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Research Article

Comparison of tumescent versus ultrasound guided femoral and obturator nerve blocks for treatment of varicose veins by endovenous laser ablation



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KEYWORDS

Tumescent anesthesia;
Endovenous laser ablation;
Femoral;
Obturator;
Ultrasound

Abstract *Background:* Endovenous laser ablation (EVLA) is a new method for treating greater saphenous vein insufficiency. Most of physicians use local anesthesia for needle punctures and tumescent anesthesia (TA) to prevent pain and protects the surrounding tissues from the conduction of heat that would originate from the effects of laser energy on the venous wall. The aim of this study is to compare the use of local tumescent anesthesia alone or combined with ultrasound guided femoral and obturator nerve blocks for treatment of varicose veins by endovenous laser ablation.

Methodology: This is a randomized, double blind study included 80 patients scheduled for endovenous laser ablation for varicose veins of the great saphenous vein (GSV) located in the anterior or medial aspect of the leg were prospectively divided into two groups of 40 patients each. Group (A) had EVLA using tumescent anesthesia given by the surgeon. Group (B) had femoral and obturator nerves block before tumescent anesthesia was done. Intraoperative pain associated with applying the tumescent anesthesia and during performing ablation was measured using visual analogue scale. Volume of tumescent was compared in both groups. After finishing the operation, femoral and obturator motor block were evaluated. Postoperative VAS, time of stay in recovery area, patient and doctor satisfaction were also measured.

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Results: Pain on application of tumescent anesthesia and during surgery revealed that group (A) had more intense pain than group (B). Volume of tumescent used during surgery; group (B) used statistically significant less tumescent solution than group (A). Motor block was measured after finishing the operation, 100% of group (A) had no restriction to active movements while 2.5%, 80% and 7.5% had no restriction, mild restriction and moderate restriction to active movements, respectively in group (B). Group (A) had more pain than group (B) postoperatively. Duration of post procedure stay in recovery area showed no statistically significant difference between the two studied groups. Patients and doctors satisfaction was significantly higher in group (B) in comparison to group (A). **Conclusion:** Ultrasound guided femoral and obturator nerve blocks combined with tumescent anesthesia are effective methods of anesthesia during endovenous laser ablation than using tumescent anesthesia alone.

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1. Introduction

Surgery was considered the only choice for treatment of varicose veins. However, complications such as infection and nerve damage were not uncommon. Also general anesthesia, postoperative pain leads to increase in hospital stay. Minimally invasive procedures using (endovenous laser ablation [EVLA] or radiofrequency ablation [RFA]) are safe and effective ways of eliminating reflux with less morbidity, faster recovery, and improved cosmetic results [1]. This procedure is typically performed in the outpatient setting, and patient was discharged home several hours after the procedure is complete.

EVLA is a new method for treating greater saphenous vein insufficiency. This method causes direct thermal injury to endothelium and results in vessel occlusion [2]. Most of physicians use local anesthesia for needle punctures and tumescent anesthesia (TA) to prevent pain and protects the surrounding tissues from the conduction of heat that would originate from the effects of laser energy on the venous wall [3]. However, multiple needle punctures and, particularly, injection of the local anesthetic (LA) solution along the veins, such as great saphenous vein (GSV), may produce considerable pain during TA. A number of centers use epidural and general anesthesia [2]. Although the patient has no pain with these methods, they are generally not recommended because delayed mobilization may increase the risk of deep venous thrombosis as well the cost is increased because the procedure requires a dedicated staff and hospital stay [4].

Intravenous conscious sedation using fentanyl and midazolam can be given. Narcotic analgesics are more effective, but may cause respiratory depression; decreased consciousness and these may interfere with the mobility of the patient after the procedure [5].

Sensory innervation areas of the femoral nerve that supplies the muscles and skin of the anterior thigh and obturator nerve that supplies the skin on the medial aspect of the thigh proximal to the knee favor the use of ultrasound in their block for interventions in the great saphenous vein [6].

The aim of this study is to compare the use of local tumescent anesthesia alone or combined with ultrasound guided femoral and obturator nerve blocks for treatment of varicose veins by endovenous laser ablation.

2. Patients and methods

The study was conducted in Ain Shams University hospitals at the vascular surgery department. After obtaining approval

from the hospital ethical committee and written informed consent from patients, 80 patients of ASA physical status I and II, of both sexes, age ranging between 30 and 60 years, and scheduled for endovenous laser ablation for varicose veins of the great saphenous vein (GSV), perforating vein (PV), or a combination of them located in the anterior or medial aspect of the leg was prospectively enrolled in this study. Exclusion criteria include patients who refused regional anesthesia, those with coagulopathy, impaired consciousness, and mental retardation. It was estimated that a sample of 40 patients per group would have a power of 80% to detect a standardized difference of 0.65 between the two study groups as regards the tumescent volume and pain scores using a two-sided Mann–Whitney *U* test and setting the type I error at 0.05.

Preoperative investigations in the form of ECG, chest X-ray, complete blood picture and coagulation profile. Details of anesthesia technique and study protocol were explained to the patients at the preoperative visit. I.V. line was inserted, all patients received midazolam 1–2 mg, basic monitors were applied (ECG, pulse oximeter, NIBP). Then patients were divided randomly into two groups:

2.1. Group (A)

40 Patients had EVLA using tumescent anesthesia given by the surgeon. (Lidocaine (400 mg/l = 0.04%), epinephrine (1 mg/l = 1:1,000,000) and sodium bicarbonate (10 mEq/l) in a physiologic saline solution pushed by a power pump. The patient was placed supine on the table in the reverse Trendelenburg position to distend the veins. After intradermal injection of a small amount of local anesthetic, the incompetent vein was punctured with an 18-gauge needle under US guidance. An angled tip 0.035-in. guide wire was then advanced and passed through the junction of the incompetent vein with the deep veins. The laser catheter (or sheath) was advanced over the guide wire and placed near to the junction. The guide wire was then removed and the tumescent solution was injected around the vein under US guidance. After TA, the laser fiber was inserted into the catheter and its tip was positioned several centimeters below the junction.

2.2. Group (B)

40 Patients had femoral and obturator nerves block before tumescent anesthesia was done. Patient position was supine with leg slightly abducted and externally rotated. The trans-

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