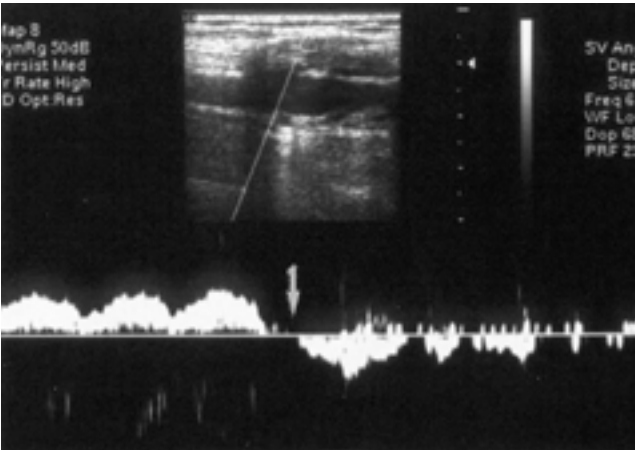




: (MR venogra-  
 phy, MRV)  
 :  
 45 ) 가 19 ( : =9:10,  
 3 MRV , 12 (7 )  
 MRV 3 MRV 3  
 13 가 3  
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 (1, 2).  
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 (1, 2).  
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 가 ,  
 (7). ( MRV)  
 Ruehm (8)  
 large - volume 3D data sets

가 19 ( 9  
 , 10 , 45 (34 -64 ))  
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 MRV , 12 (15 , 3  
 ) 가  
 18G Medicut 가 가 가  
 Guerbert, France) 50 ml 1 ml (Xenetics,

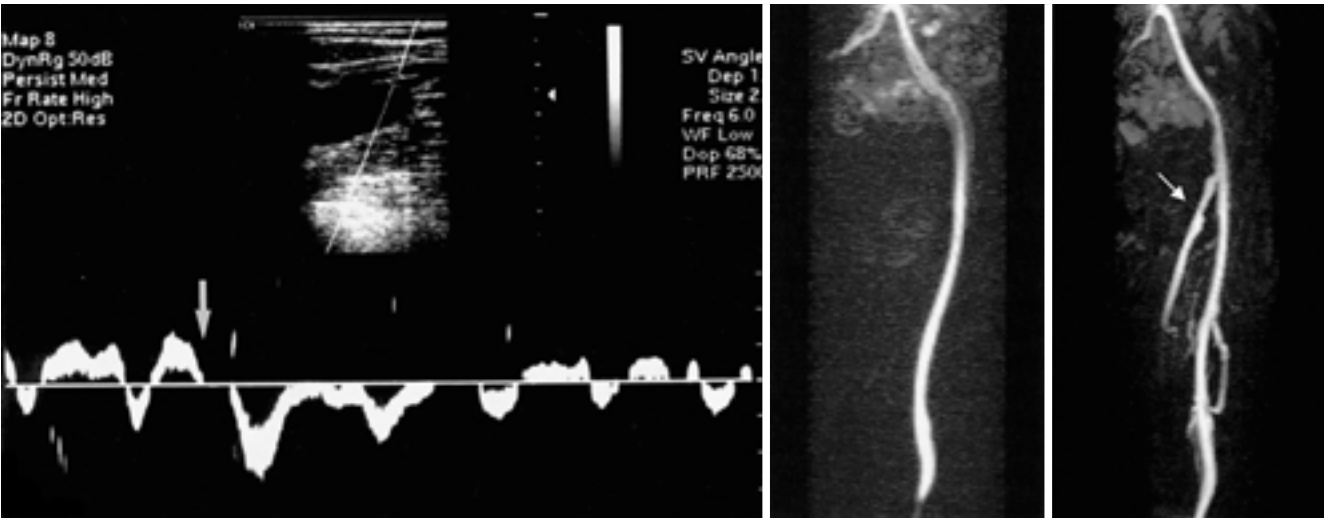


**Fig. 1.** 47-years old female with varicosity of left lower leg. Doppler sonography with valsalva maneuver (arrow) shows reflux from left common femoral vein to greater saphenous vein.

60  
 가 가 MRV  
 (Magnetom, Siemens, Germany)  
 1.5T  
 FOV  
 3D FISP (TR;4.0 msec,  
 TE;1.6 msec, FOV;500, FLIP ANGLE; 30, Matrix;256 × 200)  
 48 , 35  
 MIP  
 15:1 (Dotarem, Guerbert,  
 France) 40 ml 3 ml 5  
 가  
 (valsalva maneuver  
 with/without compression)

**Table 1.** Comparison between MRV and Ascending Venogram in Visibility of Venous Segment and Varicosity

Patient	MRV		ASV	
	Segment (No.)	Varix (No.)	Segment (No.)	Varix (No.)
1	11	3	13	2
2	14	3	13	3
3	12	1	12	0
4	20	3	11	4
5	12	3	11	1
6	10	6	8	6
7	9	0	10	1
Total	78/91	19/21	78/91	17/21



**Fig. 2.** 42-years old male with varicosity of left lower leg.  
**A.** Doppler sonography with valsalva maneuver (arrow) shows reflux from common femoral vein to greater saphenous vein.  
**B.** MRV with compression and without valsalva maneuver shows common and superficial femoral vein.  
**C.** MRV with compression and valsalva maneuver shows reflux from common femoral vein to greater saphenous vein (arrow).

(Fig. 1).  
MRV  
valsalva  
가

7  
5  
7

13 ( , , , ) .



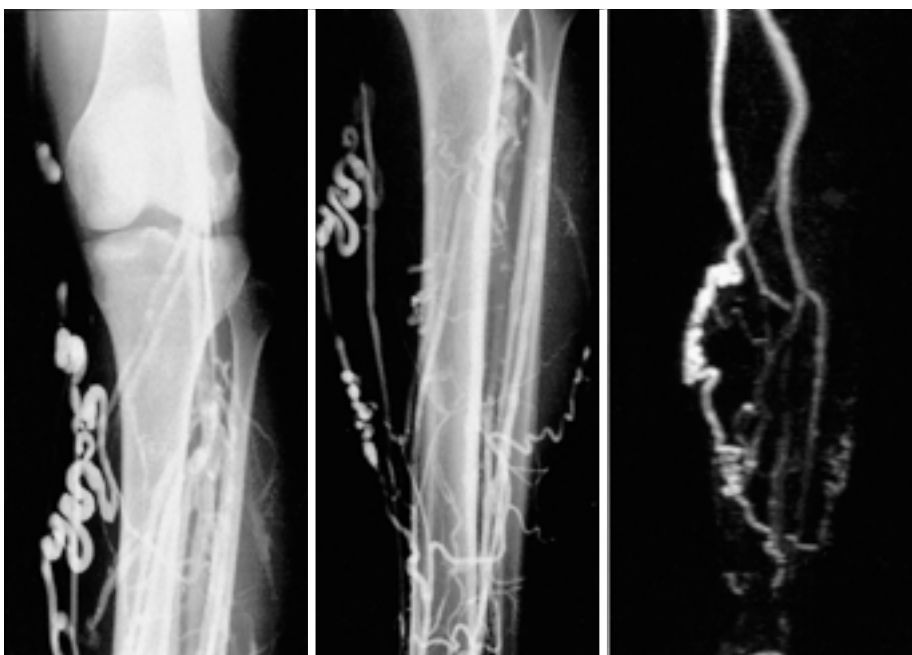
**Fig. 3.** 47-years old female with varicosity of left lower leg.

**A, B.** Ascending venography of pelvic and thigh portion. Great Saphenous vein is not seen.

**C.** MRV of thigh portion. Common and superficial femoral vein and greater saphenous vein are seen.

**D. E.** Ascending venography of knee and tibial portion. Two segments of varices are detected.

**F. MRV of tibial portion.** Also two segments of varices are detected.





20 가 valsalva  
가  
(1 ) MRV  
4).  
MRV 가 7 ,  
MRV 가 12  
가  
MRV  
valsalva

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## The Usefulness of Three-Dimensional Gadolinium-Enhanced MR Venography for the Evaluation of Varices in Lower Extremities<sup>1</sup>

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**Purpose:** To assess the performance of contrast-enhanced three-dimensional(3-D) magnetic resonance venography (MRV) of the pelvis and lower extremities in patients with varicose veins.

**Materials and Methods:** Ascending and MR venography were performed in seven legs of seven patients, and duplex Doppler sonography and MR venography in 15 legs of 12 patients, all referred for evaluation of varicose veins. For analysis, the venous system as revealed by ascending and MR venographic images was divided into 13 segments. For detection of reflux to the great saphenous vein, duplex Doppler sonography and MRV were performed.

**Results:** In ascending venography and MRV, 91 venous segments were potentially visible; both modalities depicted 78 of these, but failed to detect four. Ascending venography and MRV detected 17 and 19 varices, respectively. When two tourniquets were placed around the ankle and knee using the Valsalva maneuver, MRV and duplex Doppler sonography detected reflux in 8 of 11 and 13 of 15 legs, respectively.

**Conclusion:** Contrast-enhanced 3-D MRV comprehensively displays the venous system of the lower extremities and permits assessment of varicose veins. MRV using the Valsalva maneuver allows assessment of reflux to the great saphenous vein.

**Index words :** Magnetic resonance (MR), vascular studies

Magnetic resonance (MR), contrast enhancement

Extremity, MR

Venography

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