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Treatment for telangiectasias and reticular veins (Protocol)

Nakano LCU, Cacione DG, Baptista-Silva JCC, Flumignan RLG

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TABLE OF CONTENTS

[Intervention Protocol]

Treatment for telangiectasias and reticular veins

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ABSTRACT

This is a protocol for a Cochrane Review (Intervention). The objectives are as follows:

To assess the effects of sclerotherapy, laser therapy, intensive pulsed light (IPL), thermocoagulation, and microphlebectomy treatment for telangiectasias and reticular veins.

BACKGROUND

Description of the condition

Telangiectasias, or spider veins, are dilated venules or arterioles (small superficial veins) measuring less than 1.0 mm in diameter and occurring predominantly in the lower extremities (Thomson 2016). Reticular veins have a diameter less than 3 mm and are often tortuous and located in the subdermal or subcutaneous tissue (Eklof 2004; Porter 1995). The cause is unknown. Patients may be asymptomatic or can report pain, burning or itching. Risk factors include family history, pregnancy, local trauma, and hormonal factors (Goldman 2002).

The diagnoses of telangiectasias and reticular veins are clinical and made according to the Clinical, Ethiological, Anatomical and Pathophysiological (CEAP) classification system for chronic venous disorders in the lower limb. This CEAP classification system consists of seven main categories: C0 to C6, and telangiectasias are classified as C1 (Eklof 2004).

C0 - no visible or palpable signs of venous disease
C1 - telangiectasia or reticular veins (thread veins)
C2 - varicose veins (diameter of 3 mm or more)
C3 - oedema
C4 - changes in the skin and subcutaneous tissue: pigmentation (C4a), eczema (C4a), lipodermatosclerosis (C4b) or atrophic blanche (C4b)
C5 - healed venous ulcer
C6 - active venous ulcer

The incidence of telangiectasias increases with age (Schwartz 2011). Telangiectasias on the lower limbs are very common and have been found in 41% of women over the age of 50 years (Engel 1988). They represent an important aesthetic or cosmetic problem (Hercogova 2002). The presence of telangiectasias may be associated with insufficiency of major venous systems; approximately 50% to 62% of insufficient perforating veins are found in the

presence of telangiectasias (Andrade 2009).

Description of the intervention

Treatments for telangiectasias and reticular veins include sclerotherapy, laser therapy, intense pulsed light treatment, microphlebectomy and thermocoagulation. These techniques can be used in combination to maximise the effects and avoid any harms of the individual techniques. The most common treatment for telangiectasias is sclerotherapy (Schwartz 2011), which is a technique or group of techniques for destruction of spider veins by injection of a medication that destroys the vein endothelium, leading to occlusion and subsequent fibrosis. Sclerosant agents are injected into the vein by hypodermic needles until the area around the puncture site blanches or resistance is felt. The injection is immediately discontinued if there is extravasation. Individual injections utilize between 0.1 mL and 0.5 mL sclerosant agent for each telangiectasias area, although larger volumes or sclerosant agent are required for larger veins (Worthington-Kirsch 2005). There are many sclerosing agents and they are generally categorized as detergents, osmotic or chemical irritants. These agents cause endothelial damage that results in blocking the vein (vessel occlusion) and subsequent disappearance of the vessel being treated (Vitale-Lewis 2008). Foam sclerotherapy mixes gas and fluid sclerosant agents between two syringes (Tessari 2001). Foam with detergent sclerosants results in a more efficient effect by increasing both dwell time and contact area. This increase in efficiency also allows for lower sclerosant doses (Worthington-Kirsch 2005). Foam is associated with side effects such as microthrombi, matting and transient visual disturbance (Kern 2004). These adverse effects may also occur in conventional sclerotherapy.

Laser therapy is used for the treatment of telangiectasias in patients with veins of a diameter less than a 30 gauge needle. Patients with a phobia to needles or allergy to certain sclerosing agents can also benefit from this technique. There are several types of lasers for treatment of telangiectasias with varying wave lengths between 532 to 1064 nm (Meesters 2014). Treatment with a Nd:yag 1064 nm laser has shown similar results to sclerotherapy (Parlar 2015). Side effects of laser therapy in treatments for telangiectasias are erythema, crusting, swelling, and blistering (Tierney 2009). Laser therapy may cause less pain but also may result in complications such as spotting (Mujadzic 2015).

Intense Pulsed Light (IPL) is similar to laser therapy as high-intensity light sources emit polychromatic light ranging within the wavelength spectrum of 515 to 1200 nm. The treatment of vascular lesions with IPL depends on the type and size of vessels, with angiomas and spider veins demonstrating the best response (Goldberg 2012).There are many clinical indications for treatment with IPL (Raulin 2003). IPL is indicated for the treatment of unwanted hair growth, vascular lesions, pigmented lesions, acne vulgaris, photo damage and skin rejuvenation (Babilas 2010). The negative side effects of IPL include vesicles, burns, erosions, blisters and crust formation, as well as hypo and hyperpigmentations and are common (Stangl 2008).

Microphlebectomy is performed using hooks which enable venous extraction through minimal skin incisions or even needle punctures. Ambulatory microphlebectomy is indicated in varicose veins in any part of the body, such as arms, periorbital, abdomen and dorsum (Ramelet 2002).

Thermocoagulation or the radiofrequency energy method is a technique for treatment of telangiectasias or reticular veins.The method is based on the production of high frequency waves, 4 MHz, transmitted through a thin needle, causing thermal damage in the veins (Chadornneau 2012).

How the intervention might work

All of the above techniques cause lesions in the vascular endothelium and consequently result in the disappearance of the target vessel.

In sclerotherapy, the ideal sclerosant causes full destruction of the vessel wall and minimal thrombus formation. Incomplete destruction of wall or local thrombosis may lead to recanalisation. The ideal agent would also be nontoxic, easily manipulated, and painless (Worthington-Kirsch 2005).

Laser and IPL therapies are alternative options but they have a high cost compared to sclerotherapy. Both techniques act by exposing red elements of blood to light energy. Oxyhaemoglobin is the major chromophore in blood vessels, with two absorption bands in the visible light spectrum at 542 nm and 577 nm. Following absorption by oxyhaemoglobin, light energy is converted to thermal energy, which diffuses in the blood vessel, causing photocoagulation, mechanical injury, and finally thrombosis and occlusion of the target vessel (Micali 2016).

Different laser wavelengths can be successfully used to treat vascular lesions. Each type of laser has advantages specific to its wavelength, pulse duration, spot size, and cutaneous cooling profile. The 532 to 595 nm lasers have multiple applications treating not only telangiectasia, but also pigmentation and even fine wrinkles. The main advantage in using a 1064 nm laser is that its longer wavelength can penetrate more deeply, allowing effective thermo sclerosis of spider veins (Goldman 2004).

A possible advantage of IPL is selective photothermolysis, in which thermal damage is confined to specific epidermal or dermal pigmented targets. Tissues surrounding these targeted structures are spared, potentially reducing nonspecific, widespread thermal injury. There are three main chromophore's: haemoglobin, water, and melanin. They have broad absorption peaks of light energy, allowing them to be targeted by a range as well as a specific wavelength of light (Goldberg 2012).

The advantage of microphlebectomy is minimal or no scarring, no skin necrosis and no residual hyperpigmentation (Ramelet 2002).

Thermocoagulation is a relatively new technology with advantages such as immediate disappearance of veins, no allergic manifesta-

tions, no pigmentation and necrosis, and applicability to all skin types (Chadornneau 2012).

Why it is important to do this review

There is a high prevalence of telangiectasias, or spider veins and the most common age for presentation is between 30 and 50 years (Ruckley 2008). The incidence increases with age and represents an important aesthetic problem (Hercogova 2002). In Brazil, the incidence of telangiectasias in young women is 50% and represents a cosmetic problem to these patients (Scuderi 2002). A report of research from Poland, including women between 18 and 60 years old found an incidence of 27% of telangiectasias (Karch 2002). Sclerotherapy, the treatment most often used for telangiectasias, is low cost but is not free from complications. Laser therapy is a safe and efficacious treatment of telangiectasias and can be achieved with multiple lasers (McCoppin 2011). The IPL is versatile, which allows treatment of both vascular and pigmented lesions (Wall 2007). IPL may offer an advantage due to its selective photothermolysis but has a high cost compared to sclerotherapy. Currently, there is a lack of evidence over which of these methods is more effective in the treatment of telangiectasias. A previous Cochrane review has been published on sclerotherapy (Schwartz 2011), but none have addressed other methods of treatment for telangiectasias. This review will report on the evidence available to allow healthcare professionals and consumers to choose the most appropriate treatment method for telangiectasias and reticular veins.

OBJECTIVES

To assess the effects of sclerotherapy, laser therapy, intensive pulsed light (IPL), thermocoagulation, and microphlebectomy treatment for telangiectasias and reticular veins.

METHODS

Criteria for considering studies for this review

Types of studies

We will search and consider for inclusion all randomised and quasi-randomised studies that compare treatment methods for telangiectasias and reticular veins in the lower limb. We will include studies that compare individual treatment methods against placebo or no treatment and compare treatment methods against each other. We will also include studies that use a combination of methods.

Types of participants

We will consider all participants, both male and female and of all ages, with telangiectasias and reticular veins in the lower limb, confirmed by either the CEAP C1 classification or clinical assessment of a physician. We will exclude participants with hereditary haemorrhagic telangiectasias (HHT), mucous telangiectasias, patients treated for telangiectasias or superficial vein reflux within the previous 30 days, and patients undergoing a simultaneous treatment for telangiectasias and superficial vein reflux.

Types of interventions

We will evaluate the following interventions:

1. Sclerotherapy with any sclerosant agents of any dose or duration (with or without compression treatment);
2. Laser therapy applied directly to the telangiectasias or reticular veins (any wavelength, any treatment regimen);
3. Intensive Pulsed Light (IPL) applied directly to the telangiectasias or reticular veins (any wavelength, any treatment regimen);
4. Thermocoagulation applied directly to the telangiectasias or reticular veins;
5. Microphlebectomy in reticular veins.

Comparisons:

1. Sclerotherapy versus placebo;
2. Sclerotherapy versus sclerotherapy;
3. Sclerotherapy versus laser therapy;
4. Sclerotherapy versus IPL;
5. Sclerotherapy versus thermocoagulation;
6. Sclerotherpay versus microphlebectomy;
7. Laser therapy versus placebo;
8. Laser therapy versus laser therapy;
9. Laser therapy versus IPL therapy;
10. Laser therapy versus thermocoagulation;
11. Laser therapy versus microphlebectomy;
12. IPL versus placebo;
13. IPL versus IPL therapy;
14. IPL versus thermocoagulation;
15. IPL versus microphlebectomy;
16. Thermocoagulation versus placebo;
17. Thermocoagulation versus microphlebectomy;
18. Any combination of the above treatments versus any combination.

Types of outcome measures

Primary outcomes

- Clinically or photographically assessed resolution or improvement (or both) of telangiectasias: resolution or improvement will be measured by clear diagnostic scales (e.g.

Vessel Clearance < 20%, 20 to 40%, 40 to 60%, 60 to 80%, > 80% (Shamma 2005)) or study definitions;

- Adverse events (including hyperpigmentation, bruising, anaphylaxis, necrosis of the skin).

Secondary outcomes

- Pain during procedure and postprocedure: pain will be measured by clear diagnostic scales during the procedure and 24 hours postprocedure (e.g. visual analogue pain scale (VAS), used for determining the pain level during laser treatment. Pain is graded by the participant with the help of a coloured gradient and graduated line from 1 to 10 (Kozarev 2011));

- Recurrence: recurrence will be measured by clear diagnostic scales until 30 days after the procedure (e.g. Vessel Clearance < 20%, 20 to 40%, 40 to 60%, 60 to 80%, > 80% (Shamma 2005));

- Time to resolution (time unit: days);
- Quality of life: any scale of quality of life (e.g. Aberdeen Varicose Vein Severity Score (AVVSS) (Smith 1999)).

Search methods for identification of studies

Electronic searches

The Cochrane Vascular Information Specialist (CIS) will search the following databases for relevant trials:

- The Cochrane Vascular Specialised Register;
- The Cochrane Central Register of Controlled Trials (CENTRAL) via The Cochrane Register of Studies Online.

See Appendix 2 for details of the search strategy which will be used to search CENTRAL.
The Cochrane Vascular Specialised Register is maintained by the CIS and is constructed from weekly electronic searches of MEDLINE Ovid, Embase Ovid, CINAHL, AMED, and through handsearching relevant journals. The full list of the databases, journals, and conference proceedings which have been searched, as well as the search strategies used, are described in the Specialised Register section of the Cochrane Vascular module in the Cochrane Library (www.cochranelibrary.com).
In addition, the CIS will search the following trial registries for details of ongoing and unpublished studies;

- ClinicalTrials.gov (www.clinicaltrials.gov);
- World Health Organization International Clinical Trials Registry Platform (www.who.int/trialsearch);
- ISRCTN Register (www.isrctn.com/).

The authors will perform additional searches in LILACS and IBECS databases. The search strategy will be designed by the authors and checked by the Cochrane Information Specialist of Cochrane Brazil. See Appendix 3 for details of the search strategy that will be used for the authors' search.

Searching other resources

We will check the bibliographies of included trials for further references to relevant trials. We will contact specialists in the field, manufacturers and authors of the included trials for any possible unpublished data.

Data collection and analysis

Selection of studies

We will examine the titles and abstracts to select the relevant reports after merging the search results and removing duplicate records. Three review authors (LCUN, DGC and RLGF) will independently evaluate the trials to determine if they are appropriate to include. We will resolve disagreements by discussion within the review team. We will then retrieve and examine the full text of the relevant trials for compliance with eligibility criteria. Where a trial does not meet the eligibility criteria, we will exclude the trial and document the reason for exclusion.

Data extraction and management

Three review authors (LCUN, DGC and RLGF) will extract data independently and collect data on paper data extraction forms. We will resolve disagreements by discussion within the review team. We will collect the following information:
1. Study features: publication details (e.g. year, country, authors); study design; population data (e.g. age, comorbidities, severity of telangiectasias, duration, history concerning treatments, and responses); details of intervention (e.g. manufacture, material, site of insertion, additional procedures); number of participants randomised into each treatment group; the number of participants in each group who failed treatment; the numbers of participants lost to follow-up; the duration of follow-up; cost of treatment.
2. Outcomes: types of outcomes measured; timing of outcomes.

Assessment of risk of bias in included studies

Three review authors (LCUN, DGC and RLGF), will independently assess the included studies for risk of bias using Cochrane's 'Risk of bias' tool, described in Section 8.5 of the Cochrane Handbook for Systematic Reviews of interventions (Higgins 2011). We plan to resolve disagreements by discussion within the review team, if necessary.
We will assess the following domains and rate them as at low, unclear, or high risk of bias:

1. Random sequence generation;
2. Adequate concealment of allocation;
3. Blinding of participants and personnel;
4. Blinding of outcome assessment;
5. Incomplete outcome data;
6. Selective outcome reporting; and
7. Other potential threats to validity.

We will report these assessments for each individual study in the 'Risk of bias' tables located in the 'Characteristics of included studies' section. We plan to contact the study author(s) to seek clarification in cases of uncertainty over data.

Measures of treatment effect

We will use risk ratio (RR) for dichotomous data and mean difference (MD) for continuous data with the same scale or standardised mean difference (SMD) for continuous data with different scales, all with 95% confidence intervals (CI).

Unit of analysis issues

We will consider each participant as a unit of analysis. For trials that consider multiple interventions in the same group, we will analyse only the partial data of interest.

Dealing with missing data

We will analyse only the available data and will contact the trial authors to request missing data. We will report dropout rates in the 'Characteristics of included studies' tables of the review, and we will use intention-to-treat analysis.

Assessment of heterogeneity

We will quantify inconsistency among the pooled estimates using the I^2 statistic (where I^2 = ((Q - df)/Q) x 100% where Q is the Chi ^{2} statistic, and 'df ' represents the degree of freedom). This illustrates the percentage of the variability in effect estimates resulting from heterogeneity rather than sampling error (Higgins 2011). We will interpret the thresholds for the I^2 statistic as follows: 0 to 30% = low heterogeneity; 30% to 60% = moderate heterogeneity; 60% to 90% = substantial heterogeneity and more than 90% = considerable heterogeneity (Higgins 2011).

Assessment of reporting biases

We will assess the presence of publication bias and other reporting bias using funnel plots if sufficient studies (more than 10) are identified for inclusion in the meta-analysis (Higgins 2011).

Data synthesis

We will synthesise the data using Review Manager 5.3 software (RevMan 2014). We will use the fixed-effect model to synthesise the data if there are low to moderate levels of heterogeneity. If there is substantial heterogeneity, we will use a random-effects model. If there is considerable heterogeneity, we will not undertake a meta-analysis but will describe the data narratively in the text.

Subgroup analysis and investigation of heterogeneity

If there are sufficient data available, we will perform subgroup analyses for the following:

1. Interventions: types of sclerosants, IPL and laser wave lengths; and combination of methods;
2. Participant characteristics: age (e.g. youth (15 years to 24 years), adults (25 years to 64 years) and seniors (65 years and over)), gender and race.

Sensitivity analysis

If there are an adequate number of studies, we will perform sensitivity analysis based on allocation concealment (high, low, or unclear) and blinding of outcome assessment (high, low, or unclear). We will carry out sensitivity analyses by excluding those trials that are judged to be of high risk of bias according to Higgins 2011.

Summary of findings

We will prepare a 'Summary of findings' table to provide the key information presented in the review comparing treatments in participants with telangiectasias and reticular veins. For each comparison summarised and at one time point we will include the outcomes described in the Types of outcome measures:

- Clinically or photographically assessed resolution or improvement, or both;
- Adverse events (including hyperpigmentation, bruising, anaphylaxis);
- Pain during procedure and postprocedure;
- Recurrence;
- Time to resolution;
- Quality of life.

We will assess the quality of the evidence for each outcome as high, moderate, low or very low based on the criteria of risk of bias, inconsistency, indirectness, imprecision, and publication bias, using the GRADE approach (Grade 2004). We will base this table on methods described in Chapter 11 and 12 of the Cochrane Handbook, and justify any departures from the standard methods (Grade 2004; Higgins 2011). We have included an example of a 'Summary of findings' table for the comparison of sclerotherapy versus laser therapy for telangiectasias in the Additional tables section (Table 1).

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* *Indicates the major publication for the study*

ADDITIONAL TABLES

Table 1. Is sclerotherapy more effective in treating telangiectasias compared to laser therapy

Sclerotherapy versus laser therapy for telangiectasias						
Patient or population: people with telangiectasias and reticular veins in the lower limb **Settings:** secondary care, outpatient **Intervention:** sclerotherapy **Comparison:** laser therapy						
Outcomes	**Illustrative comparative risks* (95% CI)**		**Relative effect (95% CI)**	**No of Participants (studies)**	**Quality of the evidence (GRADE)**	**Comments**
	Assumed risk	**Corresponding risk**				
	Sclerotherapy	**Laser therapy**				
Clinically or photographically assessed resolution or improvement (or both) [range of scale or scale description] [follow up]	**[value] per 1000**	**[value] per 1000**	**RR [value]** ([value] to [value])	[value] ([value])	⊕◯◯◯ **very low** ⊕⊕◯◯ **low** ⊕⊕⊕◯ **moderate** ⊕⊕⊕⊕ **high**	
Adverse events (including hyperpigmentation, bruising, anaphylaxis, necrosis of the skin) [range of scale or scale description] [follow up]	**[value] per 1000**	**[value] per 1000**	**RR [value]** ([value] to [value])	[value] ([value])	⊕◯◯◯ **very low** ⊕⊕◯◯ **low** ⊕⊕⊕◯ **moderate** ⊕⊕⊕⊕ **high**	
Pain during procedure and post procedure [range of scale or scale description] [follow-up]	The mean pain score ranged across control groups from [value][measure]	The mean pain score in the intervention groups was **[value] [lower/higher]**		[value] ([value])	⊕◯◯◯ **very low** ⊕⊕◯◯ **low** ⊕⊕⊕◯ **moderate** ⊕⊕⊕⊕	

Table 1. Is sclerotherapy more effective in treating telangiectasias compared to laser therapy (*Continued*)

					high	
Recurrence [follow-up]	**[value] per 1000**	**[value] per 1000** ([value] to [value])	**RR [value]** ([value] to [value])	[value] ([value])	⊕◯◯◯ **very low** ⊕⊕◯◯ **low** ⊕⊕⊕◯ **moderate** ⊕⊕⊕⊕ **high**	
Time to resolution [range of scale or scale description] [follow-up]	The mean time ranged across control groups from [value][measure]	The mean time in the intervention groups was **[value] [lower/higher]**		[value] ([value])	⊕◯◯◯ **very low** ⊕⊕◯◯ **low** ⊕⊕⊕◯ **moderate** ⊕⊕⊕⊕ **high**	
Quality of life [range of scale or scale description] [follow-up]	The mean quality of life score ranged across control groups from [value][measure]	The mean quality of life score in the intervention groups was **[value] [lower/higher]**		[value] ([value])	⊕◯◯◯ **very low** ⊕⊕◯◯ **low** ⊕⊕⊕◯ **moderate** ⊕⊕⊕⊕ **high**	

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval; **RR:** Risk ratio

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

APPENDICES

Appendix 1. Glossary

acne vulgaris	skin disease caused by overactivity of sebaceous glands
ambulatory	people treated out with the hospital setting
angiomas	dilatation or new formation of blood vessels
arterioles	small branches of an artery
atrophic blanche	small smooth ivory-white areas on the skin with hyperpigmented borders and telangiectasias
chromophore	chemical group that absorbs light at a specific frequency
dermal	relating to skin and specially to the dermis
dorsum	the dorsal part of an organism
endothelium	tissue that forms a single layer of cells lining various organs
epidermal	nonsensitive layer of the skin
erythema	superficial reddening of the skin
extravasation	escape of blood from a vessel into the tissues
fibrosis	the thickening and scarring of connective tissue
hypopigmentation	decreased pigmentation of an area of the skin
hyperpigmentation	increased pigmentation of an area of the skin
lipodermatosclerosis	chronic fibrosing panniculitis associated with venous insufficiency
matting	new telangiectasis after treatment
melanin	pigment responsible for determining skin and hair colours
microthrombi	small thrombus (blood clot formed in situ within the vascular system)
necrosis	death of most or all of the cells in an organ or tissue
occlusion	blockage of blood vessel
oedema	excess of watery fluid collecting in the tissue of the body

(*Continued*)

osmotic	diffusion of fluid through a semipermeable membrane
oxyhaemoglobin	substance formed by the combination of haemoglobin with oxygen
periorbital	tissues surrounding or lining the orbit of the eye
photocoagulation	coagulation of tissue using a laser or other intense light source
photothermolysis	a method of laser skin resurfacing
polychromatic	various wavelengths or frequencies
recanalisation	process of restoring flow of the blood vessels
subcutaneous	situated or applied under the skin
subdermal	situated or lying under the skin
thermocoagulation	coagulation of tissue with high-frequency currents
thermosclerosis	coagulation of blood vessels for heat
thrombosis	local coagulation or clotting of the blood in a part of circulatory system
vascular	relating to blood vessels
venous	relating to a vein
venules	very small veins
vesicles	small fluid-filled bladders, sacs, or cysts

Appendix 2. CENTRAL search strategy

#1	MESH DESCRIPTOR Telangiectasis EXPLODE ALL TREES
#2	telangiectas*:TI,AB,KY
#3	microvaric*:TI,AB,KY
#4	(reticular near3 vein*):TI,AB,KY
#5	(reticular near3 varic*):TI,AB,KY

(*Continued*)

#6	(reticular near3 venous):TI,AB,KY
#7	(thread near3 vein*):TI,AB,KY
#8	(thread near3 varic*):TI,AB,KY
#9	(thread near3 venous):TI,AB,KY
#10	(spider near3 vein*):TI,AB,KY
#11	(spider near3 varic*):TI,AB,KY
#12	(spider near3 venous):TI,AB,KY
#13	angioectasias:TI,AB,KY
#14	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13

Appendix 3. LILACS/BECS search strategy

((MH: "Telangiectasis" OR MH: "Telangiectasia" OR MH: "Telangiectasia" OR "Spider Veins") AND (MH: "Lasers" OR MH: "Rayos Láser" OR MH: "Lasers" OR "Masers" OR E07.632.490$ OR E07.710.520$ OR SP4.011.087.698.384.075.166.027$ OR VS2.006.002.009$ OR MH: "Laser Coagulation" OR MH: "Coagulación con Láser" OR MH: "Fotocoagulação a Laser" OR "Laser Thermocoagulation" OR "Thermocoagulation, Laser" OR E02.520.745.410$ OR E02.594.530$ OR E04.014.520.530$ OR E04.350.750.410$ OR E04.540.630.410$ OR MH: "Low-Level Light Therapy" OR MH: "Terapia por Luz de Baja Intensidad" OR MH: "Terapia com Luz de Baixa Intensidade" OR "Laser Therapy, Low-Level" OR "Laser Biostimulation" OR "Laser Irradiation, Low-Power" OR "LLLT" OR E02.594.540$ OR E02.774.500$ OR MH: "Laser Therapy" OR MH: "Terapia por Láser" OR MH: "Terapia a Laser" OR "Laser Knife" OR "Laser Scalpel" OR "Surgery, Laser" OR "Vaporization, Laser" OR E02.594$ OR E04.014.520$ OR MH: "Lasers, Gas" OR MH: "Láseres de Gas" OR MH: "Lasers de Gás" OR "Argon Ion Lasers" OR "Carbon Dioxide Lasers" OR "CO2 Lasers" OR "Copper Vapor Lasers" OR "Gas Laser" OR "Gas Lasers" OR "Gold Vapor Lasers" OR "Helium Lasers" OR "Helium Neon Gas Lasers" OR "Metal Vapor Lasers" OR "Nitrogen Lasers" OR "Xenon Ion Lasers" OR E07.632.490.367$ OR E07.710.520.367$ OR MH: "Intense Pulsed Light Therapy" OR "Tratamiento de Luz Pulsada Intensa" OR "Terapia de Luz Pulsada Intensa" OR MH: "Sclerotherapy" MH: "Escleroterapia" MH: "Escleroterapia" OR MH: "Sclerosing Solutions" OR MH: "Soluciones Esclerosantes" OR MH: "Soluções Esclerosantes" OR "Injections, Sclerosing" OR "Sclerosing Agents" OR D26.776.708.822$ OR D27.505.954.411.700$ OR D27.505.954.578.822$ OR D27.720.752.822$)) AND (DB:("IBECS" OR "LILACS"))

CONTRIBUTIONS OF AUTHORS

LCUN: protocol drafting, acquiring trial reports, trial selection, data extraction, data analysis, data interpretation, review drafting, and future review updates, guarantor of the review.

DGC: protocol drafting, trial selection, data extraction, data analysis, data interpretation, review drafting, and future review updates.

JCCB: protocol drafting, trial selection, data interpretation, review drafting, and future review updates.

RLGF: protocol drafting, trial selection, data extraction, data analysis, data interpretation, review drafting, and future review updates.

DECLARATIONS OF INTEREST

LCUN: none known.

DGC: none known.

JCCB: none known.

RLGF: none known.

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NOTES

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