The relationship between varicose veins (VV) of the lower limbs and lymphoedema (LYM) has frequently been observed and has created diagnostic and therapeutic dilemmas. Both of these diseases can worsen the venous-lymphatic balance of the lower limb, which contributes to the formation of oedema, or of the multiple patterns of chronic veno-lymphatic insufficiency (e.g. lipodermatosclerosis, pigmentation, eczema, ulcer, etc.) and all the symptoms linked to it. Although VV surgery can result in the onset of a real (iatrogenic) LYM in the operated limb, it is also true that VV surgery can be performed, following very strict indications and taking specific precautions, in the lymphoedematous limb.

These two aspects of the same problem can be unified in just one view of prevention of the onset or the worsening of LYM. In fact, in the surgical approach to the VV of the lower limbs, it is extremely important to adopt a range of technical precautions and anti-oedema complementary therapies in order to eliminate as much as possible the damage (almost inevitable, even though minimised) on the lymphatic contingent of the operated limb.

The lymphoedematous limb can be affected by primary varicose pathology and in these cases, surgery of VV can have an indication in the treatment of complications related to VV, e.g. recurrent superficial thrombophlebitis, venous ulceration, especially if of recurrent nature, as well as in cases of bleeding from VV. Also in selective cases of primary VV with phlebolymphoedema, a mini-invasive surgical act can improve the impairment of venous and lymphatic drainage.1

In respect of the opposite condition (LYM as a complication after VV surgery), the uncertainties and problems become more complicated with an apparently healthy limb becoming oedematous after a saphenous stripping resulting in the onset of an iatrogenic LYM. Lymphoscintigraphy exams before and after VV surgery report lesions of the lymphatic collectors (and of the lymph nodes) in 63.6% of the patients who have undergone a complete saphenous stripping.2 This percentage is much lower (11.1%) in cases of simple phlebectomy operation (only VV avulsions with no saphenous avulsion). In the same study, a clinically evident LYM was present in only 5% of the operated patients, but the lymphoscintigraphy results give a guide to the potential damage of VV surgery. The area of the worst
lymphatic damage has been shown to be in the anteromedial aspect of the distal third of the leg, where usually the main lymphatic trunks of the lower limb run in close proximity to the saphenous axis. This data imposes upon the surgeon a strategy of minimal aggressiveness of the VV operation. This should be based on a careful pre-surgery colour-flow duplex imaging (CFDI). Through this investigation it is possible to spare many saphenous junctions, (as in our experience, 28% of the patients have a reflux of the great saphenous vein (GSV) with terminal competent valve at the saphenofemoral junction), perforators and of most of the saphenous trunks, by performing a mini-invasive surgery.

According to our surgical experience, the following technical modifications have reduced the complications of lymphatic origin:

a) Reduction of the number and especially the size of the incisions for phlebectomy/stab avulsions of VV (1-2 mm, sometimes tip shaped, performed with a 18G needle). Incisions should always be made along the longitudinal axis of the limb; (transverse incisions are more damaging for lymph vessels because of possible parallelism between the latter and the venous vessels). In addition, prolonged and thorough manoeuvres with the hook and difficult phlebectomies proved to be, in our experience, much more traumatic on the peri-venous tissues, compared to “healthy” surgical avoidance of the short problematic varicose tracts left in situ (which are destined to become fibrotic).

b) Saphenous stripping performed with the invagination (inversion) technique, using the PIN-stripper, or as more frequently performed in our experience, using the disposable plastic stripper or a firm thread. In this way it is possible to avoid most injuries to lymphatic collectors, whereas the old-fashion “olive” stripping technique produces more deleterious consequences on the lymphatic (and nervous) peri-saphenous structures. The avulsion of GSV or of small saphenous vein (SSV) should moreover, be tailored to the morphologic and haemodynamic criterions: the anachronistic and dangerous long stripping (which involves the leg segment of GSV, where lymph vessels are in close proximity of the GSV) is indicated in the 3% of patients with incompetent GSVs and in 6% of cases with refluxing SSV. A modern surgery “a la carte” can be based on the segmental saphenous stripping in all cases. Why remove 30-60 cm of healthy vein in 94-97% of the veins? No surgeon should operate on healthy vessels. There is no evidence of increased recurrence rate when leaving these healthy segments in situ.

c) High and short incision (2-4 cm, though expandable if necessary) for the cross-sectomy (high ligation), about 1 cm above the inguinal line or on the popliteal fold, with sparing and temporary displacement (manual or with the retractor) of lymph nodes and/or lymphatic lamina, helps to minimise lymphatic disruption. The limited use of electro-cauterisation can also reduce lymphatic damage. Indeed most of the inguinal lymph nodes are located along the more proximal part of the accessory anterior saphenous vein, thus they should not be involved in the cross-sectomy, emphasising the importance of avoiding wide dissections at the groin or popliteal area.

d) The re-operation for recurrent VV at the groin is well known to be a more complicated procedure, often accompanied by lymphatic injury, lymphocoele or fibrotic oedema at the groin or popliteal fossa. For these, and other reasons, another therapeutic option is gaining worldwide acceptance in recurrent VV treatment, as well as in primary VV. This is duplex guided sclerotherapy, which has been improved furthermore by the advent of sclerosant foam. This option has to be considered when presented with a lymphoedematous limb with medium to large size VVs . It is useful to add, that even sclerotherapy can produce an inflammation of the peri-venous tissues, with risks, although minimal, of loco-regional LYM , especially in those patients suffering from latent lymph-stasis.

As a further criterion of mini-invasiveness for VV surgery we must emphasise that the surgical intervention, saphenectomy included, can be performed under local anaesthesia (100-200 ml of buffered mepivacaine 0.25%), which has less vaso-dilatatory pharmacological properties than spinal and general anaesthesia. The use of local anaesthesia has positive benefits due to the prompt recovery of the patient’s ambulation. Discharge of the patient is possible 3-6 hours after the operation.

In addition, the haemo-lympho-static action of the subcutaneous anaesthetic collection along the veins can reduce bleeding and lymphorrhagia in the immediate peri-operative period.

VV surgery on “healthy” or lymphoedematous limbs must be followed by an adequate elastic-compression. We use the...
regime of compressing the operated limbs with elastic-compression for 7 days, either with multi-layer adhesive bandage or with specific stockings 35 mm Hg + 5 mm Hg (e.g. STRUVA 35 ™), with eccentric positive compression by means of pads on the operated sites. The analgesic, haemostatic, anti-embolism and anti-oedema properties of an adequate post-surgery elastic compression are useful aids to minimise venous and lymphatic impairment that may occur after VV surgery. The post-operative localized oedemas are mainly of high-protein nature and they are benefited by the recovery action of the protein, exerted by compression and manual lymphatic drainage.

We performed a review of 1824 VV operations of the lower limbs, performed between 1996 and 1999 and the following complications of lymphatic nature were highlighted: 19 cases of lymphocoele (1.0% of the total operations) and 4 cases of non-transient LYM (0.2%) 5. A similar positive result has been achieved with patients suffering from LYM, who have undergone VV surgery, according to the selective indications described above. Worsening of the lymphoedematous status, as well as specific complications such as lymph fistulae, ulcers, wound dehiscence and lymphocoele, have not been observed. In this case series, surgery was indicated in lymphoedematous limbs to minimise further complications from VV, and we recorded an improvement of phlebolymphoedema (venous oedema from VV and LYM) in most of the cases.

Besides these details, the surgical management of the lymphoedematous limbs with VV should absolutely include an integrated anti-lymphostasis therapy, both in the pre-operative, and especially in the post-operative phase. In our experience, the holistic and integrated approach to LYM is the favourite one, and we perform manual lymphatic drainage, sound wave lymph drainage (or air pressotherapy in some cases), compression multi-layer bandages and anti-stasis exercises. As a pharmacological adjuvant we administer natural coumarin (melilotus extract) as talc (topical) and orally in the form of tablets 1. A minimum of similar multi-faceted, physical-rehabilitative treatment is applied to the vast majority of the patients (non-lymphoedematous) who undergo VV surgery. Although demanding, this has been shown to reduce lymphatic complications.

### Table 1: Surgical activity 1.1.1996 - 15.12.1999

<table>
<thead>
<tr>
<th>n.pat.</th>
<th>M</th>
<th>F</th>
<th>Right</th>
<th>Left</th>
<th>Mean Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1824</td>
<td>457 (25.1%)</td>
<td>1367 (74.9%)</td>
<td>938 (52%)</td>
<td>886 (48%)</td>
<td>55.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GSV</th>
<th>AASV</th>
<th>SSV</th>
<th>REC</th>
<th>EXTRA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1431 (78%)</td>
<td>91 (5%)</td>
<td>69 (4%)</td>
<td>72 (4%)</td>
<td>161 (9%)</td>
</tr>
</tbody>
</table>

### Table 2: Main complications

<table>
<thead>
<tr>
<th>Lymphocoele</th>
<th>Lymphoedema</th>
<th>Haematoma</th>
<th>DVT</th>
<th>PE neurologic probl.</th>
<th>Wound infect.</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 (0.5%)</td>
<td>4 (0.2%)</td>
<td>20 (1.0%)</td>
<td>2 (0.1%)</td>
<td>1 (0.05%)</td>
<td>28 (1.5%)</td>
</tr>
</tbody>
</table>

### Abbreviations:
- n.pat.: number of patients operated; M: males; F: females; GSV: great saphenous vein; AASV: accessory anterior saphenous vein; SSV: small saphenous vein; REC: recurrence; DVT: deep vein thrombosis; PE: pulmonary embolism; Infect.: infection.

In conclusion, VV surgery represents a potentially harmful procedure for the lymphatic system in the operated limb. This possible damage can lead to an extremely dangerous, if performed on lymphoedematous limbs. 6,7 In these specific patients, a pre-surgery lymphoscintigraphy, in order to assess the pathways of residual lymphatic drainage, collateral flows and lymph node aplasia, may help to clarify the therapeutic approach for the VV.

In the last 10 years a new conservative approach has been proposed in VV surgery (CHIVA strategy). This approach is based on selective ligatures, mini-phlebectomies, sparing of perforators, and finally sparing the saphenous stems. In case of LYM coupled with VV, we find CHIVA approach interesting for its minimal lymphatic damage, although proper indications are not universally recognized.

Abbreviations:
- GSV: great saphenous vein; AASV: accessory anterior saphenous vein; SSV: small saphenous vein; REC: recurrence; DVT: deep vein thrombosis; PE: pulmonary embolism; Infect.: infection.
disabling condition, with secondary (iatrogenic) LYM, or worsen a pre-operative LYM. Any indication for VV surgery in the lymphoedematous limb, has to therefore, be carefully considered. The surgeon’s experience and especially the surgical technique are two very important variables to plan this kind of approach. Through modern mini-invasive tailored VV surgery, it is possible to decrease any lymphatic complications. In addition, peri-operative multi-faceted lymphatic treatment is of paramount importance in case of pre-existing LYM.

In the view of the necessity of widespread adoption of LYM prevention, surgeons should aim to improve the implementation of such conservative surgical philosophy and operative techniques in order to minimise the onset of LYM after VV surgery, as well as to selectively perform this surgical treatment on lymphoedematous limbs. Finally, duplex-guided foam sclerotherapy has become a very interesting alternative in many cases.

**Commentary**

This rather didactic article reviews the complication rate, in particular post-operative lymphoedema in over 1800 varicose veins operations undertaken by a European, surgically orientated phlebology and lymphoedema unit over a 4-year period.

It summarises the group’s surgical and anaesthetic techniques (previously described by others). Varicose vein surgery-induced lymphatic damage should be minimised through concepts put forward by the authors.

They have embraced thorough pre-operative duplex scanning / mapping with as they descriptively put it, “a la carte” operations to treat the underlying venous pathophysiology.

The authors point out that excessive surgery can lead to increased complications and as we know, recurrence via neovascularization at the saphenofemoral complex.

Two points are of particular interest.

1. Extensive postoperative care to reduce complications including compression stockings, manual and mechanical lymphatic drainage, exercise and phlebolymphatic agents. (“Lodema” was available in Australia until 1996 but discontinued because of severe and sometimes fatal hepatotoxicity).

2. European and American interventional phlebologists have embraced the use of tumescent local anaesthetic techniques; the same cannot be said for Australia, New Zealand and the United Kingdom. The reason is possibly related to the surgeon / anaesthetist relationship (the type of anaesthesia is typically decided by the anaesthetist). The fee structure favours general anaesthetics, as they are quicker and easier to administer. Local anaesthetic techniques are time consuming and take considerable effort.

Post varicose vein surgery lymphoedema is a depressing lifelong experience for both the patient and the physician.

This article reminds us that we should consider all recognised treatment options and techniques to reduce this complication

**References**


Mark Elvy