fax. 82-53-653-5484 E-mail: wkpark@ynu.ac.kr