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INTERNAL VEIN COMPRESSION – A SWISS INVENTION

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Background: Therapy of venous insufficiency, formerly consisting mainly of surgery and textile compression, today includes also endovenous thermal ablation, sclerofoam, vein gluing, stenting, and various venotonic or anti-inflammatory medications. As insufficiency usually goes along with vein dilatation, the idea to adjust dilated veins or valve zones by perivenous biocompatible gel injection was established by a Swiss work group in 2013, a potentially comfortable, fully vein saving, non-chemical method. Besides lots of known medical bulking agents like dextranomer, cellulose derivatives, polyacrylate polyalcohol copolymer, polytetrafluoroethylene, polydimethylsiloxane, calcium hydroxyapatite and even acrylates, the best choice for use in phlebology seemed to be cross-linked hyaluronan according to the huge experience with its biocompatibility. There are currently three options: 1) Percutaneous valvuloplasty (PVP), aiming at restoration of local valve function; 2) focal venoplasty (FVP), aiming at diameter reduction to modify hemodynamics, and 3) segmental venoplasty (SVP) to reduce diameters as an adjunct to endoluminal procedures.

Methods and Materials: PVP was studied in 25 patients (17 f, 8 m, 25 – 54 y., GSM valves, diameter 7.0 – 12.0 mm), using a 24 mg/l prototype hyaluronan. FVP was evaluated in 19 patients (13 f, 6 m, 26 – 69 y.) for reflux reduction in GSV, SSV or sidebranch insufficiency (also 24mg/l). SVP was investigated in 40 cases (23 f, 17 m, 41 – 72 yrs.) with GSV or SSV insufficiency, adjunctive to Biomatrix sclerofoam (Venartis), using another, less viscous and less durable hyaluronan (16 mg/l). For this collective, target segments were split and randomized to hyaluronan vs. NaCl 0,09%.

Results: PVP established orthograde flow in 24/25 cases (96.0%). With FVP, 16/19 cases were successful (83.3%) in obtaining alternate (n = 9) or orthograde flow (n = 7), correlating well with clinical improvement. In both applications, medical benefit was unchanged at 6 months FU. With SVP, technical success (> 50% lumen reduction) was obtained in all cases (40/40). In all hyaluronan compressed segments, there was no postinterventional pain or discomfort (FU 8 weeks), compared to 36/40 cases (90%) after standard procedures. All hyaluronan applications were without adverse reactions.

Conclusions: PVP is effective and safe to restore valve function, best suitable for early stages of valve decompensation. FVP for hemodynamic purposes showed feasibility, effectivity and safety, while clear indications need further studies. SVP adjunctive to endovenous ablation significantly improves post-treatment comfort. The choice of hyaluronan instead of more permanent material is justified by the excellent safety results, although PVP and FVP might require maintenance injections in few year´s intervals. However, a revisiting mode would allow individually tailored solutions, instead of failing with “once for ever” actions.

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Presentation with video instructions about how to perform the procedures.