Incompetent Perforating Veins are Associated with Recurrent Varicose Veins

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Aims: we suspected incompetent perforating veins of having a role in the development of recurrent varicose veins in some patients. The aim was to look for an association between perforators and recurrent varicose veins.

Methods: a consecutive group of patients presenting with varicose veins were examined using colour duplex ultrasound by an experienced vascular technologist. Pathological perforating veins were defined as those exhibiting bidirectional flow and a diameter of 4 mm or greater at the fascia.

Results: between September 1998 and July 1999, 204 patients were examined. Primary varicose veins were found in 198 legs (135 patients) and recurrent varicose veins in 91 legs (69 patients). In patients with primary varicose veins, 88 (44%) had incompetent perforators compared to 57 (63%) of those with recurrent varicose veins (Chi-squared, p<0.005). Also, for recurrent varicose veins, the percentage of patients with any given number of incompetent perforators was higher than for primary varicose veins. Overall, there was a higher number of incompetent perforators in those with recurrent veins compared to primary veins and this difference was significant at 95% confidence interval.

Conclusion: patients with recurrent varicose veins have both a higher prevalence and a greater number of incompetent perforating veins than patients with primary varicose veins.

Key Words: varicose veins; recurrence; perforators.

Background

Recurrent varicose veins constitute a significant problem both in terms of use of health resources and patient morbidity. The risk of developing recurrent varicose veins after primary surgery increases with time and up to 65% of patients develop recurrence by 5 years.1 Approximately 20% of varicose vein surgery in the U.K. is performed for recurrence.2 If recurrence rates could be reduced by changing the primary operation, there would be significant advantages both to patients and the health economy.

Incompetent perforating veins have long been associated with venous ulcers34 but to date, little emphasis has been placed on the role of perforator vein surgery in patients with primary varicose veins. We believe that incompetent perforating veins may be an important cause of recurrent varicose veins.

This study was designed to investigate whether an association exists between the presence of incompetent perforating veins and recurrent varicose veins.

Method

All patients presenting to one surgeon with varicose veins (both primary and recurrent), between September 1998 and July 1999 were included in the study. Those who had venous ulcers were excluded. Each leg was examined using colour flow duplex (ATL 3000 HDI, U.S.A.) using an L7–4 MHz or L 10–5 MHz linear transducer by an experienced vascular technologist. A previous unpublished audit from our department in 1998 to 1999 suggested a 98% accuracy of our vascular technologist in predicting perforators when compared with operative findings. This audit was performed on 50 consecutive patients by checking our vascular technologist's duplex assessment against the operative findings at subfascial endoscopic perforator surgery (SEPS). We found that her duplex examination had 100% specificity and 96% sensitivity.

For each leg, the number and position of any incompetent perforating veins were recorded. Pathological perforating veins were defined as those which
Incompetent Perforating Veins and Recurrence

Table 1. Number of incompetent perforating veins associated with primary and recurrent varicose veins.

<table>
<thead>
<tr>
<th>Perforators to long saphenous system</th>
<th>Perforators to short saphenous vein</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Primary varicose veins (n = 198)</td>
<td>128</td>
</tr>
<tr>
<td>(%)</td>
<td>(65)</td>
</tr>
<tr>
<td>Total number of perforators</td>
<td>110 (35% patients)</td>
</tr>
<tr>
<td>Recurrent varicose veins (n = 91)</td>
<td>43</td>
</tr>
<tr>
<td>(%)</td>
<td>(47)</td>
</tr>
<tr>
<td>Total number of perforators</td>
<td>76 (53% patients)</td>
</tr>
</tbody>
</table>

had a diameter of greater than 4 mm at the fascia and exhibited bi-directional flow.5

Results

Two-hundred-and-four patients (289 legs) were examined. Primary varicose veins were present in 198 legs (135 patients) and recurrent varicose veins in 91 legs (69 patients).

Number of patients with incompetent perforators

Eighty-eight (44%) patients with primary varicose veins had incompetent perforators compared to 57 (63%) of those with recurrent varicose veins (Chi-squared, p<0.005).

Number of incompetent perforators per leg

The number of incompetent perforating veins found in those with recurrent varicose veins was also significantly higher than in those who had not had previous surgery. In primary varicose veins, 137 incompetent perforators were found in 198 legs. These were distributed as follows: 110 incompetent perforating veins connecting to the long saphenous system and 27 related to the short saphenous vein. In those patients with recurrent varicose veins, 110 perforators were found in 91 legs. Seventy-six were related to the long saphenous system and 34 to the short saphenous vein. The difference in the number of incompetent perforators found in those with primary and recurrent varicose veins was significant at the 95% confidence interval (Table 1).

Discussion

This study clearly depends upon the accuracy of venous duplex in detecting incompetent perforating veins. Previous authors have suggested that although specific, duplex often lacks sensitivity and hence accuracy. One study found that duplex only demonstrated 40–63% of incompetent perforators and was therefore of limited value for this purpose. Ultrasound is, however, dependent on the skill of the operator. Although venography has classically been regarded as the gold standard for assessing the venous system, it cannot accurately demonstrate the characteristic of bi-directional flow that is necessary to define incompetence. Some large veins which are classified as incompetent on the basis of venograms will therefore actually be competent. There is no ideal gold standard against which to compare the accuracy of duplex but the findings at operation provided a useful guide as to the reliability of our technologist’s duplex findings. Our finding that she had a 98% accuracy (100% specificity and 96% sensitivity), led us to feel justified in our conclusions from this work.

Various studies have examined the possible causes of recurrent varicose veins including neovascularisation, “missed” tributaries in the groin, inaccurate initial diagnosis or failure to correctly identify the short saphenous vein at operation. Ligation of the saphenofemoral junction alone has also been shown to result in a higher recurrence rate than if concomitant stripping of the long saphenous vein is performed. Incompetent perforating veins have previously been implicated in the aetiology of recurrent varicose veins by several different authors. Previous studies have not, however, compared the prevalence and numbers of incompetent perforators found in those with primary and recurrent varicose veins. Despite the fact that the presence of incompetent perforating veins has already been suggested as a cause of recurrence, perforator surgery has not been widely adopted for primary varicose veins.

There may be several reasons for this. Firstly, there is some evidence that for primary varicose veins, high saphenous tie and strip restores competence in up to 80% of incompetent perforating veins. This would, however, still leave 20% of incompetent perforators...
which would continue to reflux and may lead to recurrence. In addition, there was no patient follow-up beyond 6 weeks and in view of our findings, it is probable that a large proportion of the 80% of perforators which appear to regain competence will in time become incompetent again.

Secondly, open perforator ligation is not without its morbidity and is not routinely performed for incompetent perforators in cases of uncomplicated primary varicose veins. SEPS has the advantages of being a minimally invasive technique. Initially developed for patients with venous ulcers, it has not been widely adopted for use in primary varicose veins. If a true link exists between incompetent perforators and recurrence, then performing SEPS on patients with incompetent perforators in addition to stripping of the long or short saphenous veins would reduce the risk of recurrence.

Patients with recurrent varicose veins have a higher prevalence of incompetent perforating veins and have a greater number of incompetent perforating veins per leg.

There is an association between incompetent perforating veins and recurrent varicose veins. It is now essential to establish whether this is a causative link.

References


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