

Venous endolaser – A case series report

Endolaser venoso – Estudo série de casos

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Abstract

Objective: To report our 14-month experience comparing the use of 980 nm laser with axial fiber with 1,470 nm laser with radial fiber.

Methods: Charts from 215 patients were reviewed in order to compare the results of the use of 980 nm diode laser with axial fiber and 1,470 nm diode laser with radial fiber, with and without intumescent infiltration respectively, analyzing the percentage of saphenous vein occlusion and complications.

Results: A total of 294 legs of 215 patients were treated. Among them, 141 cases (65.6%) (192 limbs) underwent treatment with 980 laser, and 74 (34.4%) (102 limbs) with 1,470 laser. There was complete ablation, with 100% closing, in 138 (97.9%) cases for 980 laser and 73 (98.6%) cases for 1,470 laser ($p = 0.999$). Persistent postoperative pain requiring analgesics for more than 7 days was reported in 4.3% of patients (six cases) treated with laser 980 and in 5.4% (four cases) treated with 1,470 laser ($p = 0.740$). There were no cases of hyperchromia, deep venous thrombosis or pulmonary thromboembolism. Paresthesias in the pathway of the saphenous vein occurred in 2.17% of the patients treated with 980 laser and in 4% of those treated with 1,470 laser.

Conclusion: Our initial experience shows good effectiveness in closing saphenous veins with laser and few postoperative complications, with similar results for both types of laser.

Keywords: laser therapy; venous insufficiency; varices.

Resumo

Objetivo: Relatar nossa experiência de 14 meses, comparando o uso do *laser* 980 nm com fibra axial com o *laser* 1.470 nm com fibra radial.

Métodos: Foram revisados prontuários de 215 pacientes e comparados resultados de utilização do *laser* diodo 980 nm com fibra axial e *laser* diodo 1.470 nm com fibra radial, com e sem infiltração intumescente, respectivamente, analisando porcentagem de oclusão das safenas e complicações.

Resultados: Foram tratadas 294 pernas de 215 pacientes. Desse total, 141 casos (65,6%) (192 membros) foram submetidos ao tratamento com *laser* 980, e 74 casos (34,4%) (102 membros), com o 1.470. Houve ablação completa, com fechamento de 100% em 138 (97,9%) casos para o *laser* 980 e em 73 (98,6%) casos para o 1.470 ($p = 0,999$). Houve persistência de dor pós-operatória, necessitando analgésicos num período superior a 7 dias, em 4,3% dos pacientes (seis casos) tratados com o *laser* 980 e em 5,4% (quatro casos) tratados com 1.470 ($p = 0,740$). Não houve nenhum caso de hiperchromia, trombose venosa profunda ou tromboembolismo pulmonar. Parestesias no trajeto da safena ocorreram em 2,17% dos pacientes tratados com o *laser* 980 e em 4% dos tratados com o 1.470.

Conclusão: Nossa experiência inicial mostra uma boa efetividade quanto ao fechamento das safenas com *laser*, poucas complicações pós-operatórias, sendo encontrados resultados semelhantes com ambos os tipos de *laser*.

Palavras-chave: terapia a *laser*; insuficiência venosa; varizes.

Introduction

The efficacy of endovenous laser treatments of varicose veins compared with conventional surgical treatment has been evaluated. Endovenous treatments of saphenous veins using laser have gained space in recent years, and results

have demonstrated their efficiency and low morbidity when compared with surgical approaches. The diversity of laser types has also been frequently discussed¹⁻⁶. This study reports on our initial 14 months' experience and compares 980-nm diode laser and axial fiber with 1470-nm diode laser and radial fiber.

Study carried out at the Clínica Albernaz no Hospital da UNIMED e Hospital Regina – Novo Hamburgo (RS), Brazil.

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Methods

This study reviewed the medical records of 215 patients with saphenous vein incompetence treated with endovascular laser ablation. Results were compared on the 30th day after treatment with 980-nm diode laser, axial fiber and tumescent infiltration, or with 1470-nm diode laser, radial fiber and no tumescent infiltration. In all cases phlebotomies were performed under epidural or subarachnoid block.

Categorical variables were described as absolute and relative frequencies and compared between groups using the Fisher exact test or a chi-square test with Yates correction according to the frequency of variable presentation. Quantitative variables were described as mean and standard deviation and compared between groups using the Student *t* test for independent samples. The level of significance was set at 5%.

Results

From July 2009 to September 2011, 294 legs of 215 patients were treated for symptomatic saphenous vein incompetence, at a total of 234 great and 78 small saphenous veins. A total of 141 patients (65.6%) (192 limbs) underwent treatment with 980-nm diode laser, whereas 74 (34.4%) (102 limbs) were treated using 1470-nm diode laser. The criteria for saphenous vein treatment were: symptoms associated with reflux, such as pain, weight sensation or tiredness, edema, trophic disorders, enlarged saphenous diameter, important venous reflux at the saphenous site. Mean age was 51.1 years (standard deviation [SD]: 13.6 years). There was a female predominance, at a total of 182 (84.7%) women. Mean diameter of internal saphenous veins at their arch was 6.5 mm (SD = 2.9) in the 980-nm laser group and 6.1 mm (SD = 2.1) in the 1470-nm laser group; of the small saphenous veins, 4.6 mm (SD = 2.2) in the 980-nm laser group and 5.6 mm (SD = 1.8) in the 1470-nm laser group ($p = 0.177$); there were no statistically significant differences between the two groups for either type of vein.

Linear energy density in the 980-nm laser group ranged from 60 to 100 J/cm, and power was 10 to 15 W. For 1470-nm laser, density ranged from 20 to 60 J/cm, at 3 to 7 W.

There was complete ablation, and 100% of the veins were occluded in 138 (97.9%) cases in the 980-nm laser group and in 73 (98.6%) in the 1470-nm laser group ($p = 0.999$).

Persistent postoperative pain requiring analgesic medication for more than 7 days was reported for 4.3% of

the patients (six cases) in the 980-nm laser group and 5.4% (four cases) in the 1470-nm laser group ($p = 0.740$).

Paresthesia along the saphenous path was found in 2.17% of the patients (three cases) in the 980-nm laser group and 4% (three cases) in the 1470-nm laser group. There were no cases of bruising, deep vein thrombosis (DVT) or pulmonary thromboembolism (PTE).

Discussion

A systematic review published by Darwood and Gough¹ found that the ablation rate was a mean 90% higher for the great saphenous vein. Our initial data revealed that rates were greater than 98% for great and small saphenous veins. This slightly superior result may be justified by the short ultrasound follow-up.

Our initial experience demonstrated a reasonable similarity between the techniques using the two types of laser when healing and complications were analyzed. However, some authors, such as Pannier et al.,⁷ reported a substantially less pain when the 1470-nm diode laser was used, as in the prospective randomized study conducted by Doganci⁸.

A multicenter study⁹ comparing the use of 1500-nm and 980-nm wavelengths found lower morbidity when the shorter wavelength was used.

Schwarz et al.,⁶ in a cohort study, found a lower rate of complications, such as phlebitis, pain and paresthesia, for the endovascular application of 1570-nm diode laser and radial fibers when compared with axial fibers, which may be justified by the need of a lower energy density for the treatment. In our series, we were not able to replicate that improvement, and our results were similar for the two types of laser. As this was a retrospective study, only analgesic use, and not pain intensity could be evaluated, which may explain such difference.

Although several studies in the literature^{4,7,8} have discussed what level of energy is necessary for treatments using a 1470-nm diode laser, no consensus has been reached. Some authors used a level of power that is similar to those adopted for the 980-nm laser treatments and a linear energy density of about 100 J/cm. Our study found good results when using lower amounts of linear endovenous energy density (LEED) than those used with the 980-nm diode laser in studies as the one conducted by Soracco et al.,¹⁰ who reported that they also used lower power and LEED and achieved good results in their studies using 1470-nm laser.

Surgery was indicated for cases of saphenous veins that had clinical symptoms and varices due to reflux, and not

according to ultrasound results alone, which is in agreement with the recommendations found in the literature¹¹.

Our practice suggests that the association of phlebectomy and endovenous laser ablation may shorten treatment time. Some authors question this approach,¹ whereas others, such as Jung et al.³ and Pannier et al.,⁴ also found good results using a similar technique.

Conclusion

Our initial experience shows that laser ablation of saphenous veins is effective and leads to few postoperative complications.

The technique using 1470-nm diode laser without tumescent infiltration, which shortens surgery time, was a good method to treat saphenous veins and had results similar to those obtained using 980-nm diode laser and lower energy densities and power.

Further studies should be conducted to evaluate the long-term ultrasound follow-up of these patients.

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