Venous malformations management by Er,Cr:YSGG laser: An Alternative approach

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Background and Aim: Venous malformations (VMs) are slow-flow vascular anomalies composed of ectatic venous channels. Its management with Er,Cr:YSGG laser has been proven effective. In the present case a teenage patient reported with a bluish lesion, soft inconsistency on the dorsal aspect of tongue. The lesion was removed with Er, Cr: YSGG laser (2780 nm) with minimal anaesthetic infiltration.

Results: Patient reported no postoperative pain. Clinical follow up after three months showed excellent results and uneventful healing.

Conclusion: Er,Cr:YSGG laser showed high clinical safety. Its advantages resulted in excellent healing of lesion and better acceptance by patient.

Key words: Venous malformations • Er,Cr:YSGG laser • Tongue
This laser has close affinity with water and hydroxyapatite; can be used on both soft (mucosa, gum, pulp tissue) and hard tissues (tooth, bone). Er,Cr:YSGG laser’s shallow depth of tissue penetration, high affinity for water, lack of thermal damage and minimal reflective property make it ideal laser for dentistry.17)

Case Report

A 14 year old female patient reported to the unit of Pediatric dentistry in Advanced Dental and Medical Care with chief complaint of growth on the dorsal aspect of tongue for the past six months [Figure 1]. A thorough examination which includes patient’s personal details, medical history, extra oral clinical examination and photographs was carried out. The general health of patient was wellbeing with no any other systemic manifestations. The patient's dental history was noncontributory.

The growth was first noticed by her six months ago. She reported gradual enlargement over a period of time and slight discomfort during swallowing. There was previous history of FNAC which revealed it as vascular lesion. The intraoral clinical examination revealed a localized well defined, bluish white and lobulated mass (1cm x 1cm) with well-defined margins present at junction of anterior two thirds and posterior one third of the tongue on dorsal aspect.

On palpation, it was soft to firm in consistency, non mobile, non-tender and blanched on application of pressure. The surrounding areas of growth were covered with debris. Based upon the signs and symptoms a provisional diagnosis of hemangioma was made. After proper eye protection and safety measures, growth was excised under minimal local anesthetic infiltration with Er,Cr:YSGG laser at setting; power 1.75 Watts, 40 Hz with an air-water spray ratio of 28%-18% respectively, at contact mode using a conical sapphire tip (MT). [Figure 2] [Figure 3] [Figure 4]. The remaining tissue was treated at 0.50 Watt, 1% water and 20% air to achieve haemostatic effect. No sutures were required. Post-operatively, patient reported minimal discomfort with no need for medications.

Excised tissue sent to laboratory in 10% formalin for histopathological examination. Histopathological examination of the excised tissue revealed it as cavernous hemangioma with surface squamous hyperplasia [Figure 5]. Patient followed up after 24 hours [Figure 6] one week [Figure 7] and three months [Figure 8]. The healing was uneventful after three months follow up although it was by secondary intention.

Discussion

The incidence of venous malformations (Cavernous hemangioma) of the head and neck is about 5% of the vascular malformations diagnosed by angiography and histologically verified. Commonly seen in 3rd to 5th decade of life, they are also seen in children and elderly patients. It presents some similar clinical characteristics to capillary hemangioma, as predilection for

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Table 1: Abbreviated ISSVA classification for Vascular Anomalies by International Society for the Study of Vascular Anomalies
Figure 1: Preoperative - Clinical presentation of lesion on dorsal aspect of Tongue

Figure 2: Intraoperative - Excision of lesion with Laser

Figure 3: Laser Settings - Intraoperative

Figure 4: Immediately after removal of lesion

Figure 5: Histological section revealing cavernous hemangioma with squamous hyperplasia

Figure 6: Follow up after 24 hours

Figure 7: One week follow up

Figure 8: Follow up after three months
females and region of head and neck region. In the present case, there was resemblance with the above mentioned features.

Venous malformations are often visible at birth but may present as a deep mass. Protrusion may be the only presenting symptom. They are known to grow proportionately with the child with sudden expansion in adulthood. Rapid growth may occur during puberty, pregnancy, or traumatic injury. VMs can be either well localized or extensive. The overlying skin may appear normal or possess a bluish discoloration. With more cutaneous involvement, the lesions appear darker blue or purple. Upper aerodigestive involvement is common or purple. Upper aerodigestive involvement is common and VMs are particularly evident when mucosa is affected. VMs are compressible and swell when the region is dependent or there is an increase in hydrostatic pressure such as during a valsala maneuver. With time, pain and swelling will occur with the formation of phleboliths (calcified thrombi), or small clots, secondary to trauma or venous stasis.

When isolated, VMs are generally benign with slow growth. They expand secondary to venous stasis and elastic vascular expansion. Airway obstruction, snoring and sleep apnea may also be present with recumbence. VMs can occur anywhere in the body but are often found in the head and neck where they involve the oral cavity, airway, or cervical musculature. With regard to the location and the number of lesions, a similarity with cases reported in the literature was observed, since approximately 80% of the patients present a single lesion, and the head and neck region is the most commonly affected. Lesion on tongue needs special consideration due to susceptibility to trauma, bleeding and ulceration; it may also become a cause of difficulty in deglutination, dysphagia, breathing, maintaining oral hygiene and in most cases esthetic problem also. In the present case, lesion on the dorsal aspect of tongue was interfering in speech, deglutination and in maintaining oral hygiene so a decision was made to excise the lesion.

The term cavernous hemangioma has traditionally been applied when lesional vascular channels are considerably enlarged. The lesion consist of deep, irregular, dermal blood-filled channels. They are composed of tangles of thin walled cavernous vessels or sinusoids that are separated by a scanty connective tissue stroma. These superficial lesions are often lobulated. They blanches under finger pressure. The deeper lesions tend to be dome shaped with normal or blue surface coloration.

Management of venous malformations and the treatment of choice depend on several factors including the age of the patient and the size and extent of the lesions, as well as their clinical characteristics. Differential diagnosis in the present case could be lingual thyroid, thyroglossal duct cyst, lymphangioma, lingual dermoid, lipoma and lobular capillary hemangioma. The presence of vascularity differentiates it from the above mentioned conditions.

Various studies reported that corticosteroids, sclerosing agents, radiation therapy, diathermy, electrocauterization, cryosurgery, embolization, interferon therapy, radiofrequency (RF) devices and Lasers have been used for the management of Venous malformations.

In the present case, Er,Cr:YSGG laser was choice of use (medium infrared, 2780 nm) for management of the venous malformations, because of its versatile use on both soft and hard tissue. With Er,Cr:YSGG laser, minimal local anesthetic required; with short intraoperative time and no need for sutures. Post operative there was minimal need for medications and no swelling or complications developed. Healing occurred by secondary intention and on follow up period there was no re-occurrence of lesion. All above are the advantages of using Er,Cr:YSGG laser for soft tissue management. The bactericidal action of Er,Cr:YSGG laser and lack of collateral damage reduces the inflammatory reaction. The above mentioned advantages makes Er,Cr:YSGG laser a treatment of choice for soft tissue management in young patients.

Generally surgical excision is the treatment of choice for problematic lesions. Attempts to remove these lesions on tongue using surgical excision may lead to serious medical problems such as heavy bleeding and post operatively recurrence may encounter. In the present case, after excision of lesion with Er,Cr:YSGG laser minimum hemorrhage reported. Although as compared to Diode laser less coagulation effect achieved but due to low depth of penetration; collateral damage was less. Though Diode laser can be used in adjunct with Er,Cr:YSGG laser to control hemorrhage.

Er,Cr:YSGG laser surgical technique have several benefits for pediatric patient: less local anesthetic requires, no analgesic or post surgical anti-inflammatory medication are require. The laser’s bactericidal action and lack of collateral damage reduced the inflammatory reaction: no swelling or infective complication develops, no sutures are require, short operative time, a very important element of success in pediatric dentistry, secondary intention healing, with prevalence of regenerative over reparative healing without tension and absence of scars, clinically safe, that makes it...
possible to operate on uncooperative patients.\textsuperscript{33}

In the present case, on follow up patient was evaluated to assess wound healing and recovery of lesion. The acceptance of Er, Cr:YSGG laser by the patient was one of the reason for therapeutic success of the treatment. Thus, Er, Cr:YSGG laser can be used as a painless alternative for the management of venous malformations. Still longer follow-ups are required to support the Er, Cr:YSGG laser as an alternative approach.

**Conclusion**

The present case showed that Er,Cr:YSGG laser is an effective treatment option with minimal intra and post-operative pain in pediatric patients. Er, Cr:YSGG laser gaining popularity in pediatric dentistry due to its advantages over the management of soft tissue pathologies. The clinical outcome of Er, Cr:YSGG laser makes it versatile to use on both soft and hard tissues.

**References**

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