

Recurrent varicose veins of the legs. Analysis of a social problem

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SUMMARY: Recurrent varicose veins of the legs. Analysis of a social problem.

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The present study was aimed at assessing the experience of a single referral center with recurrent varicose veins of the legs (RVL) over the period 1993-2008. Among a total of 846 procedures for Leg Varices (LV), 74 procedures were for RVL (8.7%).

The causes of recurrence were classified as classic: insufficient cross-section (13); incompetent perforating veins (13); reticular phlebectasia (22); small saphenous vein insufficiency (9); accessory saphenous veins (4); and particular: post-hemodynamic treatment (5); incomplete stripping (1); Sapheno-Femoral Junction (SFJ) vascularization (5); post-thermal ablation (2).

For the "classic" RVL the treatment consisted essentially of completing the previous treatment, both if the problem was linked to an insufficient earlier treatment and if it was due to a later onset. The most

common cause in our series was reticular phlebectasia; when the simple sclerosing injections are not sufficient, this was treated by phlebectomy according to Mueller. The "particular" cases classified as 1, 2 and 4 were also treated by completing the traditional stripping procedure (+ cross-section if this had not been done previously), considered to be the gold standard. In the presence of a SFJ neo-vascularization, with or without cavernoma, approximately 5 cm of femoral vein were explored, the afferent vessels ligated and, if cavernoma was present, it was removed.

Although inguinal neo-angiogenesis is a possible mechanism, some doubt can be raised as to its importance as a primary factor in causing recurrent varicose veins, rather than their being due to a preexisting vein left in situ because it was ignored, regarded as insignificant, or poorly evident.

In conclusion, we stress that LV is a progressive disease, so the treatment is unlikely to be confined to a single procedure. It is important to plan adequate monitoring during follow-up, and to be ready to reoperate when new problems present that, if left, could lead the patient to doubt the validity and efficacy of the original treatment.

KEY WORDS: Varicose veins - Legs - Saphenectomy - Recurrent varicose veins.

Introduction

Recurrent varicose veins of the legs (RVL) is an important health problem. The reported incidence ranges between 20 and 25% (1-3), although recent studies based on prospective evaluations and/or specific research have revealed a higher incidence (1,4).

In the 1950s, the principles of efficacious treatment were defined but the risk of recurrence has since undermined the faith not only of patients but also of doctors indirectly involved in this problem, leading to a common view that all types of treatment are really useless.

To study this phenomenon we decided to review all

the cases at a single surgical center where varicose vein surgery is among the major activities. A retrospective study was made of all cases of Legs Varices (LV) surgically treated in the operating room, considering all cases of recurrence. In this way, only surgically relevant cases of recurrence were identified, excluding all outpatient treatments. However, up to the end of the study period (2008), due to organizational problems no true outpatients treatment of this disease was available and even minor cases treated under local anesthesia were taken to the operating room. For this reason, we believe that our sample reflects the true bearing of this clinical issue of Varicose Veins (VV) recurrence.

Patients and methods

A retrospective analysis was made of all RVL observed in our Unit in the period 1993-2008, subdivided into primary or (a much smaller group) secondary varices of the legs. Because this disease has a strong esthetic impact, it is difficult to make an objective definition of "re-

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currence". In general, this may be regarded as the "presence of evident venous ectasia of the legs, of trunk-like or reticular type, appearing sometime after the first treatment procedure and not present immediately after the conclusion of the latter" (otherwise they would be defined as "residual varicose veins").

A total number of 846 procedures were performed during the study period, consisting of:

- uni- or bilateral saphenectomy: 600 cases (70.9%);
- hemodynamic procedures preserving the saphenous vein: 74 cases (8.7%);
- isolated crosssectomy: 25 cases (2.9%);
- short great saphenous vein stripping: 45 cases (5.3%);
- phlebectomy according to Müller not associated with other types of procedure: 19 cases (2.2%);
- stripping of the small saphenous vein: 1 case (0.1%);
- ligation of the sapheno-popliteal ostium: 8 cases (0.9%);
- redo surgery: 74 procedures (8.7%).

The data on each redo procedure for recurrence were closely reviewed and the causes specified, and finally the treatment performed in each patient were detailed.

Results

In 61 out of 74 redo procedures for recurrent varicose veins (82.4%), the cause of recurrence was defined as *classic*, namely:

- insufficient crosssectomy: 13 cases (17.6%);
- incompetent perforating veins: 13 cases (17.6%);
- reticular phlebectasia: 22 cases (29.7%);
- small saphenous vein insufficiency: 5 cases (6.8%);
- dilated accessory saphenous vein: 4 cases (5.4%);
- recurrence of a small saphenous vein insufficiency after previous ligation: 4 cases (5.4%).

In the remaining 13 patients (17.6%) a *particular* situation was observed that required specific attention. These cases were subdivided as follows:

- recurrence after hemodynamic treatment: 5 patients (6.8%);
- incomplete previous stripping: 1 patient (1.4%);
- sapheno-femoral junction neo-vascularisation (SFJNV), distal to the previous one: 3 patients (4.1%);
- SFJNV with inguinal cavernoma: 2 patients (2.7%);
- complete recurrence after endoluminal laser treatment: 2 patients (2.7%).

In 13 cases of insufficient crosssectomy (all previously operated at other centres) the treatment consisted of completing the femoral crosssectomy, in some cases associated with distal phlebectomy.

In 13 cases in which incompetent perforating veins developed, they were sutured at the fascia level. The small saphenous vein was ligated at its outlet in 4 of the 5 cases in which venous insufficiency developed after the first procedure on the great saphenous vein; in the other case, stripping was judged necessary. In recurrences due to ec-

tasia of an accessory saphenous vein, this vein was stripped.

Discussion

It should be pointed out that complete crosssectomy of the small saphenous vein (SSV) is apparently a simple procedure but in practice it can be quite delicate, both because of the great variability of the level of junction with the popliteal vein and of the presence of important branches of ischiatic (medial sural cutaneous nerve), and gluteal nerves (satellite nerve of the small saphenous vein itself).

Some further considerations need to be made about the 13 cases in which the recurrence was due to *particular* situations unlike the *classic* cases. In 1 case we found incomplete stripping, due to the previous therapeutic choice to perform short stripping above the knee. This was treated by completing the stripping down to the malleolus. Since the end of the 1990s, we have also opted for short stripping (generally below the knee), when the distal saphenous was not in a very impaired condition (45/846: 5.3% of cases). The fact that in only a single case, in our experience, did recurrence occur due to incomplete stripping does not, in our opinion, sound a "warning bell" when choosing this procedure as a first treatment.

The case of hemodynamic treatment is quite different. Like other surgeons, despite initial doubts, we have also undertaken this type of treatment, that first appeared around the beginning of the 1990s. Our experience consists of 74 cases out of 846 (8.7%), since we limited the indications to less severe cases (5). The 5 cases of recurrence of this type are all referred to previous procedures performed by our group. In the overall follow-up, we also were noticed about other patients not entirely satisfied with the long term results, and presented to other Centers for further treatment. Moreover, in the context of the postoperative sclerotherapy treatment that most patients operated for varices of the legs have to undergo (6,7), we have observed that patients who received hemodynamic treatment, in general, required more cycles and more sessions than patients undergoing other types of treatments.

For all these reasons, over the years we have reserved this type of treatment to a progressively smaller number of patients. This is in line with the general trend for "hemodynamic" treatment, that has gradually been abandoned even by the early proponents, as the long term results became more evident.

The appearance of a SFJNV and complete recurrence after laser-photocoagulation is a particularly interesting point, although the figures in our series (7 of a total of 74 recurrences: 9.4%) are not particularly significant. The

pathophysiology of the former phenomenon is presumed to be a neo-vascularization process, since prospective studies have documented recurrence even when there were no doubts as to the completeness and adequacy of the initial procedure. In any case, some authors have doubted the attribution of this phenomenon, and rather attribute it to collaterals of the saphenofemoral junction (SFJ) or directly of the femoral vein, left during the first procedure (1,8,9).

In our experience we have observed three types of anatomical situation:

- 1) the formation of a SFJNV below the cross that was completely interrupted, with clear signs of insufficiency, supplying a distal varicose circulation consisting of large branches that then supply other dilated veins below;
- 2) the presence of a SFJNV at the site of the crossotomy, from which a bundle of veins of cavernomatous type, creating an inguinal mass, originates and connects up with other peripheral veins with a smaller caliber;
- 3) the presence of an inguinal cavernoma strictly linked to the scar area of the primary crossotomy, with no evidence of a clear direct connection with the femoral vein.

Histology performed in case of "cavernoma" did not identify any peculiar aspect, apart from the extensive area involved and the fibrotic interference with the muscle tunica, yielding a similar picture to that of other cases of varicose veins of the legs. Therefore, the differences are only macroscopic, as regards the aberrant and hyperplastic appearance of the venous bundle. It is likely, as suggested by other Authors, that local growth factors play a role, due to the remarkable regenerative potential of the vascular structures, and especially the veins. How and why these factors are activated in some situations and not in others remains to be clarified. This type of cavernoma is often associated with a NSFV; indeed, both situations could originate from the same etiopathogenic mechanism.

In such cases a correct surgical procedure to solve the recurrence requires, in our view, an ample longitudinal exposure of the femoral vein, to clearly demonstrate the extravasation point.

Finally, we have recently performed redo procedures with great saphenous vein stripping (GSVS) and crossotomy in 2 patients previously treated by laser thermoablation. This sample is too small for valid considerations to be made but it should be noted that in both cases the state of the veins was comparable to that of the common varicosities.

Our investigation can be useful to assess the true situation of the various types of varicose vein recurrence. It is clear that the classic basis on which an efficacious treatment of varicose veins depends is still valid today

(9,10). This is still true even after the advent, and later decline, of hemodynamic treatments, of which one of the drawbacks is that they fail to eradicate frankly ectasic veins (11,12).

As underlined by Van der Stricht, varicose vein treatment is unlikely to be confined to a single procedure; this is particularly true in young female patients. For this reason, we continue to advocate the association of surgery and sclerotherapy. After the initial treatment, the patient needs to undergo close follow-up, and the surgical team needs to be ready to perform further procedures to block recurrences, particularly of reticular type, before they spread and the patient gains the impression that the first treatment "didn't work". Experts in the field of varicose vein surgery are aware of the negative situation in elderly patients, when the disease spreads to the entire leg, after various other specialists have dissuaded them from undergoing treatment of their varicose veins "because they will re-form in any case".

Against this background, in which insufficiency of the superficial peripheral veins may develop, as well as new incompetent perforating veins or a NSFV (this latter is difficult to predict since it is generally attributed to neoangiogenesis), the importance of the first patient visit must not be underestimated: it must be clearly explained a progressive disease is faced and surgery, although essential, may not offer a final, permanent solution to the problem.

Recurrent varicose veins is a common part of the natural history of the disease evolution and there is at least an 8.7% rate of redo surgery after a variable period of follow-up (13-15). An analysis of the time between the first surgery and recurrence was outside the scope of this study, since an accurate scientific follow-up of such a large group of patients would be difficult to achieve. In any case, such patients come to the surgeon's attention only when they have already decided to undergo further treatment; this may be some time after the real appearance of the "new" varicosities.

It is very important to comply with the treatment guidelines that were formulated long ago, in the 1950s, especially thanks to the assessments made by the Mayo Clinic, that have surely limited the incidence of recurrence. Nevertheless, the patient should be warned, right from the first course of treatment, about the risk of development of reticular phlebectasia, at least, with a greater or lesser tendency to evolve.

Apart from this aspect, but again related to the presence in these patients of greater or lesser degrees of etiopathogenic factors that predispose to varicose veins (13), other forms of evolution must also be expected, that may be absent or masked at early controls, such as new incompetence of the perforating veins, or small saphenous vein or other veins of the pudendal or gluteal districts.

As stated above, one aspect that has not yet been clar-

ified is the neoangiogenetic capacity of the venous circulation of the legs. The opinion that the flow of saphenous vein is restored via a neovascularization mechanism was first described by Sheppard in 1978 (16) on the basis of histological studies. Later, Glass demonstrated the possibility of reconnection of an interrupted venous system thanks to the development and growth of new interposed vessels (8). This was further studied by other Authors, who performed histological studies showing that this phenomenon is implicated in the formation of many cases of SFJ reflux (1,17,18). Some researchers have claimed that the tortuous veins that recreate the saphenofemoral junction are not actually of neoangiogenetic origin, but rather are small preexisting veins that in some way suffer from the venous hypertension situation at that level, become hypertrophic and thus give rise to new varicose veins (9-19). Other Authors, although they do not deny the possibility of neovascularization at the SFJ level, do not regard this as essential in the genesis of varicose vein recurrence (2). In fact, even granting the scientific basis for the possibility of neo-revascularization of the SFJ, in individual cases it is difficult to establish whether this was the underlying mechanism or else it was venous branches, even very small, in direct connection with the femoral vein, left in situ during the first procedure (3,20).

In our experience we have observed a lower incidence of varicose vein recurrence (8.7%) than is generally reported in the literature. This may be because our is a local referral center for VV treatment and so a greater number of primary cases have come to our attention. On a total of 74 cases of recurrences, 17 were caused by insufficiency of the saphenofemoral junction, and 4 by incompetent perforating veins, accounting together for 28.4% of the total. This figure is lower than the one reported by other Authors (1,2 4-20), this may also be due to a methodological problem, in the sense that among the cases undergoing redo surgery we have also included simple phlebectasia treated in the outpatients clinic.

All the cases of recurrence for insufficiency of the SFJ had undergone the first treatment in another center. We cannot therefore establish how complete these first procedures were. Nevertheless, in 15 of these cases we gained the impression, later corroborated by surgical re-exploration, that this was in fact the problem. In 5 patients it may have been due to neovascularization, although we nearly always found a NSFV directly on the femoral vein, below (up to 2.5 cm) the previous, correct ligation. In only 1 patient, that we treated with hemodynamic therapy and complete traditional crosssection (5), we found a large inguinal cavernoma, with the typical tortuous, spidery vessels due to neovascularization supplying a great saphenous vein (GSV) left in situ, lacking any connection with the femoral vein but dependent on the pudendal and epigastric veins.

On the basis of our experience, although we agree that neovascularization as an expression of reactive neoangiogenesis in patients treated for varicose veins is one possible mechanism, in agreement with other Authors (2,9,19) we believe that it may have a minor importance as compared to other possible causes of varicose veins.

Conclusions

In 1992, Darke identified three fundamental types of situation in which varicose vein recurrence occurs:

I: the appearance of varicosities due to incompetent perforating veins;

II: an insufficient second saphenic collector vein after treatment of the first (e.g. varicosity of the small saphenous vein after treatment of the GSV);

III: a new insufficiency at the saphenofemoral (or saphenopopliteal) level.

As regards the scheme we propose, it can be said that a later appearance of further reticular phlebectasia could be included in Darke type I, even if this is independent of the presence of incompetent perforating veins (ex-novo or left during the first procedure). This type of situation belongs to the evolution of the natural history of varicose veins, that comes under the heading of the disease of a system not just a single vein. Therefore, the most important thing is to recognize the situation and explain it clearly to the patient, illustrating the available treatment so that the idea that the treatment of varicose veins is useless is not further perpetuated.

By affinity, we would include the long term appearance of an accessory great saphenous vein in Darke type II; this will ultimately prevail, during recurrence, as the main incompetent collector vein from which other varicosities will develop.

As regards this Darke classification, our experience indicates that a type IV recurrence of varicose veins should also be included, linked to an incomplete planning of the original procedure. Recurrence after an isolated crosssection belongs to this category, but we believe that Darke did not take this possibility into account because in 1992 it seemed to be clear that the gold standard treatment for varicose veins of the legs included stripping of the GSV, even if it cannot be evinced from his work whether all patients with recurrence had undergone primary stripping. Nowadays recurrences are observed that are linked to "new" treatments that have been proposed or re-proposed: we refer to recurrences after hemodynamic treatment, after incomplete previous stripping and after endoluminal treatment (21).

Are there any certain elements that need to be taken into account when planning the first procedure for LV, in order to avoid or at least limit the onset of recurrence?

It cannot be denied, not only on the basis of the early results reported (10) but also of later comparative assessments (9,22,23), that stripping of the GSV provides a better guarantee of success, making a later recurrence less likely. This probably applies to all complete long stripping procedures as compared to the shorter procedure.

It is not known whether taking a greater care of the saphenofemoral stump, as proposed by various Authors using protective devices of various natures, is the best way to prevent the growing of incompetent neo-vessels. In our view, a "flat" ligation of the femoral vein, to prevent either a slight restriction of the lumen or a cul-de-sac, is the best technical solution to achieve a stable resolution of the SFJ. This also allows a greater exposure of the

femoral vein, extending for a couple of cm, making it possible to perform further ligations of veins originating directly from the femoral vein at this level, which in our experience are those most likely to induce a recurrence of LV.

In any case, whatever the care and attention paid, and the procedures adopted in the first procedure, it must be remembered that varicose veins are an evolutionary disease. It is surely better to point this out to the patient right from the start, and ensure close follow-up so as to be ready to act as soon as there are clear signs of a recurrence. A delay in the later correction procedure can lead to a very serious situation and ultimately to the patient's loss of faith in any form of treatment.

References

1. Van Rij AM, Jiang D, Solomon C, Christie QA, Hill GB. Recurrence after varicose vein surgery: a prospective long-term clinical study with duplex ultrasound scanning and air plethysmography. *J.Vasc.Surg* 2003;38:935-943.
2. Egon B, Donnelly M, Bresnihan M, Tierney T, Feeley M. Neovascularization: an "innocent bystander" in recurrent varicose veins. *J. Vasc. Surg.* 2006;44(6): 1279-84; discussion 1294.
3. Darke SG. The morphology of recurrent varicose veins. *Eur. J. Vasc. Surg.* 1992;6:512-517.
4. Fischer R, Linde N, Duff C, Jeanneret C, Chandler JG, Seeber R. Late recurrent saphenofemoral reflux after ligation and stripping of the greater saphenous vein. *J. Vasc.Surg.* 2001;34:236-40.
5. Cardia G, Loverre G, Melino R, Tumolo R, Cianci V. An original approach to perform hemodynamic treatment of lower extremity varicose veins. *J.Surg.* 2001;108:103-109.
6. Cardia G, Lauriero M, Lillo A, Regina G. Risultati dell'associazione chirurgia-scleroterapia nel trattamento delle varici degli arti inferiori. *Flebologifolia* 1988;1:363.
7. Cardia G, Cianci V, Topi S, Nacchiero M. In tema di terapia chirurgica delle varici degli arti inferiori: quale trattamento? *Vasc. Dis. & Ther.* 2001;II:2:34-60.
8. Glass GM. Neovascular reconnection in recurrence of varices of the great saphenous vein in the groin: phlebography. *Angiology* 1988;39:577-82.
9. Bresnihan M, Tierney S, Feeley M. Neovascularization: an "innocent bystander" in recurrent varicose veins. Egan B, Donnelly M. *J Vasc. Surg.* 2006;44(6):1279-84; discussion 1284.
10. Lofgren KA. Il trattamento delle varici venose: esperienza della Mayo Clinic. In: Bergan JJ, Yao JST. *Malattie delle vene. Attualità e orientamenti.* E.M.S.I. Roma 1981:67-79.
11. Belardi D. Lo C.H.I.V.A.: una rivoluzione mancata. *G. It. Chir. Vasc.* 1995;2:77-83.
12. Mc Mullin GM, Coleridge Smith PD, Scurr SH. Objective assessment of high ligation without stripping the long saphenous vein. *Br. J. Surg* 1978;78:1139-42.
13. Hartmann K, Klode J, Pfister R, Toussaint M, Weingart I, Waldermann F, Hartmann M. Recurrent varicose veins: sonography-based re-examination of 210 patients 14 years after ligation and saphenous vein stripping. *VASA.* 2006 Feb;35(1):21-6.
14. Allegra C, Antignani PL, Carlizza A. Recurrent varicose veins following surgical treatment: our experience with five years follow-up. *Eur J Vasc Endovasc Surg* 2007;33(6):751-6. Epub 2007 Feb 2.
15. Pittaluga P, Chastanet S, Guex JJ. Great saphenous vein stripping with preservation of sapheno-femoral confluence: hemodynamic and clinical results. *J Vasc Surg* 2008;47(6):1300-4; discussion 1304-5. Epub 2008 Apr 28.
16. Sheppard MA. A procedure for the prevention of recurrent sapheno-femoral incompetence. *Aust. N. Z. J. Surg.* 1978;48:322-326.
17. Nyameckye J, Shephard NA, Davies B, Heather BP, Earnshaw JJ. Clinicopathological evidence that neovascularization is a cause of recurrent varicose veins. *Eur. J. Vasc. Endovasc. Surg.* 1998;15:412-5.
18. Van Rij AM, Jones GT, Hill GB, Jiang D. Neovascularization and recurrent varicose veins: more histologic and ultrasound evidence. *J. Vasc. Surg.* 2004;40:296-302.
19. El Wajeh Y, Giannoukas AD, Gulliford CJ, Suvarna SK, Chan P. Saphenofemoral venous channels associated with recurrent varicose veins are not neovascular. *Eur. J. Vasc. Endovasc. Surg.* 2004;28: 590-594.
20. Jones L, Braithwaite BD, Selwyn D, Cooke S, Earnshaw JJ. Neovascularization is the principal cause of varicose vein recurrence: result of a randomized trial of stripping the long saphenous vein. *Eur. J. Vasc. Endovasc. Surg.* 1996;12:442-445.
21. Badri H, Bhattacharya V. A review of current treatment strategies for varicose veins. *Recent Pat Cardiovasc Drug Discov.* 2008;3(2):126-36. Review.
22. Jakobsen BH. The value of different forms of treatment for varicose veins. *Br. J. Surg.* 1979;66:182-184.
23. Mumm SR, Morton JB, MacBeth WAAG, Mc Leish AD. To strip or not to strip the long saphenous vein? A varicose veins trial. *Br. J. Surg.* 1981;68:426-428.