

Endovenous Techniques are improved by Ultrasound-Guided Hyaluronan Injection instead of Tumescence

Johann C. Ragg, angioclinic® Vein Centers

Background

Thermal closure methods are currently replacing surgery in the treatment of saphenous vein insufficiency. However, standard saline-based tumescent anesthesia is not suitable for optimal results, as it compresses the target vein just for hours to days. In consequence, symptomatic inflammatory reactions including local pain, indurations and discolorations may occur in more than 40% of the cases

After basic experience with perivenous hyaluronan injections (UIP 2013) we examined a modified substance to achieve initial and lasting vein lumen reductions.

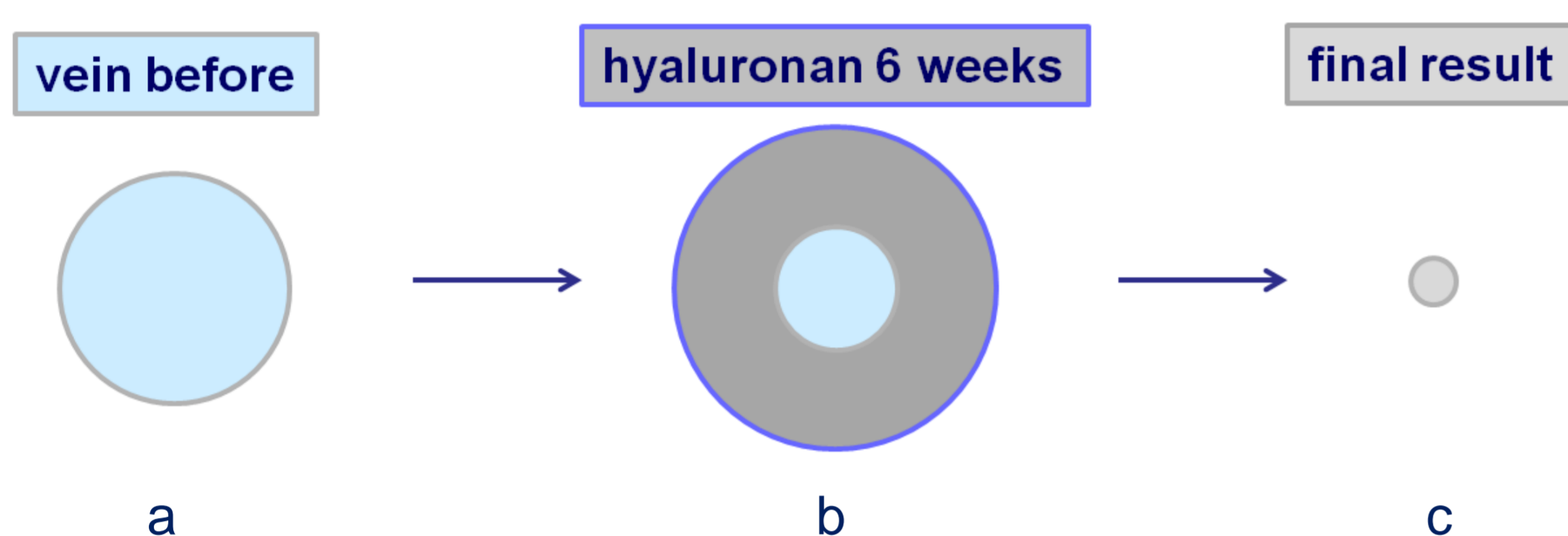


Fig. 1: When a vein (a) is compressed by hyaluronan solution (b) for several weeks instead of using tumescent anesthesia, an immediate and lasting lumen reduction will result.

Materials & Methods

44 patients (28 f, 16m, 42 – 71 yrs.) with insufficiency of the GSV, diameter 7.4 – 23.1 mm, distance to skin > 10 mm, receiving endovenous laser treatment (1470 nm) or catheter microfoam (Aethoxysklerol 1%) were randomized for lumen reduction: Group A (n = 12) received a novel hyaluronan solution (NASHA investigational, crosslink ratio < 1.0%), while group B received standard tumescent fluid (n = 12). Some patients (n = 20) received both hyaluronan and tumescence in separate GSV segments. The application of hyaluronan was performed with a coaxial safety cannula system (IntraShape®, Fig. 1) using ultrasound monitoring. No external compression was applied. Clinical and sonographic follow-up was performed after 2, 8 and 16 weeks.

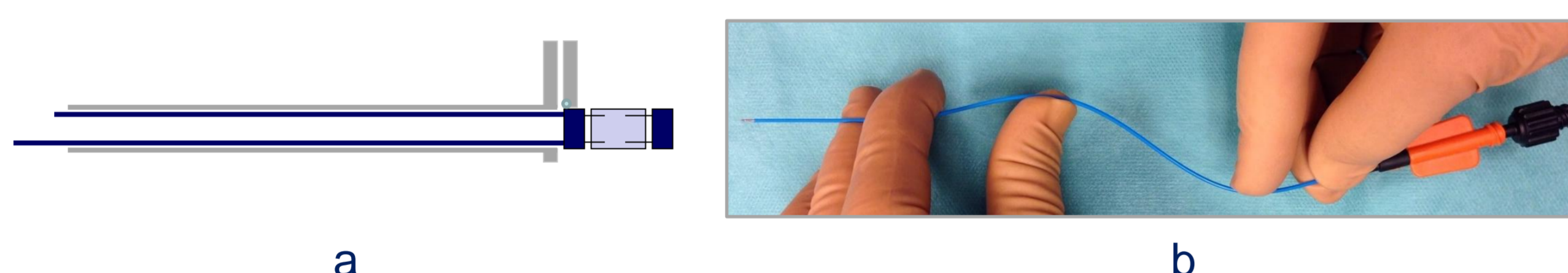


Fig. 2: Coaxial injection system, consisting of a sharp inner cannula to perforate skin and fasciae, and an outer blunt tip for non-traumatic use near to veins; a) scheme, b) prototype

Results

Hyaluronan injection was technically successful in 41/44 cases (93.2%). Initial diameter reduction obtained by hyaluronan was 54 – 81%, mean: 68.3%. At the first control (14d) all veins were occluded.

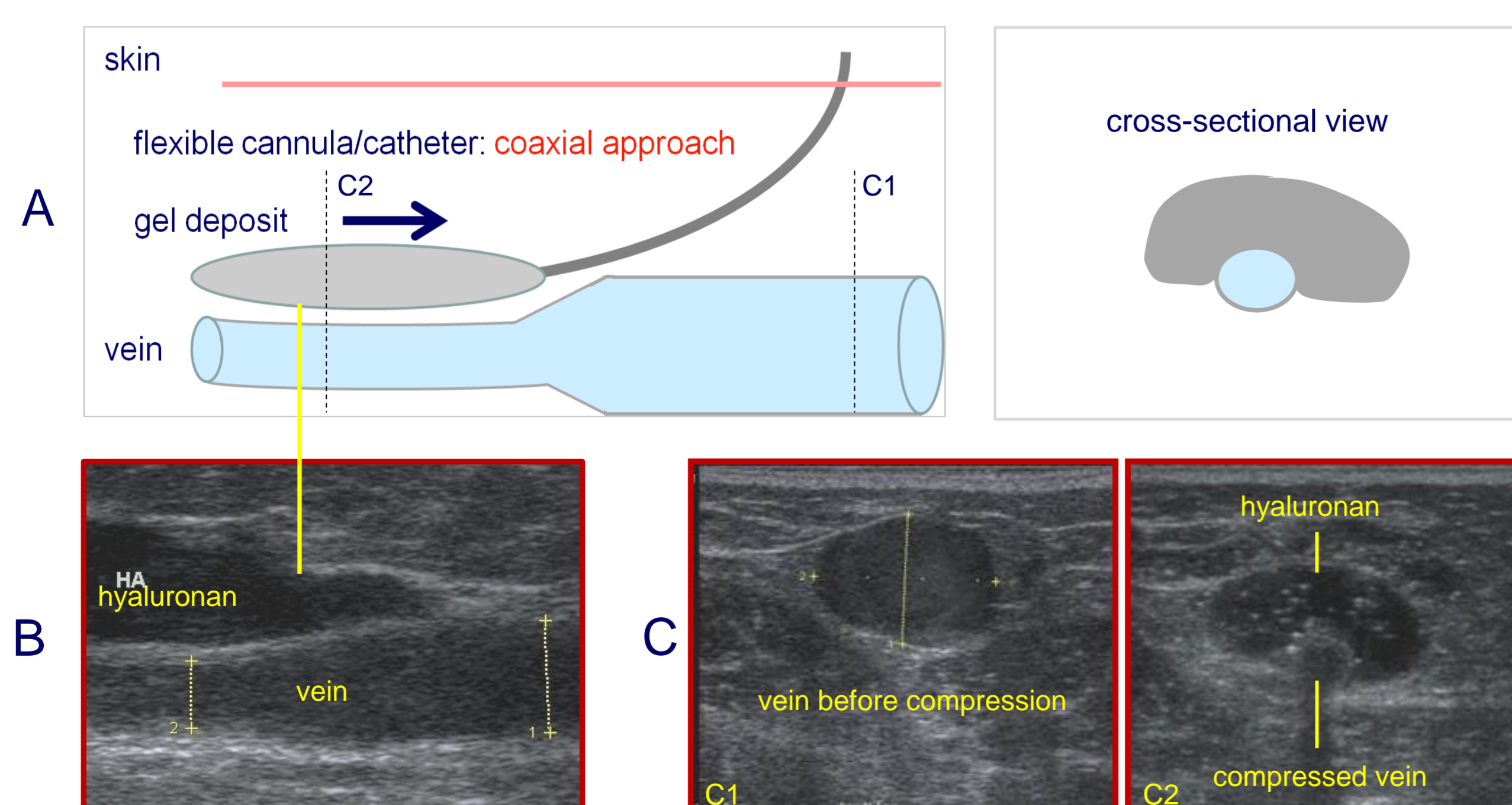


Fig. 3: Hyaluronan injection accompanying foam sclerotherapy, A) scheme, B) ultrasound longitudinal view; C) vein before and after hyaluronan injection, cross sectional view

Clinical follow-up showed a complete absence of symptomatic phlebitic reactions and no discolorations in hyaluronan-treated segments, while segments receiving tumescent anesthesia had symptomatic inflammations in 15/22 cases (68.2%). 5/22 (22.7%) underwent micro-thromb aspirations.

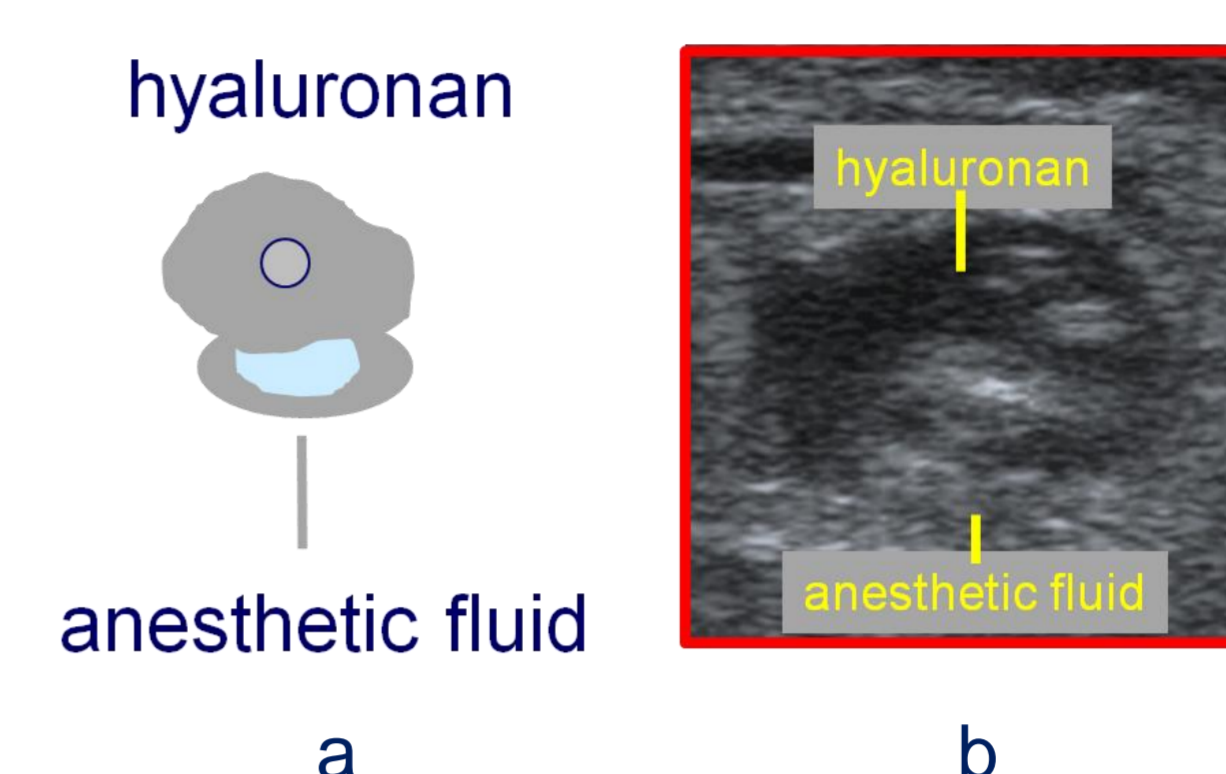


Fig. 4: Hyaluronan vein compression accompanying endovenous laser; a) scheme, b) ultrasound image

Visible hematoma were present in 2/22 (8.7%) after injection of hyaluronan solution versus 18/22 (81.8%) following tumescent anesthesia. No particular adverse events were observed after administration of hyaluronan. No traces of hyaluronan were found at visit 3 (16 weeks).

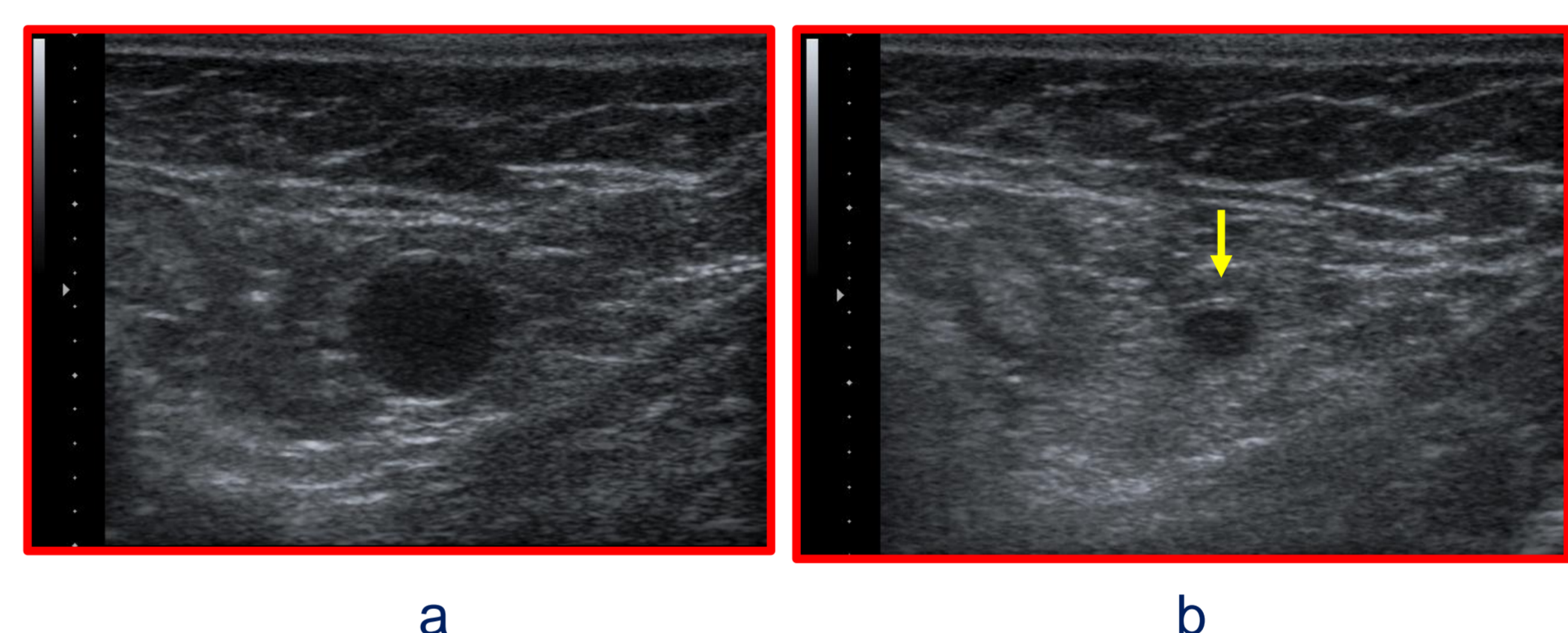


Fig. 4: Ultrasound comparison of adjacent GSV segments with pre-treatment diameter of 8.2–8.7 mm, week 8 after ClosureFast, a) using tumescent anesthesia, b) after hyaluronan compression

Gel volumina were 1.4 – 2.9 ml/cm (mean 1.9 ml/cm) with laser and 1.3 – 3.1 ml/cm (mean 2.1 ml/cm) with sclerofoam. Application time was 3.5 – 13.7 s/cm (mean 6.7 s/cm) for laser and 2.2 – 8.8 s/cm (mean 3.8 s/cm) for sclerofoam.

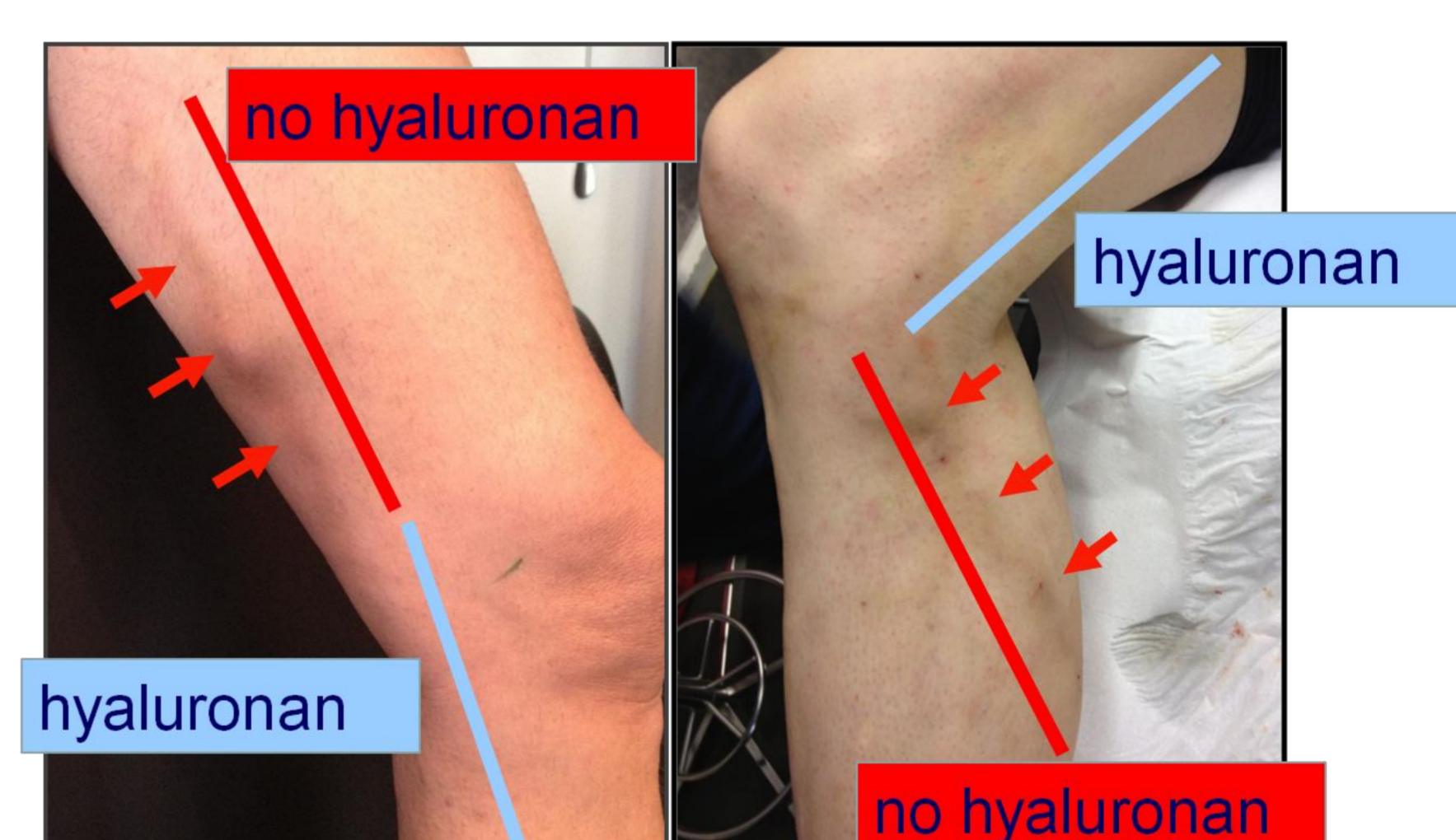


Fig. 5: Visual comparison of vein segments with/without hyaluronan cover

Conclusions

Perivenous hyaluronan injection used with catheter sclerofoam or endovenous laser is safe and effective. It improves results, comfort and aesthetic aspects by initial and permanent vein lumen reduction.

Concerning lumen minimization the method seems similar to vein gluing, but without use of aggressive or long lasting chemicals.

As soon as industry provides suitable commercial products, replacement of tumescent fluid may be recommended for saphenous veins > 6 mm in diameter.

Contact:
Johann C. Ragg, MD ragg@angioclinic.de
Founder & Head of angioclinic® Vein Centers

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