

1

2

3

:

: 2002 9

2005 3

가

207 , 288

74

133

20

79 (51)

5

Grade(Gr.) 0

가

, Gr.

I

3

가

, Gr. II

가

, Gr. III

, Gr. IV

가

:

Gr. 0, 42 , Gr. I, 68 , Gr. II, 23 , Gr. III, 104

, Gr. IV, 51 ,

Gr. 0, 98 , Gr. I, 60 , Gr. II, 38 ,

Gr. III, 36 , Gr. IV, 56 .

Gr. 0, 2 , Gr. I, 9 , Gr.

II, 3 , Gr. III, 85 , Gr. IV, 44 ,

, Gr. 0, 3 , Gr.

I, 4 , Gr. II, 4 , Gr. III, 23 , Gr. IV, 37 .

. Gr. III

76.5%

:

30 - 70

10 - 40%

(Hand-held Doppler)

가 (1).

(2, 3).

가

가

, , ,

(1).

가

가

, 가

(Trendelenburg test)

(2)

1

2

3

2003

2006 1 24

2006 4 25

2002 9

2005 3

207 ,

20 - 79 (: 51) , 74:133
207 175 , 32
63
ATL HDI 5000 (Advanced Technology Laboratories, Bothell, WA, U.S.A.) Sequoia (Acuson, Mountain View, CA, U.S.A.) 5 - 10 MHz
(great saphenous vein; GSV)
(small saphenous vein; SSV)
1/3
(perforating vein)
(artifact)
(6.4 cm/sec)
20 60
5
Grade (Gr.) 0
가 , Gr. I
0.5 3 가 , Gr. II
가
, Gr. III
, Gr. IV
(Table 1).
Gr. III 가
Grade grade
SPSS windows 10.1
(grading system)

Table 1. Grading System of Primary Varicose Vein

Grade	Definition
0	No reflux
I	Only early reflux in valsalva maneuver within three seconds
II	Continuous reflux without venous dilatation in Valsalva maneuver
III	Continuous reflux with venous dilatation in Valsalva maneuver
IV	Reflux at resting state.

(Kruskal - Willis one - way ANOVA test)

288 Gr. 0, 42 , Gr. I, 68 , Gr. II, 23 , Gr. III, 104 , Gr. IV, 51 , Gr. 0, 98 , Gr. I, 60 , Gr. II, 40 , Gr. III, 34 , Gr. IV, 56 가 가 17 (Gr. I, 1 , Gr. II, 2 , Gr. III, 9 , Gr. IV, 5) , 2 Gr. III 가 40 가 103 , 29 가 Gr. III 12 , Gr. 0, 42 2 , Gr. I, 68 , 9 , Gr. II, 23 3 , Gr. III, 104 85 , Gr. IV, 51 44 (Table 2), Gr. 0, 98 3 , Gr. I, 60 4 , Gr. II, 38 4 , Gr. III, 36 21 , Gr. IV, 56 37 (Table 3). Gr. III , 2 4 (1 - , Gr. III, 1 -

Table 2. Distribution of Operated and Non-operated Veins by Grading System in Great Saphenous Vein

Grade	No. of veins (%)	No. of operated veins (%)	No. of non-operated veins (%)
Gr. 0	42 (14.6)	2 (1.4)	40 (27.6)
Gr. I	68 (23.6)	9 (6.3)	59 (40.7)
Gr. II	23 (8.0)	3 (2.1)	20 (13.8)
Gr. III	104 (36.1)	85 (59.4)	19 (13.1)
Gr. IV	51 (17.7)	44 (30.8)	7 (4.8)
Total	288 (100)	143 (100)	145 (100)

Table 3. Distribution of Operated and Non-operated Veins by Grading System in Small Saphenous Vein

Grade	No. of veins (%)	No. of operated veins (%)	No. of non-operated veins (%)
Gr. 0	98 (34)	3 (4.3)	95 (43.4)
Gr. I	60 (20.8)	4 (5.8)	56 (25.6)
Gr. II	38 (13)	4 (5.8)	34 (16)
Gr. III	36 (12.5)	21 (30.4)	15 (6.8)
Gr. IV	56 (19)	37 (54)	19 (8.7)
Total	288 (100)	69 (100)	219 (100)

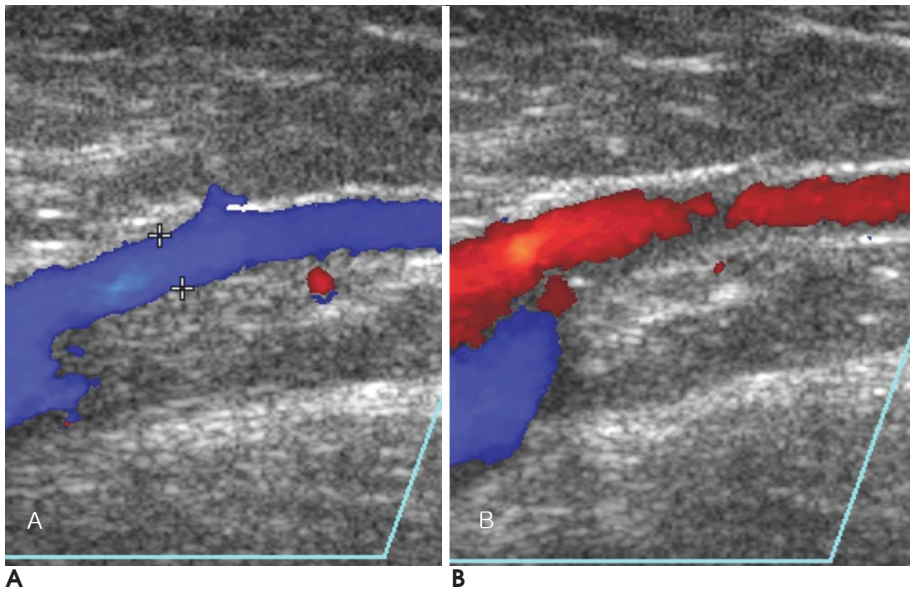


Fig. 1. Grade II reflux : **A.** Color Doppler image of great saphenous vein in resting state. **B.** Color Doppler image with Valsalva maneuver show continuous reflux without dilatation in great saphenous vein.

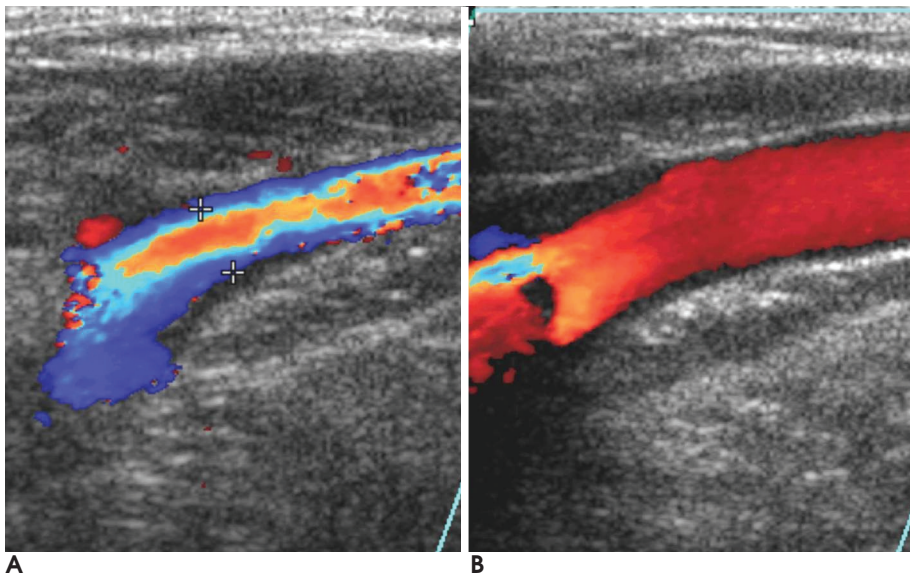


Fig. 2. Grade III reflux : a. Color Doppler image of great saphenous vein in resting state. b. Color Doppler image with Valsalva maneuver show continuous reflux with dilatation in great saphenous vein.

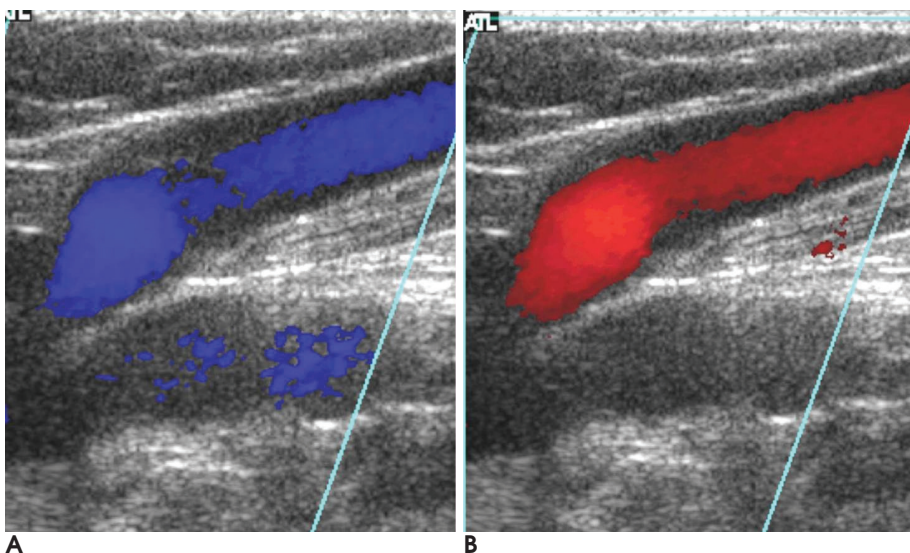


Fig. 3. Grade IV reflux : a. Color Doppler image of small saphenous vein in resting state. b. The reflux is detected at resting state in small saphenous vein.

Gr. IV, Gr. IV) 0.03 , Gr. I 0.07 , Gr. II 0.11 , Gr. III
0.58 , Gr. IV 0.56 Gr. III
(Table 3)
(p -value < 0.01) (Table 5).

가 1 ,
3
가 Gr. IV
가 1
(stripping of varicose vein),
(high ligation of great saphenous vein or small saphenous
vein) (endovascular sclerotherapy),
(TIPP: Transiluminated powered
phlebectomy), (Radiofrequency
treatment; VNUS closure technique),
(EVLT:endovascular laser treatment)
, Gr. 0 5
1 가 4
. Gr. I
가
. Gr. II 5
grade가 가
가 Gr. III 가
(saphenofe - moral junction)
Gr. 0 0.05 , Gr.
I 0.13 , Gr. II 0.13 , Gr. III 0.82 , Gr. IV
0.86 Gr. III
(p -value < 0.01)
(Table 4). Gr. 0

Table 4. Result of Kruskal-Willis Test by GSV Grading System

Grade	No. of patients	Mean rank	Chi-square	p -value
Gr. 0	42	79.86	151.903	<0.01
Gr. I	68	92.06		
Gr. II	23	91.78		
Gr. III	104	190.69		
Gr. IV	51	197.23		
Total	288			

Table 5. Results of Kruskal-Willis Test by SSV Grading System

Grade	No. of patients	Mean rank	Chi-square	p -value
Gr. 0	98	114.41	114.566	<0.01
Gr. I	60	119.60		
Gr. II	38	125.16		
Gr. III	36	194.00		
Gr. IV	56	205.14		
Total	288			

, Jeanneret (13)

(Common femoral vein)

(30%)

가

가 Jeanneret

가

(14)

10

가 가

(13 -

15).

가

(14, 15).

가

가

Grade III 가

77.14%

93.06%

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The Usefulness of Venous Color Doppler with Valsalva Maneuver for Varicose Vein¹

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Purpose: We wanted to evaluate the usefulness of venous color Doppler with performing a Valsalva maneuver for classifying primary varicose vein of the lower extremity.

Materials and Methods: From September 2002 to March 2005, 207 patients and 288 extremities that were clinically suggestive of primary varicose vein in the lower extremity underwent venous color Doppler with performing a Valsalva maneuver. The patients included 133 women and 74 men aged between 20 - 79 years (mean age: 51 year). Color Doppler study was performed in the great and small saphenous veins. We used a 5 point grading system, Grade (Gr.) 0 was no evidence of reflux, Gr. I was early reflux within 3 seconds after the Valsalva maneuver, Gr. II was continuous reflux without dilatation during the Valsalva maneuver, Gr. III was continuous reflux with dilatation during the Valsalva maneuver and Gr. IV was reflux at a resting state. To find a relationship between the rate of operation and the grading system, we retrospectively reviewed the patient's medical records and the grading system.

Results: In the great saphenous vein, Gr. 0 was noted in 42 cases, Gr. I was noted in 68 cases, Gr. II was noted in 23 cases, Gr. III was noted in 104 cases and Gr. IV was noted in 51 cases. In the small saphenous vein, Gr. 0 was noted in 98 cases, Gr. I was noted in 60 cases, Gr. II was noted in 38 cases, Gr. III was noted in 36 cases and Gr. IV was noted in 56 cases. Among these cases, 2 cases of Gr. 0, 9 cases of Gr. I, 3 cases of Gr. II, 85 cases of Gr. III and 44 cases of Gr. IV of the great saphenous vein were operated on. 3 cases of Gr. 0, 4 cases of Gr. I, 4 cases of Gr. II, 23 cases of Gr. III and 37 cases of Gr. IV of the small saphenous vein were also operated on. Consequently, the operation rate was 76.5% in the severe cases over Gr. III.

Conclusion: Color Doppler with performing a Valsalva maneuver and our new grading system is a useful method to determine the rate of operation for the patients suffering with primary varicose vein.

Index words : Varicose vein
Ultrasound (US), doppler studies

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