

Repair of Saphenofemoral Transition: Reşat Operation for Patients With Venous Reflux

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Objective: To develop a new solution superior to the current surgical interventions in patients with venous reflux in the great saphenous vein (GSV).

Materials and Methods: Patients with the symptoms of venous incompetence in their legs like pain, edema, and cramp were also examined with color Doppler ultrasonography (CDU). One hundred ninety-one extremities with venous reflux at the saphenofemoral transition (SFT) were subjected to surgery over 8 years. A newly designed operation, the Reşat operation, was performed in all of the patients. The Reşat Operation was performed only in the patients with continuous reflux at their saphenofemoral transition during the entire Valsalva maneuver. The follow-up time spanned more than 8 years. The patients' complaints, physical examinations, and CDU findings were evaluated.

Results: All of the patients had continuous reflux at the SFT for the duration of the entire Valsalva maneuver preoperatively. However, 67.88% of the patients had no reflux postoperatively ($P < 0.001$). Additionally, 95.76% of the patients recovered to different degrees in the early postoperative period ultrasonographically ($P < 0.001$). All of the patients reported being satisfied with the result in the early postoperative period ($P < 0.001$). In the late postoperative period, although the CDU reports of some patients showed reflux at the GSV, no patient complained about their condition.

Conclusion: The Reşat operation is a well-tolerated operation and reconstitutes the saphenofemoral transitions successfully. Its early and late postoperative results are satisfactory. The Reşat operation should be the first-choice surgical treatment in patients with venous reflux at the saphenofemoral transition.

Key words: Saphenofemoral reflux – Venous reflux – Venous insufficiency – Reşat operation – Venous repair – Surgery

Venous incompetence of the great saphenous vein (GSV) and venous reflux are still major problems of vascular surgery. According to reports in the literature, approximately 10%–40% of Western populations develop this problem.¹ Pain, edema, swelling, and cramps in the legs might limit the patients' daily life and social comfort. Besides, skin ulcers or cellulitis on the legs based on the venous incompetence may be a reason for additional severe problems on occasion. Unfortunately, medical treatments for venous incompetence can be insufficient at times, and surgery may be inevitable for an important percentage of the patients.

Although new technological instruments and interventions such as lasers² and radiofrequency³ have become more popular among both surgeons and patients, patient satisfaction is still limited,⁴ especially years after stripping operations when the symptoms of the patients restart, and surgeons become frustrated because they have no other option. Even if the cumulative knowledge of laser operations is less than that of stripping operations, it is possible to speculate that patients will receive similar results because the basic approach of both operations is the same—to make the GSV nonfunctional.

On the other hand, to lose the saphenous vein may be a problem for some patients who will undergo any bypass operation, such as coronary bypass grafting surgery (CABG), in the future. Although no surgeon wants to use a varicose vein as a graft in any bypass surgery, and despite the variety of graft choices, the GSV remains an important choice for grafts for bypass surgeries. Thus, GSV is one of the most widely used grafts in bypass surgeries.

Due to the reasons mentioned already, new strategies and operations, in addition to stripping or stripping-like operations (laser, radiofrequency, sclerotherapy), need to be developed for patients with reflux in their GSV.

In this manuscript, it's described as a newly developed operation for these patients and its results during the early and late postoperative periods, reaching more than 8 years.

Materials and Methods

Patients

One hundred ninety-one Reşat operations were carried out in 145 patients during 148 different seasons. All of the patients were informed about the procedure, and the operations were conducted

according to the Declaration of Helsinki. Informed consent was obtained from all of the patients.

Preoperative evaluation

All of the patients had symptoms of venous incompetence in their legs. Major symptoms in the patients are pain and swelling restricting the daily life and night cramps leading to insomnia. Other complaints of the patients and changes due to operations were noted. They were first examined physically and then by color Doppler ultrasonography (CDU). All parts of the venous systems of their legs were examined by CDU. Only the patients with continuous reflux at their saphenofemoral transition during the entire Valsalva maneuver were enrolled in the study. Any patient with thrombosis in any part of the venous system of their lower extremities was not included. Likewise, patients with any local or systemic infection were not included. Any patients who had previous ligations or resections were not included in this study. The CEAP (Clinical, Etiology, Anatomy, and Pathophysiology) classifications of the patients were C_{2s-5}, E_p, A_{s±d±p}, P_r.

Surgical operation

After local anesthesia with prilocaine (Priloc; VEM Ilac Sanayi ve Ticaret Ltd. Sti. Ankara, Turkey), saphenofemoral transition was explored through a 3-cm incision at the groin. Strip testing was carried out to examine the GSV by the fingers. Strip test is a test in which surgeon puts one of his fingers on the distal part of the vein through the incision to block the venous blood flow. Next, another finger is slid over the vein to drain the blood in the vein toward the heart. The lumen of the vein becomes empty by this maneuver. Next, the finger on the distal side is taken out to see the blood flow in the vein and to test the patency of the vein or the finger on the proximal side is taken out to test the existence/amount of the reflux.

After satisfaction with the active blood flow in the GSV, surgery was continued. All side branches of the GSV at this location were ligated and then divided (Fig. 1). The saphenofemoral transition was explored with part of the common femoral vein (CFV). The patients were ordered to undergo the Valsalva maneuver. Meanwhile, both the saphenofemoral transition and the valve at this region and its cusps were examined by inspection. Reflux at this region and the diameters and borders of the damage on both the GSV and CFV due to reflux

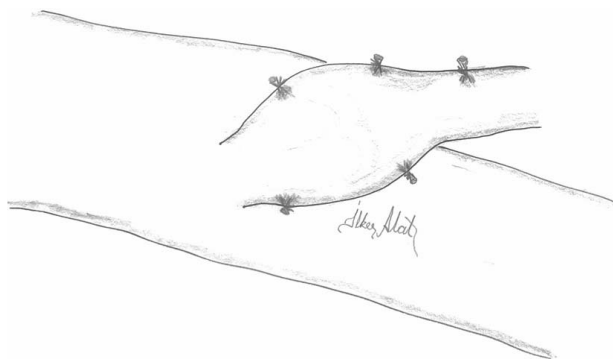


Fig. 1 The exploration of the saphenofemoral transition. Side branches of the GSV near the transition are divided and ligated.

were evaluated carefully. Next, the GSV at this region was wrapped with a 0.4-mm thick polytetrafluoroethylene (PTFE) graft (Fig. 2). The same type of PTFE graft materials were used in all of the patients. Their dimensions were 2 cm x 9 cm x 0.4 mm. All of the patients except 10 underwent surgery using Gore-Tex Cardiovascular Patch PTFE grafts (W.L. Gore & Associates, Inc., Phoenix, Arizona). IMPRA ePTFE (expanded PTFE) Cardiovascular Patch (Bard Peripheral Vascular Inc., Tempe, Arizona) grafts in the same dimensions were used in 10 patients. However, in those instances, the Bard grafts required many more sutures for their handling and shape, although the thickness of the graft is the same, 0.4 mm. The reason is that Bard 0.4-mm PTFE grafts are much more rigid than Gore-Tex grafts, resulting in difficulty with the wrapping of the GSV without any spaces, especially at the

bifurcation zones such as the saphenofemoral transition. However, Gore-Tex grafts cover the vein surfaces without any space and function like a native layer of the vessels. Thus, Gore-Tex PTFE grafts were chosen by the surgeon with regard to this experience.

After wrapping the GSV with the graft, the first stitch was sutured on the proximal edge of the graft at the saphenofemoral transition (Fig. 2). This stitch is significant. If it is too tight, the GSV will be occluded; if it is too loose, the patient will not obtain any benefit. Thus, before sewing, measurement of the graft at the transition zone is important. This measurement will not only determine the diameter of the tube part of the GSV but will also determine the diameter of the orifice of the GSV at the transition region. This suture should be made tight to the degree that allows the GSV to be moved by

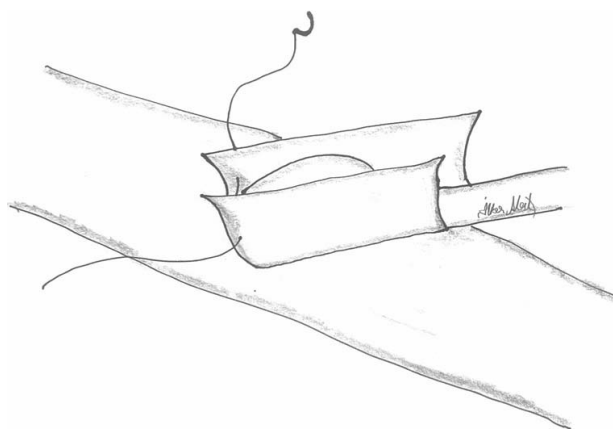


Fig. 2 After wrapping of the GSV with the PTFE graft, the first stitch is sutured on the proximal edge of the graft at the saphenofemoral transition. This suture determines the diameter of the orifice of the GSV.

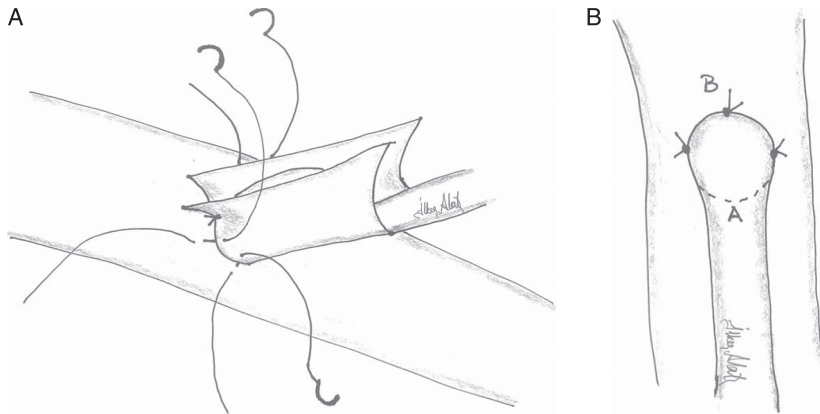


Fig. 3 (A, B) The stitches shown in Fig. 3B are sutured on the CFV as shown in Fig. 3A. The main purpose for those sutures is to reconstitute the orifice shape of the GSV at the transition.

pulling the graft at both sides. To check the blood flow in the GSV, a strip test should be carried out one more time after this suture.

Next, the stitches shown in Fig. 3B were sutured on the CFV as shown in Fig. 3A. These sutures are not the fixation sutures for the graft. They also work like fixation sutures for the graft, but the main purpose for those sutures is to reconstitute the orifice shape of the GSV at the transition. The needle must not pass through full thickness on the CFV to prevent deep venous thrombosis. The suture line on the CFV should be determined according to the borders of the damage on the CFV due to the reflux at the saphenofemoral transition. Nevertheless, it should not be forgotten that larger suturing on the CFV than necessary might result in stenosis in the CFV. These sutures will reconstitute the orifice of the GSV and will also help the resuspension of the cusps indirectly. The “A” point, shown in Fig. 3B, does not need to be sutured. The desired effect at the “A” point can be managed by gentle tension while

suturing at the “B” point. In conclusion, reconstituting the orifice of the GSV at the transition as close as possible to the desired extent can be obtained by gentle tension at those three sutures shown in Fig. 3B. The surgeon will make a decision regarding the shape of the orifice of the GSV by determining the suturing points on the CFV. If needed, additional stitches can be sutured on the CFV among those 3 sutures. It must not be forgotten that the optimum reconstitution of the orifice of the GSV will also be an important factor for the resuspension of the valve at the transition. The sutures shown in Fig. 3A will also help the resuspension of the valve annulus.

Next, the edges of the graft were sutured repeatedly to reconstruct the tube part of the GSV. Normal tube formation was obtained by this suturing as illustrated in Fig. 4. The aim of this suturing is to have the cusps of the valve become closer as shown in Fig. 5. Finally, the graft was fixed with 2 fixation sutures at this side.

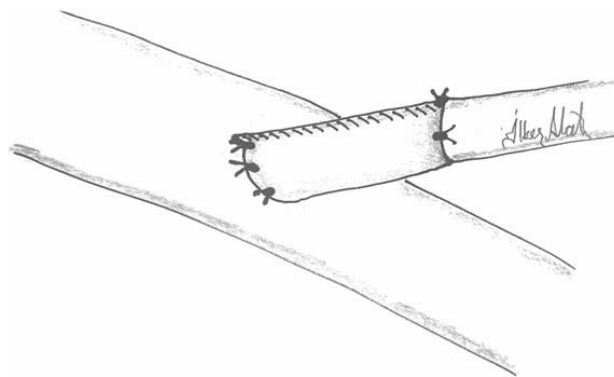


Fig. 4 The edges of the graft are sutured repeatedly to reconstruct the tube part of the GSV.

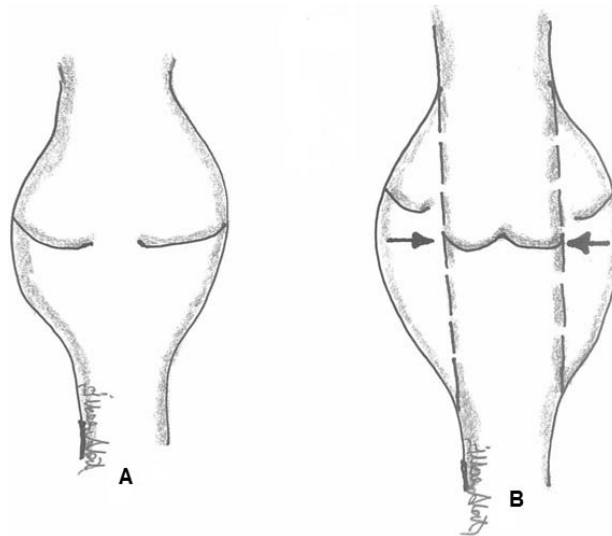


Fig. 5 The aim of the suturing, shown in Fig. 4, is illustrated.

If there was any remnant of the side branches under the graft, a suitable hole was made, and the ligated stump side branch was passed through the hole as shown in Fig. 6 before the suturing process of the graft was repeated. These holes should be carried out for each stump side branch under the graft to prevent

luminal narrowing which can account for the GSV occlusion due to thrombosis in the future.

The 6/0 polypropylene sutures (Ethicon Inc., Somerville, NJ) were used for all of the stitches described already.

A strip test was carried out a final time to check the blood flow in GSV. Next, the patient was ordered

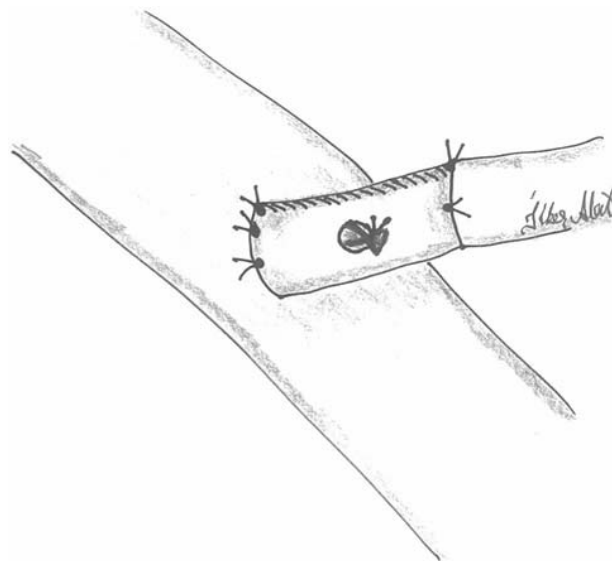


Fig. 6 If there is any remnant of the side branches under the graft, a suitable hole is made and the ligated stump side branch is passed through the hole before the suturing process of the graft repeatedly. These holes are made for each stump side branches under the graft to prevent the luminal narrowing.

Table 1 List of concomitant operations

Concomitant operations	Numbers
Ambulatory phlebectomy ^a	23
Perforating vein ligation	46 patients - 64 branches in calf - 8 branches in thigh
Ligation of contralateral GSV	2
Division and ligation at the contralateral saphenofemoral transition	2
Direct repair of the valve of the superficial femoral vein	1
SEPS	1
Venous aneurysmoplasty	1
Lymph node resection	29

GSV, great saphenous vein; SEPS, subfascial endoscopic perforator surgery.

^aAmbulatory phlebectomies were performed in the varicose segments of superficial venous systems except GSV.

to undergo the Valsalva maneuver to be sure of the repair and absence of the reflux.

All of the layers were closed as usual after hemostasis.

Medications and follow-up

Patients underwent antibiotic prophylaxis starting one hour before surgery and completing by the end of the first week after surgery. Next, acetylsalicylic acid, 150 mg/d, and classical venotonic agents (like diosmin + hesperidin or oxerutin) were ordered postoperatively. Moreover, pentoxifylline treatment was added for the first postoperative year. An elastic bandage was not used unless another additional venous operation was carried out. A compression sock was suggested postoperatively.

The operated extremities of the patients were elevated during the first night after surgery. All of the patients were discharged 1 day after their operations. To determine the changes in their quality of life, they were asked about their feelings and the existence or absence of their complaints before discharging. A control CDU examination was carried out during the first postoperative 10 days and annually.

Concomitant operations

Concomitant operations were carried out in 78 patients and are listed in Table 1. If any lymphadenopathy was observed, it was excised to prevent postoperative graft infection due to contact. No

lymphedema was observed in any case; however, in 1 case, lymphorrhea was observed after the operation. It was cured with a second operation. Ligations and divisions of contralateral great saphenofemoral veins and their branches at the groin were carried out together with a Reşat operation in the ipsilateral legs in some patients who had venous incompetence in both legs. In this group of patients, it was proven that their complaints in their contralateral legs were related to a previous incomplete stripping operation.

Because it is well-known that perforating veins are the most frequent reason for recurrent operations in the patients with venous insufficiency,^{5,6} perforating veins larger than 2 mm with a reflux longer than 4 seconds were ligated.

Statistical analyses

All of the data were analyzed by a statistician. PASW 18.0 (Predictive Analytics Software, SPSS Inc, Chicago, Illinois) and Stata 11.0 (StataCorp LLC, College Station, Texas) programs were used for statistical calculations. The binomial test and Wilcoxon signed-rank test were used for analyses. A *P* value less than 0.05 was assumed to indicate statistical significance.

Results

Demographic values

One hundred ninety-one Reşat operations were carried out in 145 patients during 148 different seasons. Sixty of the patients were male, and the remaining 88 were female. The demographic values of the patients' ages were as follows: minimum: 21 years; maximum: 74 years; mean: 41.09 years; median: 39 years; SD: 12.07 years.

The range of the 191 Reşat operations was as follows: right lower extremity in 49 patients, left lower extremity in 56 patients, and bilateral operations in 43 patients.

Clinical and monitoring findings

All of the patients were symptomatic and had continuous reflux at the saphenofemoral transition during the entire Valsalva maneuver during their preoperative CDU examination.

Major symptoms in the patients are pain and swelling restricting the daily life and night cramps leading to insomnia. All of the patients had pain and half of the patients had complaint from swelling,

Table 2 Statistical results of CDU findings in the early postoperative period. One hundred sixty-five extremities could be examined in the first 10 days postoperatively with CDU

CDU findings in the early period ^a	Numbers (percentages)	P value
0	112 (67.88%)	<0.001
1	14 (8.48%)	
2	16 (9.70%)	
3	11 (6.67%)	
4	7 (4.24%)	>0.05
5	5 (3.03%)	

CDU, colored Doppler ultrasonography.

^a0 = No reflux (100% correction); 1 = a distinctive, prominent improvement in reflux (A reflux, 0–500 ms); 2 = a reasonable improvement in reflux (A reflux, 500–2000 ms); 3 = a mild improvement in reflux (A reflux, 2000–4000 ms); 4 = no improvement in reflux (A reflux, much more than 4000 ms); 5 = suspected thrombosis.

which increased toward the end of the day. Some of the patients with edema had night cramps and itching. Because of pain and edema, especially for patients who had a job such as teacher or nurse, they were complaining about lost work.

During the late follow-up period (after 1 year), 121 of 145 (83.45%) cases were reached. Communication with the remaining patients ($n = 27$) was not possible for several reasons. However, to report the results of 83.45% of the patients was satisfying, and this finding was sufficient to reflect the entire group statistically ($P < 0.001$).

On the first morning after the operation, no patient had any symptoms, and all of the patients (191 extremities) were satisfied. Additionally, they reported that all of their preoperative complaints were resolved completely ($P < 0.001$).

One hundred sixty-five extremities could be examined in the first 10 days postoperatively with CDU. The results of the preoperative CDU findings of 165 extremities are summarized in Table 2. According to these results, 67.88% of the patients did not show any reflux on CDU during their early postoperative period ($P < 0.001$). In total, 153 of the extremities (92.73%) recovered to different degrees ($P < 0.001$).

Five patients (3.03%) had suspected thrombosis on the CDU examination during their early postoperative period ($P > 0.05$); however, reexamination with CDU 1 month later showed no thrombosis in the same patients, although none of the thrombolytic agents were applied. It was thought that the suspected thrombosis observed on CDU during the

early period was a false-positive result of early perivascular edema due to the surgical trauma. Thus, if those 5 extremities were added to the 153 extremities who recovered to different degrees, the total number of extremities reaches 158 (95.76%) ($P < 0.001$).

Another unexpected finding of the early CDU examination was related to 7 patients (4.24%) in whom no improvement was observed in their reflux ultrasonographically, although those patients did not complain about anything and stated that their preoperative symptoms were resolved completely. It is believed that this discordance between the CDU findings and patient clinical findings is related to routine CDU evaluations. Because the reflux volume was not measured in daily CDU practice, the decrease in the amounts of the reflux must have been masked. Therefore, the patients feel good due to the decreased amount of reflux, although the CDU reports showed failure. Thus, a further investigation on this subject was planned to explain the discordance. However, even if 4.24% of patients did not show any improvement, it was not significant statistically.

During the early postoperative periods, only a single case (0.52%) among 191 operations underwent revision due to seroma, and 2 cases (1.05%) of segmental thrombophlebitis (not in the GSV) in 191 extremities were observed. The patient with seroma healed after draining surgically, and 2 patients with thrombophlebitis in the side branches of the GSV healed with medical therapy without any problem.

The follow-up time reached a period of more than 8 years (101 months). The patients were controlled clinically regularly, and CDU examination was repeated annually.

During the late period, 90.54% of the patients had no complaints ($P < 0.001$), 6.08% of the patients had some complaints but not as much as those preoperatively, and 2.03% of the patients had some complaints similar to those preoperatively ($P > 0.05$). Two patients (1.35%) had a small venous ulcer less than 1 cm postoperatively ($P > 0.05$), and their venous ulcers healed with medical therapy completely.

During the late period, the number of patients examined with CDU a few years later was 84; 60.71% of those patients still had no reflux according to their CDU findings, and 79.76% of those patients still showed improvement in their symptoms. These results were significant statistically. Additionally, 20.24% of those patients relapsed according to CDU findings years later. However, recurrence in those

Table 3 Changes in the range of clinical score between preoperative and postoperative status according to Venous Clinical Severity Score

Parameter	Range of preoperative score	Range of postoperative score
Pain	2 to 3 points	0 points (none)
Varicose veins	1 to 2 points	0 to 1 point(s)
Venous edema	2 to 3 points	0 points (none)
Pigmentation	0 to 2 points	0 to 1 point
Inflammation ^a	0 points (none) ^a	0 points (none)
Induration ^a	0 points (none) ^a	0 points (none)
Number of active ulcers ^a	0 points (none) ^a	0 to (1 point) ^b
Duration of active ulcers ^a	0 points (none) ^a	0 to (1 point) ^b
Size of Active Ulcers ^a	0 points (none) ^a	0 to (1 point) ^b
Compression therapy ^c	2 to 3 points	0 points (none)
Total points	7 to 13	0 – 2 – (5) ^b

^aBecause a prosthetic material, a PTFE graft, was used in the operation, the Reşat operation was not performed in the patients with active venous ulcers, inflammation, induration, and or cellulitis to minimize the risk of postoperative graft infection and the wound healing problems.

^bTwo patients had a small venous ulcer less than 1 cm postoperatively, and their venous ulcers healed with medical therapy completely. However, a stripping operation had to be performed after 6 years for one of these patients due to recurrence in his venous ulcer.

^cA compression sock was suggested postoperatively as a prophylaxis, but patients were reluctant to use it because they were not symptomatic in terms of edema and or pain.

patients was not related to the saphenofemoral transition generally. The severity of the disease in those 20.24% of patients was related to the GSV part except the transition. Thus, 20.24% of those patients did not complain as much as compared with those preoperatively, although CDU findings reported progression.

During the late period, only 4 patients underwent a secondary operation, stripping, carried out by different surgeons. These patients had a complaint similar to that during their preoperative status. Three of these 4 patients could be reached; unfortunately, 2 of those 3 patients had undergone unsatisfactory stripping operation; they complained that the pain did not improve after the stripping. Unfortunately, advanced tests such as computed tomography proved that the source of their pain was lumbar disc hernia. The third patient did not have pain but had an unhealed venous ulcer in his right leg despite medical dressing. This patient had been operated bilaterally 6 years ago. There was no reflux or complaint in his left leg but a stripping operation was carried out in his right leg by the author of this manuscript.

Table 4 Spectrum of the resolved complaints postoperatively. All of the improved conditions listed in the table were collected from the patients' histories and experiences

A. Relief of the symptoms
• Disappearance of the pain
• Disappearance of the edema
• Disappearance of the itching
• Disappearance of the cramps
B. Improvement symptoms
• Decrease in the diameter of lower extremity
• Changes in the size of shoes
• Healing on the wounds
• Changes in the color of the extremity (pink-purple to white)
• Increase in the range of motion of the joints ^a
C. Wellbeing
• Feeling like losing weights from the leg
• Regaining the lost physical activities ^a
• Increase in the mobilization
• Avoidance of different operations like orthopedic surgeries ^a

^aPlease read the discussion part of the manuscript for the explanations.

According to the CEAP classifications, the clinical findings of all of the patients were resolved during the early postoperative period. All of the symptomatic patients became asymptomatic (C2a) and were satisfied during the early postoperative period. The changes in the range of clinical score between preoperative and postoperative status according to the Venous Clinical Severity Score (VCSS) were summarized in Table 3.

The detailed list of changes in the complaints of all patients during both the early and late periods is shown in Table 4.

Discussion

Venous reflux of the lower extremity remains a major problem of vascular surgery,¹ although new technical instruments and surgeries such as laser² or radiofrequency³ ablation have become more popular. Furthermore, patient satisfaction remains limited.^{4,7} Because classical venous operations (stripping, laser or radiofrequency ablation) or interventions (sclerotherapy) can be unsatisfactory in patients with venous incompetence, new strategies and operations must be developed for these patients. Thus, the Reşat operation that was invented by the author of this manuscript has many features and characteristics superior to all classical venous operations, such as stripping, and stripping-like operations, such as laser and radiofrequency ablation or other vein-sparing surgeries.

The components of the Reşat operation can be summarized as follows:

1. **Rerouting** the collateral blood flow at the saphenofemoral transition by division and ligating the side branches of the GSV at the saphenofemoral transition (illustrated in Fig. 1).
2. **Decreasing** the enlarged diameter of the orifice of the GSV at the transition (illustrated in Fig. 2).
3. **Reconstituting** the orifice shape of the GSV at the transition (illustrated in Fig. 3A and B).
4. **Resuspension** of the valve at the transition indirectly by the sutures (illustrated in Fig. 3A).
5. **Reshaping** the tube part of the GSV close to the orifice, (illustrated in Figs. 4 and 5).
6. **Arrangement of the holes** on the graft for the remnants of the side branches to prevent luminal narrowing (illustrated in Fig. 6).
7. **Augmentation of the competent coaptation (c.c.)** of the saphenofemoral valve at the transition using the ones listed in 2, 3, 4, 5 and 6 aforementioned.

Comparing the Reşat operation with other operations for venous reflux in the literature shows the differences and superiorities of the Reşat operation. There are different types of vein-sparing operations in the literature for the patients with venous reflux in the GSV.⁸⁻¹¹ However, those operations do not concern the Reşat operation. For example, the main purpose of the CHIVA (Cure conservatrice et Hémodynamique de l'Insuffisance Veineuse en Ambulatoire) operation⁹ was only rerouting the blood flow. The aim (*rerouting*) of this study was to fulfill only a single purpose of the Reşat operation. Likewise, other valvuloplasty techniques such as plication of the saphenofemoral junction¹¹ or other vein-sparing surgeries with or without angioscopy^{8,10} fulfill only 1 purpose of the Reşat operation—that is, either *reconstituting* the orifice shape of the GSV or *rerouting* the blood flow. Moreover, their techniques are different than those of the Reşat operation. Additionally, the literature clearly shows that these operations cannot be applied worldwide among surgeons possibly due to their sophisticated requirement in both CDU evaluations and angioscopic interventions. These results are similar to those for another vein preservation technique, ASVAL (the Ambulatory Selective Varices Ablation under Local anesthesia).¹² Moreover, both CHIVA and ASVAL operations were coded “number 2” (means that the grade of recommendations is weak) in the Clinical Practice Guidelines of the Society for Vascular

Surgery and the American Venous Forum.¹³ Similar recommendations are observed in the Clinical Practice Guidelines of the European Society for Vascular Surgery.¹⁴

On the other hand, it is possible to find some innovative interventions in the literature such as the use of cryopreserved vein valves¹⁵ or tissue-engineered valves¹⁶ to solve the problems with the incompetent venous valve. Unfortunately, those studies have reported unsuccessful outcomes.

There is another group of vein-sparing studies in the literature in which reflux at the saphenofemoral transition was intended to be prevented using different materials such as ESV (external valvular support), the Venocuff, polytetrafluoroethylene grafts, or stents.¹⁷⁻²¹ However, when these operations were compared with the Reşat operation, they did not fulfill all of the components of the Reşat operation. In those operations, the surgical area basically comprised the tube part of the GSV, which is very close to saphenofemoral transition but does not consist of a true transition zone. They intended to decrease the enlarged diameter of the GSV tube part, including the valve or just under the valve, which is only 1 purpose of the Reşat operation as listed in number 5 aforementioned. These types of operations do not fulfill the other components of the Reşat operation listed already. In this group of studies, only Belcaro's work¹⁷ intended to decrease the enlarged diameter of the orifice by continuous suturing of the GSV orifice. This application of Belcaro's work fulfills only 1 component of the Reşat operation, listed as number 2 aforementioned. However, there is a significant technical difference between Belcaro's style and the Reşat operation regarding the decrease in the GSV orifice. Moreover, Belcaro's work does not fulfill the other components of the Reşat operation. Furthermore, in Belcaro's technique, there is no part of the operation that reaches the femoral vein. However, the Reşat operation has some components in which stitches are sutured on the anterior and both lateral surfaces of the common femoral vein as described in the Materials and Methods section.

Compared with other operations, including stripping or *stripping-like operations*, such as laser or radiofrequency ablation, transilluminated powered phlebectomy (TIPP) or cryostripping or sclerotherapy or mechanochemical ablation,²² the superiorities and benefits of the Reşat operation can be summarized as follows:

1. Support of venous circulation:

As is well known, the superficial venous system is responsible for 10%–15% of venous drainage of the lower extremities. Additionally, the GSV plays a major role in this function. During venous insufficiency, varying degrees of the loss of function in the superficial venous system appear due to the severity of the disease. Stripping or stripping-like operations (laser or radiofrequency ablation and sclerotherapy) result in a total loss of the function of the GSV. It is certain that the GSV cannot work regularly and completely during venous insufficiency; however, it is much better to have a GSV working better than losing 10%–15% of the benefit completely. After stripping, the total load rides on other parts of the venous circulation, especially the deep venous system, which might eventually result in the insufficiency of the deep venous system as the patient ages, leading to circulation problems. Thus, repairing the GSV will support the venous circulation and result in fewer problems with other venous systems of the lower extremity venous circulation.

2. Comfort of other possible interventions:

Patients who have undergone stripping operations report the same symptoms and complaints to their surgeons years later. However, surgeons generally do not like this confrontation because there is no additional opportunity for a second surgical intervention because of the total absence of the GSV. However, for a patient who has undergone the Reşat operation, there is always another solution because stripping or stripping-like operations (laser, radiofrequency coagulation, sclerotherapy) are a second option. Thus, surgeons and their patients are more satisfied.

3. Prevention of confrontation associated with unresolved problems:

Venous disease causes different problems such as venous ulcers, swelling, burning, and cramps. Those problems cannot be resolved by only medical therapies in many patients. However, in a patient who has undergone stripping or stripping-like operations, there is no other option except medical therapy for those situations. Thus, the Reşat operations will offer a second chance for those patients even if it fails subsequently. In conclusion, problems will not remain unresolved.

4. Reversibility:

Stripping and stripping-like operations are irreversible interventions. However, the Reşat operation can be reversed whenever desired.

5. Convertibility:

Stripping or stripping-like operations cannot be converted into another procedure, but the Reşat operation can be converted into any other procedure.

6. Ability to obtain a venous graft:

In patients undergoing coronary bypass surgery or peripheral bypass surgery, the GSV is the most commonly used graft among all vascular grafts. Patients in whom stripping operations were carried out lose that chance because of the absence of the GSV. Likewise, patients in whom stripping-like operations were carried out lose that chance because the GSV will be nonfunctional even if it is already in the body. Unquestionably, surgeons do not like using a varicose vein as a graft. However, under some conditions, it might be the only choice. Under those circumstances, patients in whom the Reşat operations were carried out will have a superior opportunity because their GSVs exist.

Furthermore, regarding venous grafts, the Reşat operation has really a superior benefit, particularly for the younger patients. If a patient with venous reflux at the saphenofemoral transition is in a younger age group such as 20–30 years old, a Reşat operation performed during those years will protect the GSV from the trauma of venous reflux, the GSV will remain normal, and abnormal changes due to the pressures or trauma of venous reflux will not be observed in the vein. Thus, a healthy vein graft will be obtained.

7. Anesthetic superiorities:

Although stripping or stripping-like operations can be performed under general, epidural, or spinal anesthesia, the Reşat operation requires only local anesthesia. Thus, complications due to anesthesia are fewer in the Reşat operation. Moreover, death due to anesthesia cannot be expected in the Reşat operation unless anaphylactic reactions occur due to local anesthetic material. However, epidural, spinal or general anesthesia carry many more risks regarding death.

8. Less surgical trauma:

Compared with operations in terms of surgical trauma, the Reşat operation shows less trauma

because it can be performed through a 3- to 4-cm incision in the groin.

9. Less pain and much more postoperative comfort:

Because it results in less surgical trauma and needs only local anesthesia during the postoperative period, patients do not complain of any meaningful pain generally, and their postoperative period is usually comfortable.

10. Earlier normal mobilization:

Regarding the high level of postoperative comfort in the patients, the Reşat operation allowed the patients to walk easily and normally on their first postoperative day. Patients in whom stripping or stripping-like operations were carried out started to walk much later, and they could not walk normally because of stumbling due to much more surgical trauma and pain.

11. Fast recovery:

Because of those reasons listed already, faster recovery occurs in the patients who have undergone Reşat operation, and they can return to their routine daily practice much more easily and much earlier compared with patients who have undergone stripping or stripping-like operations.

12. Respectfulness toward the human body:

In other operations, a part of the human body is either excised or burned. However, in the Reşat operation, the main purpose is to try to save the human body. Thus, the Reşat operation is much more respectful to the human body.

13. Quality of life:

According to the CEAP classifications, the clinical findings of all of the patients were resolved during the early postoperative period. All of the symptomatic patients became asymptomatic and were satisfied during the early postoperative period. According to VCSS, a prominent healing was obtained in significant numbers of the patients. Furthermore, some very peculiar events were observed. In 1 case, the patient stated her satisfaction while she was already on the operation table. The restoration of the vein had been completed, but the skin and subcutaneous tissue had not yet been sutured. However, the patient expressed that she could not shake her ankle preoperatively because of the pain, but now she could shake her ankle without any pain. She

reported great satisfaction while she was shaking her ankle rapidly under the sterile green operation clothes on the operation table.

In another case, the patient was very happy after the operation because she could kneel easily on her first operative day.

In a yet another case, the patient had had an appointment for orthopedic surgery because she had severe pain in her knee. However, she did not need orthopedic surgery after the Reşat operation because her pain was resolved completely.

Generally, patients visited the hospital after being referred by another patient who received the Reşat operation previously.

14. Description of success:

Regarding the stripping or stripping-like operations, the description of a successful operation is the sum of two events: (1) The patient's complaint (C) must be resolved (C-) and (2) The vein must become nonfunctional (F-).

However, in the Reşat operation, the description of a successful operation is the sum of two events: (1) The patient's complaint (C) must be resolved (C-) and (2) The vein must remain functional (F+).

During 1 complication, for instance, thrombosis in the GSV after the Reşat operation, the GSV became nonfunctional (F-), but the patient's complaint was resolved (C-). This status, (C-) / (F-) is described as being an unsuccessful operation for the Reşat operation, but this status is the description of a successful operation for the stripping or stripping-like operations.

In conclusion, the unsuccessful result of the Reşat operation was as successful as the stripping or stripping-like operations.

The REŞAT operation is named after and commemorates the father of the inventor and manuscript author who passed away in 2013. Actually, the name Reşat is quite appropriate to describe the operation because, etymologically, it means "going forward on the right way." As described in the previous sections already, blood can flow forward on the right way using this operation because venous reflux is prevented by reconstructing the way. On the other hand, as seen in the title of the manuscript, the name REŞAT also fulfills the description of this operation like an abbreviation (REpair of SAPHenofemoral Transition), with only a small difference in the use of the letter Ş instead of the letter S. The pronunciation of the word "Reşat" sounds like "Re:Shut." It's believed that this name,

the REŞAT operation, will be accepted by surgeons, authors, readers, leaders, and others in this field kindly and respectfully.

Conclusion

The Reşat operation is a well-tolerated operation that reconstitutes the saphenofemoral transitions successfully. Its early and late postoperative results are satisfactory. The Reşat operation should be listed in the guidelines as being the first choice of surgical treatments in patients with venous reflux at the saphenofemoral transition.

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