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ORIGINAL ARTICLE

INCIDENCE AND CAUSES OF RECURRENT VARICOSE VEINS IN SOHAGE

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Abstract

Objective: To assess the incidence and causes of recurrence of varicose veins in the Sohag Faculty of Medicine Hospital.

Patients and Methods: A prospective observational study was carried out in Vascular Surgery and Radiology Departments of Sohag Faculty of Medicine Hospital. Seventy four patients, 46 female and 28 male (89 limbs) with a mean age (41 years) (range 25-57) were evaluated prospectively preoperative and postoperative at one month, one year, and one and half year following surgery by clinical examination and Duplex examination. Varicose veins were treated either by restricted stripping or total stripping

Results: The overall recurrence rate by Duplex following stripping operation was 19% (17/89). Twenty seven percentage (5/16) of patients who were subjected to restrict stripping and only 16%(12/73) was the recurrence rate for patients who were subjected to total long saphenous vein stripping (LSV).

The causes of recurrence were due to: 1) True recurrent varicose veins, in 29.4% (5/17) limbs, caused by neovascularization in 4 limbs and tactical errors in one case. 2) New veins in 23.5% (4/17) limbs as a result of disease progression. 3) Residual veins in 11.8% (2/17) limbs. 4) Complex pattern in 35.3% (6/17) limbs.

In limbs presented with recurrent varicose veins, (41) sources of refluxes were seen: (7/41) new set of veins caused by disease progression, (5/41) caused by neovascularization, (6/41) caused by tactical errors, (2/41) caused by technical errors and (21/41) caused by complex pattern.

Conclusion: Despite of preoperative and operative precautions, there is still an unavoidable percentage of recurrence, mainly caused by neovascularization and disease progression. The total stripping of LSV is more favorable than restricted stripping.

Keywords: Varicose veins, recurrence, Color Doppler Imaging CDI, restricted stripping, total stripping.

INTRODUCTION

Venous disease, including varicose veins (vv), is one of the most commonly reported chronic medical conditions and a substantial source of morbidity.[1] The saphenus venous system is commonly affected by varicose.[2]

Recurrent varicosities is not only common and complex surgical problem but expensive as well. The recurrence rate following varicose vein surgery ranges from 20-80% despite improvement of preoperative assessment.[3] The causes of vv recurrence are multifocal.[4] Inadequate surgical experience, lack of pre-operative color Doppler imaging assessment,[5] neovascularization and /or reflux, disease progression, or technical error[6,7] has a role in vv recurrence.

The aim of this study: Estimate the incidence and causes of recurrence of varicose vein in the Sohag Faculty of Medicine Hospital.

PATIENTS AND METHODS

A prospective observational study was carried out in Vascular Surgery and Radiology Departments of Sohag Faculty of Medicine Hospital. The study included all patients with primary varicose vein who underwent varicose vein surgery between February 2008 and February 2009. The Institutional Review Board has approved the study and a written informed consent was obtained from the entire patients before the procedure.

Patients were assessed preoperatively clinically and by Duplex. All operated patients were reassessed clinically and by Duplex at 1, 12 and 18 months after surgical intervention.

Exclusion criteria were secondary varicose veins, deep venous insufficiency or lack of surgical fitness, or history of primary vv that were managed earlier by Sclerotherapy or surgically.

Preoperative assessment:

1. Clinical examination focused on sites of reflux, sites and shape of varicosities.
2. Color Duplex Imaging (CDI) was to evaluate the whole venous system from groin to ankle in both lower limbs using either convex 3-7 MHZ transducer or 5-10 MHZ linear transducer of Sonoline Siemens Ultrasound Machine Germany. The examination protocol consisted of examination of deep venous system (common femoral, superficial femoral, the common trunk of the deep femoral, popliteal, crural gastrocnemius), superficial venous system (long, short saphenous, veins and their branches as well as the sapheno-femoral (SFJ) and sapheno-popliteal junctions (SPJ) and standard sites for perforators. The patients were examined in supine and standing position. The reflux was assessed by Valsalva maneuver in the groin and by manual compression with sudden release distal to the examined venous segment. Reflux was diagnosed when retrograde flow by pulsed Doppler duration was more than 500 milliseconds. Deep venous insufficiency was defined by the presence of reflux in any deep venous segment distal to the level of the common femoral vein and at least 1 cm away from the sapheno-femoral or sapheno-popliteal junctions when there was coexistent reflux at these sites.

Surgery:

All surgical interventions were carried out as routine cases. The surgery was performed under spinal anesthesia. The choice of surgical technique was determined based upon Duplex examination. The level of stripping (knee or ankle level) was decided based on the extent of reflux along LSV and was always performed from the groin downwards. Total stripping from the groin to the ankle was performed when reflux extended below the knee and in the presence of significant varicosities below the knee. Restricted stripping to the knee level was chosen when (LSV) incompetence was restricted to this level and had no significant varicosities below the knee. The entire cases were performed by one surgeon (the first author). Flush ligation of the sapheno-femoral junction after fully dissecting the four quadrants of the junction, and exposing the femoral vein up and downstream before division of all tributaries. The long saphenous vein (LSV) was stripped to either just above or below the knee, according to saphenous vein incompetence using a flexible, with interchangeable head, internal stripper (Babcock stripping). Stab avulsions of varicose tributaries were performed using Oesch hooks with dissection and ligation of the feeding incompetent perforator.

Evaluation of recurrence:

All patients were followed up by clinical examination and CDI at one, 12 and 18 months, following surgery to evaluate the source of reflux that causes recurrence. Clinical examination was carried out to diagnose recurrence that is close to surgical scar or the new refluxing veins. Duplex Doppler exam was conducted to diagnose all possibilities.

Recurrent varicose veins were defined by the source of reflux and duration it took to be clinically evident

1. **Residual veins:** those were varicose veins that have already presented in the operated sites at 1 month follow-up examination due to tactical error that was defined as the persistence of venous reflux in a saphenous trunk resulting from erroneous or inadequate preoperative evaluation and inappropriate surgery. Technical error was defined as the persistence of venous reflux due to inadequate or incomplete surgical technique or technical errors.

2. **True recurrent varicose veins:** those were varicose veins that were absent in the operated areas during the 1 month follow-up examination, but they subsequently reappeared at the operated sites either as a result of neovascularization which was defined: (the presence of reflux in previously ligated SFJs caused by development of thin incompetent serpentine veins linked with a thigh varicosity) or as a result of tactical and technical errors.

3. **New varicose veins:** those were varicose veins which were not present at the 1-month follow-up, but developed later in non-operated areas, due to disease progression.

The data were collected and student t test was performed two tailed paired type and p value less than or equal 0.05 was considered significant.

RESULTS

Eighty one patients (96 limbs) who initially assigned our protocol. Our study enrolled only 74 patients, 46 female and 28 male (89 limbs) with mean age (41 years) (range 25- 57) who fulfilled our protocol. Seventy three limbs subjected to total LSV stripping and 16 limbs subjected to restricted LSV stripping. The overall recurrence rate of varicose vein following stripping operation based on clinical examination was 7.9%, while recurrence rate by Duplex was 19%.

Detailed recurrence rate with each type of surgery is shown in Table 1. The CDI showed higher incidence of recurrence than that discovered by clinical exam and the difference was statistically significant p value = 0. 008.

True recurrent veins were considered the most common types of recurrent varicose veins, which were presented in 29.4% (5/17) of limbs which mainly caused by neovascularization , followed by new veins in 23.5%, (4/17) which was considered the second most common type of recurrent varicose vein and considered as a result of disease progression (Table 2). LSV recurrent varicosities in the form of both true recurrent veins and new varicose vein (complex pattern) were found in 35.3%(6/17) limbs.

Residual veins were considered the least common types of recurrent vv pattern in 11.8%(2/17) of limbs. The total number of refluxes was 41. The highest number of refluxes was 39% (16/41), caused by disease progression and was diagnosed at 18 months duration follow up. Refluxes caused by disease progression only (7/41) and those caused by disease progression as part of a complex pattern (9/41). Tactical errors were responsible for the recurrence of varicosity in 2 limbs (2/17) those presented by true recurrent vein in one case due to failure of ligation of thigh perforator, and the other due to the appearance of one residual vein in follow up after one month. Duplex examination showed the number of refluxes was 5 in restricted stripping versus 6 in total stripping.

One case (5.8%)(1/17) had residual vein seen in the first follow up after one month caused by technical errors in this case there was failure to remove anterior and posterior accessory vein LSV.

The disease progression as a cause of recurrent vv was lower in total stripping than is restricted stripping (Table 3). The difference was statistically significant.

Table 1. Recurrence after total and restricted LSV stripping by clinical and duplex.

Type of surgery	No of limbs	No of recurrence clinically	Percentage %*	Recurrence by duplex	Percentage by duplex*	P value
Total LSV stripping **	73	5	6.8%	12	16%	0.0008 *
Restricted LSV stripping **	16	2	12.5%	5	27%	** 0.22
Total	89	7	7.9%	17	19%	

Table 2. Venous reflux diagnosed by duplex exam and Clinical presentation of recurrence.

Doppler exam			No of refluxes (41)	Clinically diagnosed recurrent varicose vein limbs (17)			
				Recur vein (5) (29.4%)	New vein (4) (23.5%)	Residual vein (2) (11.8%)	Complex pattern (6) (35.3%)
Refluxes with total LSV stripping	Sources of reflux	Neovas.(A)	3	3			
		D.P. (B)	4		3		
		Ta.E. (C)	3	1			
		Te.E	2			1	
		Complex Pattern:					
		. A+B+C	3+4+3				3
		. A+B	2+1				1
		. B+C					
Refluxes with restricted LSV stripping		Neovas.	2	1			
		D. P.	3		1		
		Ta.E.	3			1	
		Te.E					
		Complex Pattern:					
		1- A+B+C	2+4+2				2
		2- A+B					
		3- B+C					

Abbreviations: neovas: Neovascularization, D. P= Disease progression, Ta E.: Tactical Error, Te.E: Technical Error.

Table 3. Showing the numbers and causes of refluxes after either total or restricted stripping.

	No of refluxes	Total LSV stripping *	Restricted LSV stripping*	P Value *
Neovascularization	12	8	4	0.03
D.P.	16	9	7	
		36%	44%	
Ta. E.	11	6	5	
Te.E	2	2		
Total no of refluxes	41	25	16	

DP: disease progression, Ta E tactical Error, Te E technical Error. LSV: long saphenus vein.

DISCUSSION

Recurrent vv is a responsibility of more than one factor.[8] Surgical trainees, pre-operative CDI assessment,[7] neovascularization and /or reflux, or disease progression, technical errors[9,10] has a role in vv recurrence.

Negus[11] reported that primary varicose vein surgery that is performed by an inexperienced junior surgeon is responsible for a high rate of recurrence. Also, Lees et al,[12] reported that the consultant does surgery more effectively than trainees and recorded a persisting incompetence rate of 41% for cases done by trainees.

Turton, et al[13] reported that junior surgeon can do varicose vein surgery after appropriate training by a consultant vascular surgeon and under their supervision.

Blomgren et al[2] reported that recurrence rate by experienced vascular surgeon two years after ligation of the SFJ and stripping of the LSV was 25%. In our study the entire cases were performed by a consultant vascular

surgeon and recurrence rate for total LSV stripping was 16% and that for restricted LSV stripping was 27% however our follow up period was shorter.

The appropriate surgical treatment of vv and the decrease in the recurrence rate depend on adequate preoperative assessment that in turn depends on the method of preoperative assessment.[10,14] It has been suggested that the failure of preoperative assessment by CDI, leads to about 25% of patient were subjected to an inappropriate surgical procedure.[15,16] Many studies of vv surgery prefer preoperative assessment using CDI to evaluate the extent of superficial venous insufficiency.[17-19] On the other side, the authors stated that recurrence rate has not changed with preoperative CDI recurrence rates from 13 to 38%.[20,21] Although using preoperative assessment by CDI for all cases of vv, technical and tactical errors were reported.[7]

In our study, preoperative assessment by CDI was offered to the entire cases of vv.

Neovascularization, defined as tangled clusters of small, thin walled vessels from the site of the former SFJ.[5,23,24] Small tributaries at SFJ may be left as a technical failure , can be enlarged and branched giving thin walled tortuous vessels mimicking a Neovascularization.[25] The discrepancy between the results of different studies can be probably explained by different detection criteria of the term neovascularization.[25] Egan et al[26] considered all veins seen joining the SFJ stump or junctional area as missing tributaries. Other studies considered stump tributaries as large as 3mm to be neovascularization.[5,27,28] Other studies tried to explain the cause of varying frequencies of neovascularization by differing duration of follow-up, surgical technique, and the sensitivity of CDI and the operator skills.[29] Turton et al[30] found neovascularization in 4.3% (2/46) of limbs using duplex, one case at one month and the other case at one year postoperative. But, Jones, et al[23] reported that using duplex technique, the recurrence related to neovascularization represent 52% although the first operation included disconnection of all tributaries within 2 cm round the SFJ using duplex and histological examination. Van Raji, et al[31] reported that neovascularization is partly or entirely responsible for up 94% of recurrence. In another study, Theivacumar[29] reported that neovascularization detected by duplex in 18% (11/60) of limbs treated by surgery, this resembles 73% (11/15) of total recurrence in cases treated by surgery 2 year after vv surgery.

In our study, neovascularization was detected by duplex, taking criteria of thin walled vessels presented in entangled clusters. These vessels were identified for the first time in one year postoperative and were not seen in the first time follow up one month postoperative. Neovascularization represents 11.2%(10/89) of limbs, 58.8% (10/17) of recurrence. Neovascularization is completely responsible for recurrence in (4/17) and partly responsible for recurrence in (6/17).

Many studies have suggested that disease progression contributes significantly to venous recurrence.[7,32,33] Sarine[34] et al, found new sites of reflux in 18% of limbs of patients who waited 2 years before having surgery. Acquired new sites of varices represent a single cause of reflux in 25% of cases and one of the complex recurrent vv in 36% after 5 years follow up.[7]

In our study, after 18 months of follow up, new veins caused by disease progression represent 23% (4/17) of recurrent cases as a single cause of recurrent varicose vein and 35.2% (6/17) as part of a complex pattern. The rate of recurrence in our study was close to that of Kostas[5] et al however our follow up duration was shorter and this can be explained by failure of patients to follow postoperative instruction to have elastic stocks In our study, neovascularization and disease progression either as a single cause of varicose vein recurrence or as part of multiple causes were responsible for more than 3/4 of varicose vein recurrence. Kostas[7] et al reported that the tactical errors were responsible for recurrence in 5.3% in the operated limb, despite using the preoperative assessment of CDI. Most of the tactical errors were in elderly patients with multiple clinical problems and subsequently cutting time of surgical procedure ending up with the suboptimum procedure in which an incompetent LSV was left behind either partially or totally. In our study, tactical error was responsible for the recurrence of varicosity in 11.8% (2/17)of cases those presented by true recurrent vein; one case was due to failure of ligation of thigh perforator , and the other was due to the appearance of one residual vein in follow up after one month. In these 2 cases the sources of refluxes were not detected by preoperative duplex may due to obesity of the patients. It is believed that the wide anatomical variation of the saphenofemoral junction leads to technical errors by leaving some collateral veins without ligation and division.[35] In an autopsy study, residual saphenous veins were found in 15.1% in previously operated limbs.[36] Another study showed that 54.5% of the ligatures were incorrectly placed.[37]

Kostas et al,[7] reported that, technical errors were responsible for recurrence in 3.5% this is close to our results where technical errors were seen in one case 5.8% (1/17) who had residual vein seen in1st follow up after one month at a site close to surgical incision, in this case there was failure to remove anterior and posterior accessory LSV. Although the CDI report included the presence of dilatation of both veins, but there were no skin marks on these veins during the operation.

Our results were similar to that of Kostas,[38] et al who showed that almost of the recurrence of vv in restricted LSV stripping due to disease progression and in the residual part of LSV below the knee. In our study the difference between the number of refluxes of recurrent vv in restricted LSV stripping and total LSV stripping was statistically significant but Theodor's results showed the difference was not statistically significant.

In conclusion This study shows that despite pre-operative assessment of patients with varicose veins by CDI and good ligation of sites of refluxes, there still unavoidable percentage of recurrence, mainly caused by neovascularization and disease progression. The total stripping of LSV is more favorable than restricted stripping. More studies are needed with long term follow up and to develop new technique to overcome the recurrence of varicose veins and improve the outcome of surgery.

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