

Diode laser photocoagulation of sublingual varices in 706 patients on antithrombotic therapy without drug discontinuation



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Several conditions such as age, gender, systemic diseases, smoking, consuming vitamin rich foods, denture wearing may play a role in aetiology of sublingual varices. However, few studies investigating these associations. Nevertheless, prevention of potential bleeding of sublingual varices especially in patients in antithrombotic therapy should lead clinicians to treat them by diode laser, since it allows a minimally invasive treatment of photocoagulation. We report on a large sample of patients (706) showing single or multiple SVs on antithrombotic therapy, highlighting the possibility to treat lesions without drug discontinuation and without intra- and post-operative complications.

KEY WORDS: Antithrombotic therapy, Bleeding, Diode laser photocoagulation, Sublingual varices

Introduction

The term varices generally describes lesions of whole body originating from abnormalities of dilated and tortuous veins or venules, artery or lymphatic vessels^{1,2}.

Nevertheless, the term refers exclusively to venous lesions when occurring in the oral cavity³⁻⁶.

Oral varices (OVs) are most frequently observable on the ventral surface of the tongue, generally named sublingual varices (SVs); they may also occur in lips and floor of the mouth, while less frequently occur on the buccal mucosa, labial commissure, soft and hard palate^{7,8}. Generally, no treatment is required for SVs as haemoptysis due to bleeding from OVs is very un-frequent in healthy patients.

Spontaneous or trauma-related bleeding may occur in patients taking anticoagulant and antiplatelet therapy⁹⁻¹¹; for such reason, a preventive treatment of SVs is strongly suggested in such patients, especially by laser surgery thus also avoiding therapy discontinuation^{6,10,12,13}.

Despite to the conventional blade surgery, in fact, the introduction of the laser therapy in the last two decades certainly represented a true innovation for the treatment of vascular malformations as well as SVs, being non-invasive, conservative and also easily repeatable when necessary, e.g. for large lesions¹⁴⁻¹⁸.

To date, different lasers (Nd_YAG laser, KTP laser, Dye laser and Diode laser) are widely used for trans-mucosal photocoagulation, thanks to their target selectivity toward oxy-hemoglobin which provides photo-thermolysis, erythrocytes micro-agglutination and vessel obliteration^{16,19,20}.

The aim of the current study is to report on the diode laser photocoagulation (DLP) of SVs in patients on anticoagulant and antiplatelet therapy (ACAPT), highlighting the advantages resulting from laser therapy in terms of patient compliance, intra- e post-operative bleeding and fast healing, always without discontinuation of therapy.

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Materials and Methods

All patients enrolled in the current study were referred from their general dentist to the Complex Operating Unit of Odontostomatology of the University of Bari "Aldo Moro" in the period 2008-2017. All patients, totally 706, were in ACAPT and showed single or multiple blue-violet nodular lesions of the ventral tongue which were bleaching during diascopy test, and clinically diagnosed as SVs. Totally 1670 SVs were collected. Spontaneous or trauma-related bleeding of SVs was frequently referred. After a general medical evaluation, especially oriented to the investigation of adjunctive diseases/conditions influencing the haemodynamic, patients were informed about the possible risk of bleeding from untreated SVs, the DLP of all lesions was suggested and their consent to the treatment was obtained in all instances. (Fig. 1) For the surgical procedures, we used a GaAlAs diode laser (GaAlAs-A2G laser "Surgery35", AsG s.r.l – Italy) with a wavelength of 800 ± 10 nm and a flexible fibre of 320 micrometre. All SVs were treated by laser trans-mucosal photocoagulation with non-contact irradiation (2–3 mm far from lesion), with laser was set in pulsed wave modality (t-on 190 ms/t-off 250 ms) with an output power of 12 Watt. Patients were all treated with previous local infiltration of anaesthesia and with lesions cooling by ice-sticks, 10 minutes before and during the whole procedure (10 spots – total output energy 80/120 J). During laser irradiation, the colour of the lesions changed immediately from blue-violet to white/greyish. The time-length of each laser application was related to lesion size and depth, but it did not overpass from 100 to 110 spots (total output energy 800-1200 J). In the post-operative course, all patients received anti-inflammatory drugs and prolonged topic cryotherapy with ice-sticks along with local application of a regenerative gel that was advised till to the complete healing of the covering mucosa.



Fig. 1: Typical appearance of multiple sublingual varices in patient with a poor dental condition and partial edentulism, wearing partial removable dental prosthesis in the lower jaw.

The study was carried out in accordance to the principles of the Declaration of Helsinki, and it was approved by our internal review board (Study no. 4576, Prot. 1443/C.E.). All patients released informed consent for diagnostic and therapeutic procedures and also for possible use of biologic samples for research purposes.

Results

Patients were 706, 295 male and 411 female, with a mean age of 70.3 years, totally showing 1670 SVs; 69% of patients referred at least a spontaneous or trauma-related bleeding during the previous 3 months. 602 patients were affected by hypertension for which they did therapy, and more precisely 92 of grade 3, 234 grade 2 and 276 grade 1. The 22% of patients showed not fitting removable prostheses and/or with irregular areas promoting trauma of the tongue mucosa, 18% fractured teeth, 8% irregular tooth reconstructions or different tooth splinting systems. (Fig. 2 A,B,C,D,E) With regard to the clinical appearance, all lesions were smaller than 5 millimetres, and showing always a nodular appearance, soft consistency and blue-violet colour. All the clinically diagnosed SVs were treated by DLP. No patient discontinued or replaced the antithrombotic therapy before laser surgery, and no bleeding was observed during any of the surgical procedure as well after DLP. (Fig. 3 A,B,C,D) All lesions were successfully treated by a single irradiation exposure by diode laser. Healing was completed in 2-3 weeks, and no patients experienced severe complications; more precisely, the 8% of patients experienced light post-operative pain, 6% showed ulceration of the treated areas, 3% moderate tongue oedema. No recurrence was detectable at a one-year follow up.

Discussion

Vascular anomalies were first classified by Mulliken and Glowacki in 1982²¹ in haemangiomas and vascular malformations on the bases of their clinical, histological and histochemical findings. Recently, a further re-analysis has led to the last classification system of the International Society for the Study of Vascular Anomalies (ISSVA), published in May 2018, which classify varices as simple vascular malformations²².

It is generally accepted that age is the most important factor for development of SVs, although also gender, smoking habit, consuming vitamin rich foods, denture wearing and systemic diseases have been related to their aetiology^{3,5,6,8}. With regard to systemic diseases, several reports have been published on the association between SVs and thalassemia trait, cirrhosis, diabetes mellitus, and cardiovascular diseases, especially hypertension for which SVs may also represent a potential indicator of risk^{3,6,9,23}. However, there is a limited number of studies investi-

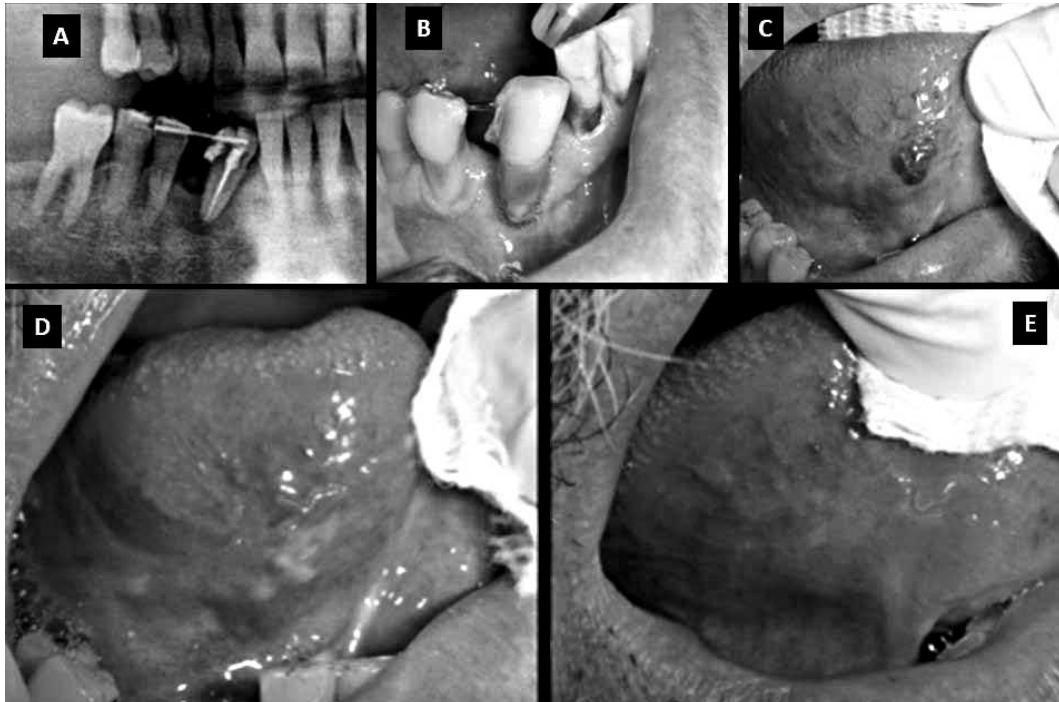


Fig. 2: A,B) Patient in ACAPT with recurrent dental trauma related; C) showing a single large sublingual varix; D) one treatment by diode laser photocoagulation promotes complete resolution after 15 days without drug discontinuation.

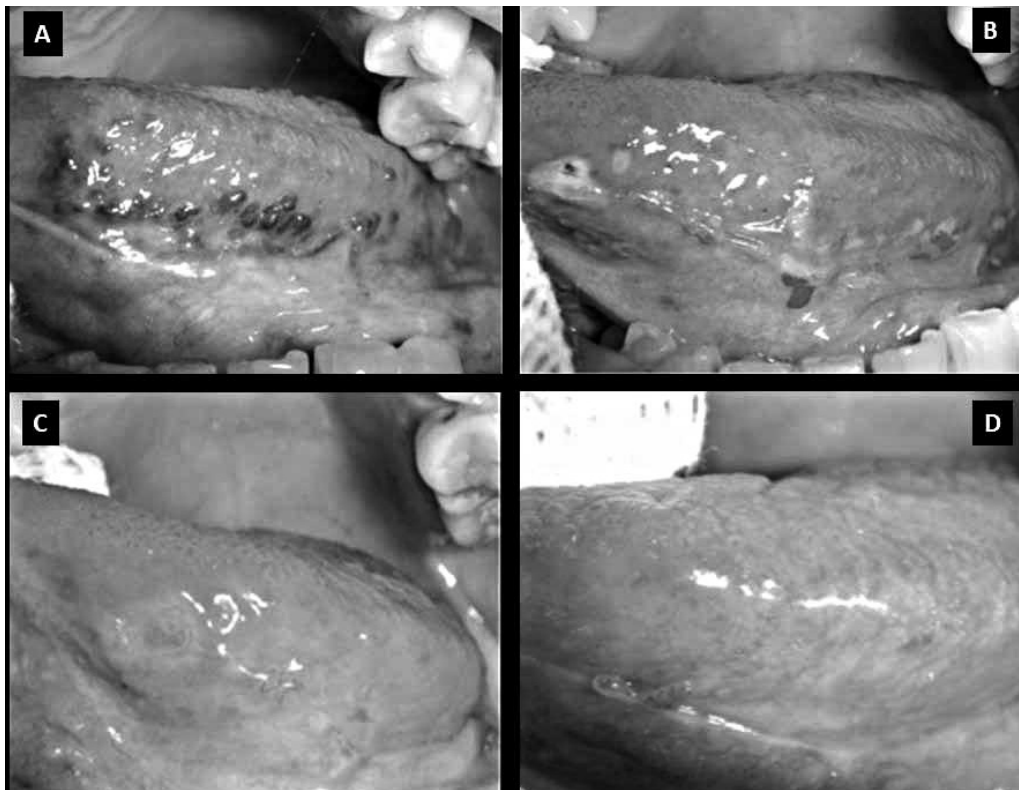


Fig. 3: A) Multiple varices of the left ventral tongue in patient in ACAPT also referring sleep bruxism; B) contextual photocoagulation by diode laser of all lesions without drug discontinuation provides an immediate variation of colour from blue-violet to white-grey, without bleeding; C) partial healing 5 days after laser treatment; D) complete healing after 14 days.

gating these associations and, in addition, SVs are considered as normal age-related degenerative changes of tissue by several authors and often excluded from the studies on oral mucosal lesions^{4-6,13,24,25}.

Nevertheless, aesthetic problems, recurrent haemorrhaging episodes or impairment of oral normal functions are usually the main reasons leading to the treatment of vascular malformations^{1,13,14}.

Several different treatment modalities have been proposed in the past for vascular malformations, such as steroid therapy, embolization, β -blockers therapy, sclerosant therapy, surgery or cryosurgery,²⁶⁻²⁸ but surely laser is nowadays considered the greatest technologies advance in this field, as small and low-flow venous malformation can be successfully and easily treated by photocoagulation^{14,16,17,20,29}. In fact, it is generally accepted that laser is a suitable tool also for the treatment of vascular malformations of the oral cavity and delivers very efficient results without complications such haemorrhage, pain, infection, and significant scarring^{14,15}. These clinical advantages provided by lasers such as elimination of vascular lesion without bleeding, disinfection of surgical wound, no need for stitches and reduced or absent post-operative complications in comparison with conventional surgery, are strictly related to the intrinsic properties of laser light^{14,16,17}.

The most used lasers founded to be safe and effective in the treatment of vascular malformations, are neodymium–yttrium–aluminum–garnet (Nd:YAG) laser (1064 nm), potassium–titanium–phosphate (KTP) laser (532 nm), diode laser (800–980 nm), pulsed dye lasers (585 and 595 nm), argon laser (514 nm) and carbon dioxide (CO₂) laser (10,600 nm)^{14,15,19,29}.

Among all, the diode laser (800-980 nm) we used in this study is poorly absorbed by water and selectively absorbed by haemoglobin, thus resulting in a deep penetration in the tissue (4-5 nm) with heat production and promoting coagulation within blood vessels¹⁴⁻¹⁷. These intrinsic properties make the diode laser ideal for the photocoagulation technique of SVs by a simplified, repeatable, non-invasive and no-complication procedure.

Conclusions

Authors sustain that good setting of laser device as selected output power and pulse duration is mandatory to provide better interaction with the vascular lesions, and with the cromophora representing the target of the diode laser wavelength.

According to our results regarding the number of laser applications, complications and acceptability of treatments, we maintain that the reported settings of diode laser may be helpful for the successful treatment of SVs in patients on antithrombotic therapy, without pre-operative drug discontinuation.

Riassunto

Diverse condizioni quali età, sesso, malattie sistemiche, fumo, consumo di cibi ricchi di vitamine, utilizzo di protesi dentarie possono svolgere un ruolo importante nell'eziologia delle varici sublinguali. Tuttavia, pochi studi investigano tali associazioni. La prevenzione del potenziale sanguinamento delle varici sublinguali, specialmente nei pazienti in terapia antitrombotica, dovrebbe indurre i medici a trattarli in partoclar modo mediante utilizzo di un laser a diodi, poiché esso consente un trattamento minimamente invasivo mediante fotocoagulazione. Questo studio analizza un ampio campione di pazienti (706) affetti da varici sub-linguali singole o multiple ed in terapia antitrombotica, evidenziando la possibilità di trattare tali lesioni senza interruzione del farmaco e senza complicanze intra e post-operatorie, specialmente emorragiche.

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