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ORIGINAL ARTICLE
VENOUS DISEASE

Effects of long-pulsed 1064-nm Nd:YAG laser on telangiectasias and reticular veins: a human *in-vivo* histological study

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Background: Telangiectasias and reticular veins are associated with aesthetic disorders. Sclerotherapy is the gold standard treatment, but long-pulsed 1064-nm Nd:YAG laser (LP1064 laser) is also used. No data on the human histological effects of these lasers are reported. The objective was to test different LP1064 laser parameters and their histological effects on the dermis, collagen, telangiectasias, and reticular veins.

Methods: This was a single-center, prospective, single-arm, case-control, human study. During surgery (dermolipectomy), the abdominal section of 10 female patients was irradiated with 6 different transdermal LP1064 laser parameters after anesthesia. Ten pieces with areas of varying irradiation were evaluated according to the characteristics of the vessels identified by area. In each piece, two irradiation areas were performed per group, totaling 12 irradiation areas per piece, with 120 regions later analyzed at the end of the ten samples. After removing the surgical product, histological sections were extracted, and the dermis, telangiectasias, and reticular veins were analyzed.

Results: Histological analysis showed that exposition to six different parameters from LP1064 laser led to significant dermal layer separation and collagen alterations. The effects were inconsistent on the loss of endothelial cells, intravascular thrombus formation, and fusion of vascular walls for both telangiectasias and reticular veins. In reticular veins, effects on intravascular thrombus formation and vascular wall fusion were not observed.

Laser parameters	Loss of endothelial cells		Presence of intravascular thrombus		Fusion of vascular walls	
	t (EP)	P value	t (EP)	P value	t (EP)	P value
G1	2 (-1.58)	0.109	3 (-0.95)	0.344	2 (-1.58)	0.109
G2	4 (-0.32)	0.754	3 (-0.95)	0.344	4 (-0.32)	0.754
G3	0 (-2.85)	0.002	3 (-0.95)	0.344	4 (-0.32)	0.754
G4	4 (-0.32)	0.754	4 (-0.32)	0.754	6 (0.32)	0.754
G5	4 (-0.32)	0.754	2 (-1.58)	0.109	3 (-0.95)	0.344
G6	2 (-1.58)	0.109	3 (-0.95)	0.344	7 (0.95)	0.344

Laser parameters	Loss of endothelial cells		Presence of intravascular thrombus		Fusion of vascular walls	
	t (EP)	P value	t (EP)	P value	t (EP)	P value
G1	3 (-0.95)	0.344	1 (-2.21)	0.021	0 (-2.85)	0.002
G2	4 (-0.32)	0.754	0 (-2.85)	0.002	2 (-1.58)	0.109
G3	5 (0.0)	1.00	0 (-2.85)	0.002	0 (-2.85)	0.002
G4	3 (-0.95)	0.344	0 (-2.85)	0.002	1 (-2.21)	0.021
G5	5 (0.0)	1.00	1 (-2.21)	0.021	0 (-2.85)	0.002
G6	3 (-0.95)	0.344	0 (-2.85)	0.002	1 (-2.21)	0.021

Conclusions: The LP1064 laser in monotherapy with fixed settings did not lead to a consistent vascular lesion to promote immediate occlusion in telangiectasias and reticular veins. This strategy may not work as monotherapy for small vein treatment, but the possible late response to the LP1064 laser cannot be ruled out and require further investigation.

Figure 3.—Correspondence analysis for telangiectasias.

Figure 4.—Correspondence analysis for reticular vein.

PREVENTION AND MANAGEMENT OF VENOUS THROMBOEMBOLISM

INTERNATIONAL CONSENSUS STATEMENT
(Guidelines according to scientific evidence)

Under the auspices of the

- European Venous Forum
- North American Thrombosis Forum
- International Union of Angiology
- Union Internationale du Phlebologie
- Cardiovascular Disease Educational and Research Trust
- The Cyprus Cardiovascular Disease Educational and Research Trust

Chairman: Andrew N. NICOLAIDES


PREVENTION AND MANAGEMENT OF VENOUS THROMBOEMBOLISM

Levels of evidence	Strenght of recommendations
HIGH	STRONG
MODERATE	MODERATE
LOW	WEAK

PREVENTION AND MANAGEMENT OF VENOUS THROMBOEMBOLISM



In patients with active cancer edoxaban, apixaban or rivaroxaban for 6 months are the first line anticoagulant therapy (Level of evidence high, recommendation strong). LMWH is an alternative approach, to be preferred in patients with thrombocytopenia, renal failure and in those at higher hemorrhagic risk because of gastrointestinal or genito-urinary cancer (Level of evidence high, recommendation strong)



Recommendation 43


For patients with cancer associated deep vein thrombosis, a low molecular weight heparin is recommended for initial and principal phase anticoagulation.

Class	Level	Reference
I	A	Kirkstein et al. (2019) ¹⁰⁰

Recommendation 43

In selected patients with cancer associated deep vein thrombosis, with the malignancy not located in the gastrointestinal or genitourinary systems, an approved direct oral anticoagulant for initial, principal, and extended treatment should be considered.

Class	Level	Reference
III	A	Froeh et al. (2015), ¹⁰¹ Kirkstein et al. (2019), ¹⁰² Krausz et al. (2018), ¹⁰³ McKinnon et al. (2020), ¹⁰⁴ Agelli et al. (2020) ¹⁰⁵



VS

In patients with acute VTE in the setting of cancer (cancer-associated thrombosis) we **RECOMMEND** an oral Xa inhibitor (APIXABAN, EDOKABAN, RIVAROXABAN) over low molecular weight heparin (LMWH) for the initiation and treatment phases of therapy

Strong Level B



Thank you!



