EXTENDED LONG LINE ECHOSCLEROTHERAPY (ELLE)

Review of technique

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The technique of Ultrasound Guided Sclerotherapy [UGS] or Echosclerotherapy of lower limb varicosities was first presented in Strasbourg in 1989. It involves introduction of a sclerosing agent into the lumen of a varicosity under duplex ultrasound guidance. UGS was initially developed to reduce the risks inherent in injection rather than to improve results. This technique has been shown to be effective in treatment of primary truncal varicosities as well as post-surgical recurrences involving isolated perforator incompetences, neovascularisation, and treatment of duplicated vessels or saphenous tributaries.

Intravenous catheters or “long lines” have been used as central or peripheral lines for the introduction of intravenous agents. These lines are primarily used in interventional radiology or in intensive care units.

The Extended Long Line Echosclerotherapy was first described by one of the authors in 1997. It involves the use of an intravenous catheter to deliver the sclerosant into the lumen of the varicosity under duplex ultrasound control. This article reviews the experience of the authors in using this technique in the past three years as well as further modifications and recommendations.

MATERIALS AND METHODS

Materials

Cavafix MT 134, Cavafix Certo 375 (B.Braun Medical Suppliers, Sydney, Australia), Fibrovein 3% (Sodium Tetradecyl Sulfate 3%) (Australian Medical and Scientific, Sydney, Australia).

Method

Mapping

The target vein, either the Long Saphenous Vein [LSV] or the Short Saphenous Vein [SSV], is visualised using a duplex ultrasound. A 12 MHz or higher frequency probe is the preferred choice. The diameter of the vein at the junction is measured and documented. The vein is then followed distally to establish the incompetence pathway. All perforators and tributaries are noted and the tortuosity of the vein is assessed. The pathway of incompetence is assessed and mapped prior to treatment. The length, depth and lumen diameter of the selected vein is measured to assist in selection of the appropriate cannula, catheter and the entry point.

Cannulation

Selection of the Entry Point

The site chosen for cannulation is of paramount importance. The entry point should ideally be at the most distal

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catheter is inserted through the sheath with the protective cover in place, ensuring sterility.

The catheter is introduced into the lumen of the vein under duplex ultrasound guidance and advanced towards the junction. Once the catheter is about 5 cm distal to the junction, the guide-wire is removed. The leg is then raised to about 45 degrees to empty the vein as much as possible. This will minimize collection of intra-vascular haematoma which may lead to post-sclerotherapy recanalisation. The proximal saphenofemoral/popliteal junction is then compressed (Cloutier Technique) and the leg is brought back to about 30 degrees while maintaining the compression on the junction. The sclerosant is then introduced as the catheter is being withdrawn. An average of 4ml of Sodium Tetradecyl Sulfate 3% is injected along the whole length of the vein under ultrasound visualization. This can be divided into 5 injections of 0.8 ml of solution. In our experience this method of ‘pulse injections’ is superior to a continuous and gradual infusion of sclerosant through the catheter. The injections are delivered through a number of 1 ml syringes as the small diameter of the plunger allows a rapid introduction of sclerosant thereby producing turbulent flow in the lumen which maximises the contact of solution with the tunica intima. It also contributes to the so called ‘summation effect’ as described by Cloutier. In measuring the total volume of injected sclerosant, the dead space of the catheter should be taken into account.

Special attention is given to T-junctions with tributaries and perforators as the catheter is gradually withdrawn. The bent tip of the catheter can be turned to point towards the entrance of tributaries or perforators. In our experience, extra volume of sclerosant is required at these escape points to ensure full sclerosis of these openings. Failure to fully sclerose the escape points may lead to partial recanalisation of the treated vein.

The end points of the treatment include vasospasm, non-compressibility along the entire length of the treated vein and absence of any blood flow in the vein. This is confirmed by duplex re-examination at the end of the treatment session.

Finally, the catheter and the cannula are fully withdrawn and light pressure is applied to the site of insertion. Immediate compression in form of a Class 2 graduated compression stocking is then applied and the patient is advised to mobilise immediately and walk at a moderate pace for 30 minutes. The patients are also instructed to leave the stocking on continuously for the first seven days and to walk daily for 30 minutes.

**DISCUSSION**

An ‘open catheter’ technique has been described by Grondin. This technique recommends a 20G 44mm cannula for cannulation of the main trunks, 6 to 8cm distal to the junction following which the sclerosant is injected as a bolus. This method does not attempt to directly expose the incompetent perforators or the remaining trunk distal to the site of injection to adequate volumes and concentrations of the sclerosant.
cannula diameter also makes entry into smaller diameter vessels more difficult. Finally, there is a definite learning curve associated with this technique making it a significant time and skill challenge for the novice.

The long term effectiveness of ELLE is currently being assessed by the authors. This data when complete, will enable efficacy evaluation of the ELLE technique compared with other procedures such as UGS and surgery.

REFERENCES