



# Does the suture material influence the outcome after high ligation of great saphenous vein?

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Ever since new methods to treat saphenous vein reflux were introduced, the controversy is held, whether the new methods are or not better than the classical one: High ligation and stripping (HLS). New methods were possible after the upcoming of duplex ultrasound (DUS) so did proper evaluation of recidives. In the meantime, a series of comparative studies have been performed: high ligation and stripping versus high ligation alone (HL), versus CHIVA, versus endothermal venous laser ablation (EVLA) alone or with HL and foam sclerotherapy. The most known studies are the three under the auspices of Earnshaw published by Jones (2 years follow-up) [1], Dwerryhouse (5 years follow-up) [2] and Winterborn (11 years follow-up) [3] comparing HLS with HL. Reading them closely it surprises that the authors do not tell the reader, which suture material was used to close the great saphenous vein (GSV) and the tributaries in the groin. It seems like this is so clear, that nobody must discuss.

In the literature review from the German Guidelines for Diagnostics and Therapy of Varicose Veins [4] the author was surprised by a very wide spread percentage of recidives found in different series at the groin site. Few authors have written the type of suture used in the publication, excepting for the group around Frings [5–8] and Heim [9], Cappelli [10] and de Maeseneer [11]. To sort out, if the type of suture used had an influence on the result, an additional pubmed-search focusing on neovascularization was performed. Studies with at least one group of patients undergoing high ligation with or without stripping or crossotomy (interruption of the saphenofemoral junction (SFJ) at the ostium level, leaving the groin tributary in connection with the distal GSV) were selected. Study arms applying special barrier techniques to avoid a recidive were excluded. Only those publications using duplex to detect recidives with description of the de Maeseneer criteria [11] or with a clear description of either neovascularization or tortuous vessels in the groin not due to technical errors were included in the evaluation.

A total of 23 studies were found with 30 arms that described neovascularization at the SFJ site after surgical

intervention. The overall percentage of the duplex-assessed neovascularization in the groin region ranged between 1.1 % and 12.3 % after non-absorbable sutures and between 10 % and 65 % after absorbable. In studies with follow-up between 5–10 years the recurrence rate after absorbable suture was even higher, ranging between 18 % and 65 % (see Figure 1). The results of all studies are found in the electronic supplementary material (ESM) 1, Table and ESM 2, Figure. Some groups used titanium clips in addition to non-absorbable ligation, their recidive rates ranged between 1.1 % and 7.4 % [10, 12, 14].

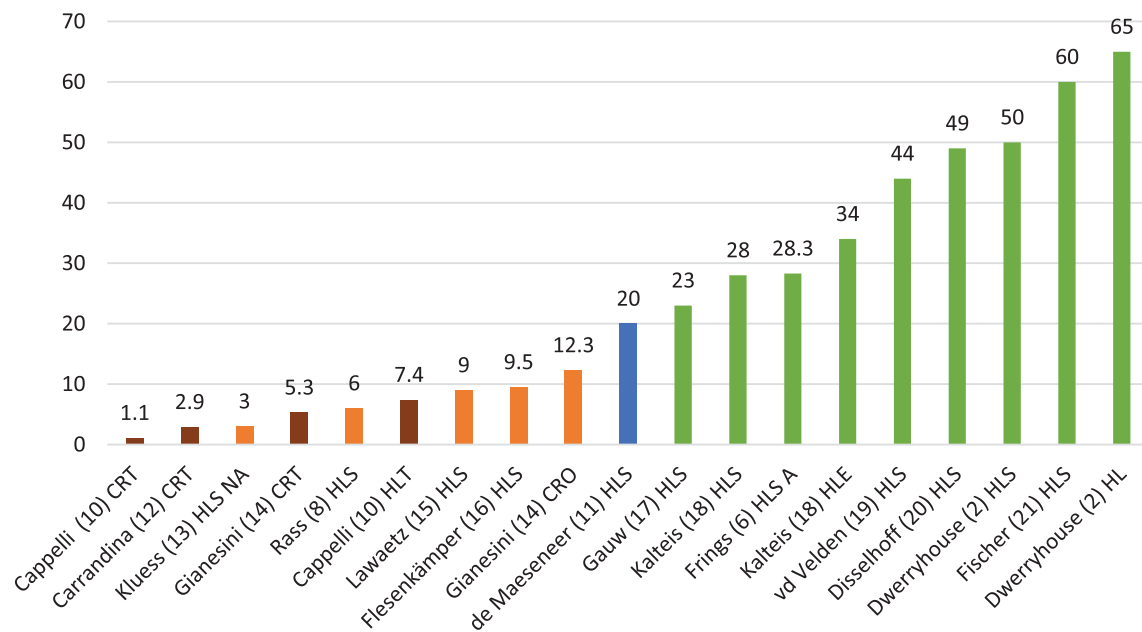
Of course, this evaluation of literature is not a review as there was only one randomized study focusing on the topic investigated [7]. Thus, a review cannot be performed, and the author is aware that the study settings, interventions and surgeons were diverse. Also, the fact that the question about the used suture material was asked via mail and was mostly not published does not help to scientific rigor, although every author was completely sure about the used material. Nevertheless, the surprisingly clear difference in frequency of neovessel formation depending on the type of suture used with a clear cutoff around 18 % after 5 years (below found in non-absorbable, above for absorbable material) is impressive.

Some phlebologists have abandoned saphenous surgery completely, but others not, for different reasons, specially reimbursement of public health care. Apart from this fact, the last word is surely not spoken about which method is the best to treat axial reflux at the groin, neither for the ablating techniques nor for the saphenous vein surgical techniques [22, 23] nor how to treat the recurrences after both [24]. So, the question which suture might reduce recidives is still of high interest.

It looks like non-absorbable material improves the results, and absorbable material is involved in higher neovascularization rate.

The question concerning which suture material is the most appropriate to close the SFJ should now be present in the awareness of every surgeon and will only be definitively sorted out by prospective randomized studies.

## % Neovascularisation 5-10 years FU



**Figure 1.** Frequency of neovascularization 5–10 years after interruption of the saphenofemoral junction. The bars are labeled with the name of the first author and the technique used (see below), the bars are colored depending on the suture used: Green: absorbable suture, Orange: non-absorbable suture, blue: Mixed (non-absorbable at the sapheno-femoral junction and absorbable for the tributaries), brown: Mixed non-absorbable and titanium clip. A: Absorbable; CRO: Crossotomy (interruption at the level of the ostium without interruption of tributaries); CRT: Crossotomy with additional titanium clip; HL: High ligation alone; HLE: High ligation and EVLA; HLS: High ligation and stripping; HLT: High ligation alone with titanium clip; NA: non-absorbable (2, 6, 8, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21).

## Electronic supplementary material

The electronic supplementary material (ESM) is available with the online version of the article at <https://doi.org/10.1024/0301-1526/a000833>.

**ESM 1.** Table with an overview of all the results.

**ESM 2.** Figure with the results from all the study-arms.

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#### Conflicts of interests

No conflicts of interest exist.

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