US-guided femoral and sciatic nerve blocks for analgesia during endovenous laser ablation

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1. Purpose

Endovenous laser ablation may be associated with significant pain when performed under standard local tumescent anesthesia. The purpose of this study was to investigate the value of femoral and sciatic nerve blocks for analgesia during endovenous ablation in patients with lower extremity venous insufficiency.

2. Materials/Methods

Between June 2009 and December 2009, US-guided femoral and sciatic nevre blocks were performed to provide analgesia during ELA in 98 legs in 57 patients. The demographic and clinical aspects of the patients are given in table 1. For femoral block, the patient was put supine. After the groin was disinfected, the femoral vessels were visualized in transverse section. The femoral nevre was identified in the hyperechoic triangle formed by the lateral border of the common femoral artery, fascia iliaca and iliopsoas muscle.

US-guided femoral nerve block

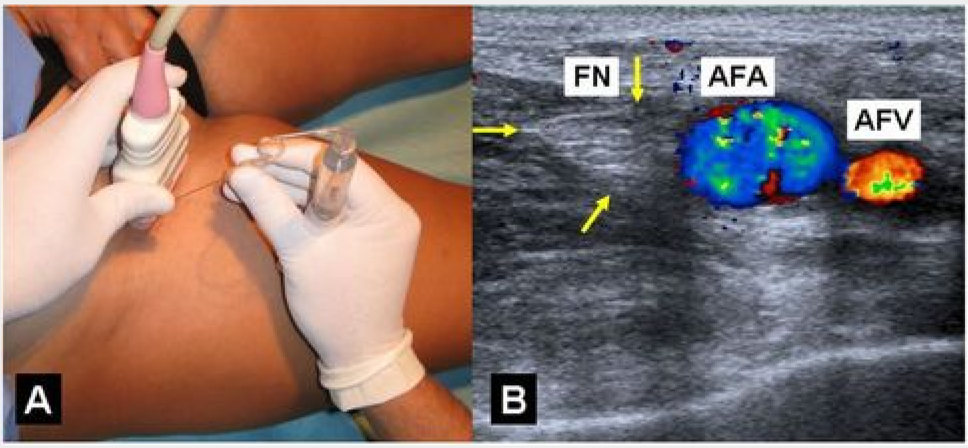

Figure 1A. For femoral block, transducer is held paralel to the inguinal ligament and femoral vessels are visualized in transverse section. B. Femoral nerve (FN) is within the echogenic triangular area lateral to the common femoral artery (CFA) and vein (CFV).

Then, a 3ml 2% lidocaine or bupivacaine solution diluted to 10ml with saline was injected into this triangle under US guidance (Figure 1). For sciatic block, the patient was put prone. The posterior aspect of the knee and lower thigh were disinfected. The popliteal wessels were visualized in the popliteal fossa in transverse section. The sciatic nerve was first identifed posterolateral to the popliteal artery at the knee, and then scanned upto the midthigh level. Then, the same amount of lidocaine or bupivacaine solution was injected around the nerve under US guidance (Figure 2).

US-guided sciatic nerve block

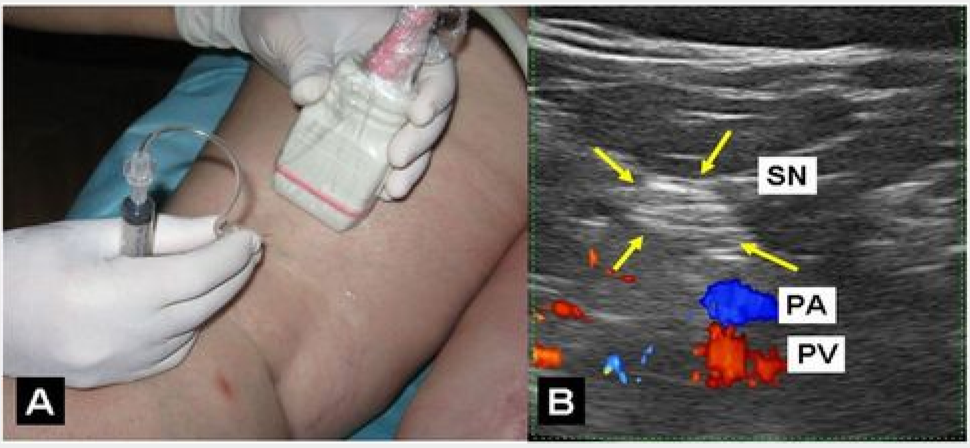

Figure 2A. For sciatic block, transducer is held proximal to the the popliteal fossa and popliteal vessels are visualized in transverse section. B. Sciatic nerve (SN) is seen as a large, round and echogenic structure posterolateral to the popliteal artery (PA) and vein (PV).

After the blocks, ELA procedure was performed using the standart tumescent anesthesia. In 98 legs, 111 refluxing veins were ablated. Femoral block was used for the ELA of 81 GSVs and 5 perforating veins, and sciatic block was used for the ELA of 21 SSVs and 4 perforating veins. Following the ELA, concomitant foam sclerotherapy was also performed in 94 of 98 legs. After the procedures, the patient was put on compression stockings and the motor function was evaluated. In the presence of persistent motor block, a short-stretch elastic bandage was applied around the knee to prevent sudden flexion and the patient was accompanied by another person during the walking until the motor function was completely recovered.

figure 3.jpg

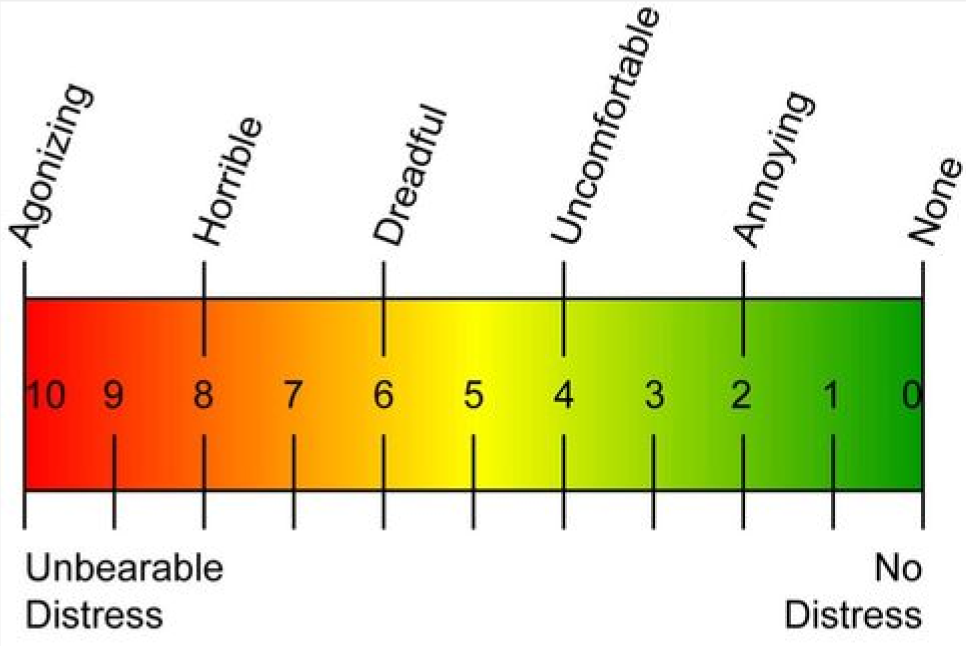

Figure 3: Visual analogue pain scale

After the procedures, a visual analogue scale (1–10) was used for pain assessment (Figure 3).

Table 1: Demographic and clinical aspects of the study population.

Number of patients	57, 98 legs (bilateral in 41 patients)
Age	24-66 years
Sex	45 female, 12 male
Incompetent veins	111 (81 GSV, 21 SSV, 9 Perforating veins)
Clinical classification (CEAP) in 98 legs	C1 (n=4) C2 (n=59) C3 (n=11) C4a (n=9) C4b (n=7) C5 (n=5) C6 (n=3)

3. Results

After the blocks, pain scores were 0 in 29 legs, 1 in 21, 2 in 30 and 3 in 18 legs. After femoral nevre block, pain scores were lower in the left leg compared to the right (Table 2), and this difference was statistically significant (p=0,000). After sciatic block, pain scores were slightly lower compared to the femoral block (table 2), but this difference was statistically not significant (p=0,006). After femoral block, mild to moderate motor block occurred in 5 legs (4 in the left, 1 in the right). Venous spasm was observed in only 1 leg (in the right) during the catheterization.

Table 2: Technical details and results of US-guided nerve blocks.

Extremity	49 right, 49 left
Nerve block	Femoral in 82, Sciatic in 25 (both in 9 legs)
Total pain scores in the right and left legs	81 in the right leg (0 in 10, 1 in 10, 2 in 16, 3 in 13), Mean: 1.65±0.16 54 in the left leg (0 in 19, 1 in 11, 2 in 14, 3 in 5) Mean: 1.10±0.15 P=0,000
Total pain scores in femoral and sciatic blocks	109 in femoral (0 in 24, 1 in 21, 2 in 23, 3 in 14), Mean: 1.33±0.12 31 in sciatic (0 in 9, 1 in 5, 2 in 7, 3 in 4) Mean: 1.24±0.13 P=0,006

4. Conclusion

ELA is a well-accepted alternative to surgery in the treatment of saphenous and perforating venous insufficiency. The procedure is normally performed using local tumescent anesthesia. The aim of tumescent anesthesia is not only to eliminate pain during ELA, but also to protect the surrounding tissues from laser and to empty the vein, bringing the vein wall in close contact with the laser fiber **(1-3)**. However, multiple needle punctures and injection of the local anesthetic solution along the veins such as GSV and SSV may induce considerable pain during the tumescent anesthesia. Although the intensity of the pain is "tolerable" for most patients, it may be quite a "bad experience" for the others. Pain may be particularly intense if the patient develops venous spasm during the catheterization. Additional pain may also be created if foam sclerotherapy is performed concomitantly following ELA **(4)**.

A number of methods are currently used to decrease pain during the ELA. Some physicians, particularly surgeons, perform the procedure under spinal or even general anesthesia. Although the patient has "no pain" with these methods, they are generally not recommended because: 1. Delayed mobilization may increase the risk of deep venous thrombosis. 2. Deep anesthesia may increase the risk of saphenous or sural nevre injury during ELA **(5,6)**. 3. The cost is increased since the procedure requires dedicated staff and a hospital stay. Other physicians use oral or parenteral pain killers to cope with the pain problem. Our personal experience does not favor this method, because: 1. Standart NSAIDs are generally sufficient for postoperative pain, but they are not very effective for pain during the procedure. 2. Narcotic analgesics are more effective, but may cause hypotension and other hemodynamic problems and thus, interfere with the mobility of the patient after the procedure.

Alternatively, US-guided femoral or sciatic nevre blocks may be used for analgesia during ELA **(7)**. In our experience, this method was very effective in the elimination of pain during the ELA procedure. In our study, we did not compare the pain scores of patients in whom we performed US-guided nevre blocks versus those in whom we did not. However, very low pain scores of the patients suggest that US-guided femoral and sciatic nevre blocks are highly effective in the elimination of pain during the ELA. In our patients, our aim was to provide analgesia while preserving the motor function, keeping the patient as active as possible after the treatment. To do this, we diluted the local anesthetic with saline and chose a relatively short-acting local anesthetic (lidocaine in most patients). Despite that, transient mild to moderate motor block occurred after femoral nevre blockage in 5 legs. In these, we applied a bandage around the knee to prevent unintenional flexion and the patient was accompanied by another person during the walking until the motor function was completely recovered. In our study, the femoral block was more effective in the left leg compared to the right (pain scores were significantly lower and the frequency of motor block was higher). Although we don't have a definitive explanation for this difference, it may be that in right-handed individuals (the majority of the general population), peripheral nerves on the left side may be more susceptible to local anesthetics.

In our experience, another advantage of femoral and sciatic nevre blocks was to decrease the frequency of venous spasm. In the patients we performed ELA solely with tumescent anesthesia, we encountered venous spasm relatively frequently, particularly when the vein was thin and when nonhydrophilic guidewires and catheters were used. In the present study, although we used the same materials, we saw venous spasm in only one patient. In this patient, the treated vein (below the knee GSV) was 3mm in diameter, and the block was probably not optimal (pain score was 3). In the remaining patients, there was no venous spasm during the ELA, and we observed a slight increase in the diameter of the refluxing veins after the nevre block, probably due to the sympathetic blockage. In our experience, this venous distension made the puncture and catheterization easier, and together with the absence of venous spasm, markedly facilitated the ELA procedure.

Finally, femoral and sciatic nerve blocks are easy to perform for radiologists who are familiar with US-guided interventions. The procedures do not require any additional equipment and staff; all the medications, materials and US machine are already used during the ELA. Thus, there is no additional cost. The amount of local anesthetic is far lower than the toxic limit. Thus, the procedure is extremely safe and can be performed in the office setting.

In conclusion, US-guided femoral and sciatic nerve blocks may provide considerable reduction in pain and venous spasm during endovenous laser ablation. They may make the procedure more comfortable for the patient and easier for the operator.

5. Reference

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6. Mediafiles

figure 3.jpg

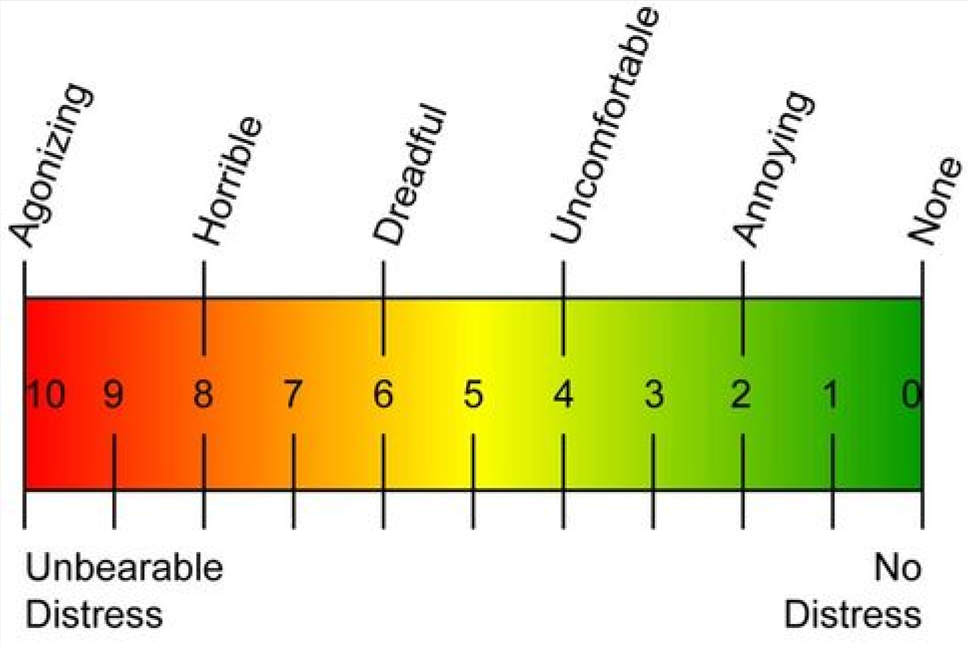

Figure 3: Visual analogue pain scale

US-guided femoral nerve block

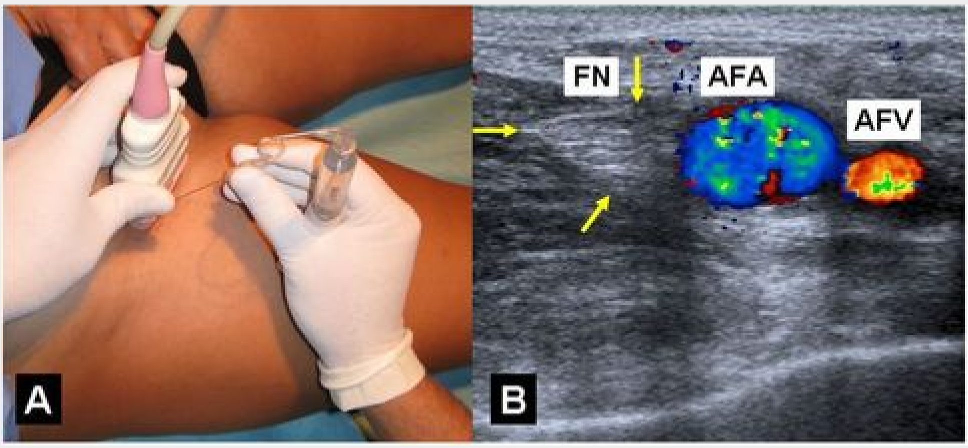

Figure 1A. For femoral block, transducer is held paralel to the inguinal ligament and femoral vessels are visualized in transverse section. B. Femoral nerve (FN) is within the echogenic triangular area lateral to the common femoral artery (CFA) and vein (CFV).

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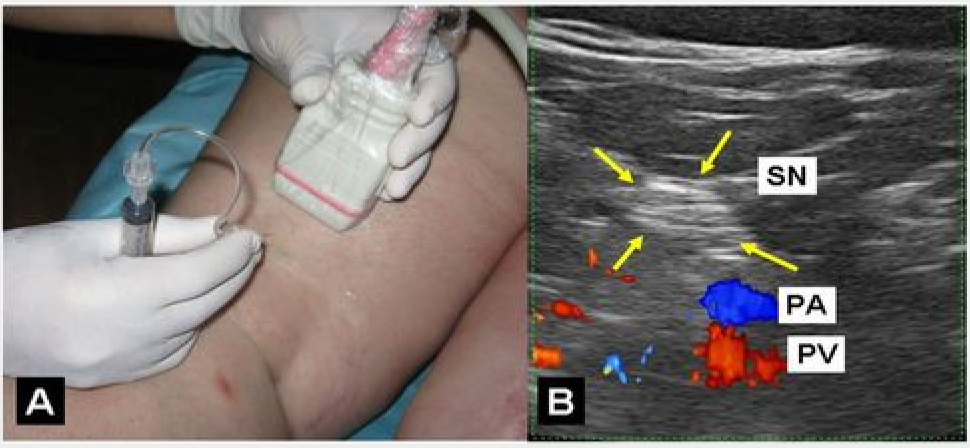

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