

Case Report

Surgical excision of lobular capillary hemangioma with laser under N₂O/O₂ conscious inhalational sedation in an uncooperative pediatric patient, Frankl class 2: a case report

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ABSTRACT

Here, we report a case of lobular capillary hemangioma (LCH) associated deleterious oral habit on lateral border of the tongue in an anxious child excised under nitrous oxide (N₂O) sedation using soft tissue diode laser. LCH are rapidly growing vascular lesions and are common occurrence over tongue, but to be associated with deleterious oral habit is an uncommon occurrence. A 9-year-old female child was brought to the dept by her parent due growth on the tongue. The child was quite anxious and displayed negativity towards examination and treatment. The child was classified as Frankl 2 on the behaviour rating scale. A pre-anaesthetic check-up was carried out on the child as it was envisaged to carry out the treatment under inhalational sedation. The anaesthesiologist along with crash cart were present throughout the procedure to cater to any adverse events. The excision was done with 980-nm soft tissue diode LASER to reduce intraoperative haemorrhage, enhance patient comfort and improve postoperative healing. A novel combination of inhalational sedation with soft tissue diode LASER with all necessary precautionary protocols as used in management of this child may be an useful approach for successful and uneventful management. To highlight the importance of proper use of pharmacologic methods in behaviour management as well as surgical techniques for better management of these vascular lesions in children.

Keywords: Pyogenic granuloma, LCH type, N₂O, Inhalational sedation

INTRODUCTION

The pyogenic granuloma (PG) is a type of inflammatory hyperplasia which is used to describe a large range of nodular growths of the oral mucosa.¹ They are broadly divided into two varieties namely LCH type and non-LCH type, due to differences in their histological features.² The PG is a commonly occurring benign tumor in the pediatric age group and it constitutes 8-10% of all such lesions, of which 80% occur in the head and neck region.³ These lesions which represent inflamed fibrovascular tissues have been found to be more common in females as compared to males with an average female to male ratio of 3:1.⁴ The management of

young pediatric patients in dental clinics is always challenging especially when certain invasive surgical procedures are planned.⁵ The dental procedures and minor surgical interventions may be conducted uneventfully on the dental chair in cooperative patients however in uncooperative children these procedures may take long and, in some cases, even minor precise surgical procedures may require to be undertaken under general anesthesia to avoid unavoidable stress and anxiety to patients.⁶ Inhalational minimal sedation using nitrous oxide is definitely a better alternative for these patients hence eliminating all potential risks associated with general anesthesia.⁷ The case described in this report has been attempted under conscious sedation using N₂O-O₂

for behavior management of a Frankl 2 child requiring excision of a LCH on the right lateral aspect of the tongue. In this case report a novel approach of combining inhalational sedation with soft tissue diode laser for excision of the lesion was attempted to simplify the surgical procedure, reduce intraoperative bleeding, improve haemostasias and post operative healing.⁸

CASE REPORT

A 09-year-old female patient reported to OPD along with her mother with chief complaint of a swelling over the right lateral surface of tongue since last two months. There was no history of trauma or ulceration. Her medical history did not reveal anything significant. Her personal history as narrated by her mother revealed that she had the habit of sucking the tongue especially the swollen part very frequently. The patient was quite anxious and was classified to be a Frankl 2 on the behavior rating scale. Extraoral examination revealed nothing significant, with no extraoral nodal involvement. On intraoral examination, patient was found to be in mixed dentition phase with early exfoliation of 84 and 83. The examination of tongue revealed a well demarcated soft swelling of approximately 1×1 cm in dimension (Figure 1). The surface of the swelling was irregular and smooth with sessile base. The borders of the swelling were well defined. There was neither any sign of superficial ulceration over the swelling nor any presence of discharge from the surface. On palpation the swelling was non tender, smooth to touch, and showed blanching on application of pressure. A provisional diagnosis of PG of tongue was given based on these clinical features and findings. On asking the patient to swallow, the patient was thrusting the swollen part of the tongue into the edentulous space created due to early exfoliation of deciduous canine and first molar. Based on complete clinical examination and history of the patient, a provisional diagnosis of PG was made due to deleterious habit of lateral tongue thrust and sucking through the edentulous space (Figure 2).



Figure 1: Lesion on lateral border tongue.



Figure 2: Lesion associated with edentulous space and tongue sucking habit.

As the patient displayed reluctance to undergo treatment and was quite anxious her cooperation during any surgical procedure was thought to be questionable. Hence treatment was planned for excisional biopsy under local anesthesia assisted with nitrous oxide conscious sedation on the dental chair. A pre anesthetic checkup was conducted to rule out any systemic conditions. The patient was downgraded to ASA grade 2 due to sudden increase in the cases of pediatric COVID-19 cases in the hospital. The due consent was taken from, and procedure was explained to the parents. A trial demonstration was conducted on patient for selection of nasal hood size and making the patient familiar and aware of the procedure of conscious sedation. This was done a day prior to the procedure.

On the day of surgery, the patient was advised have an early breakfast and remain nil orally at least for two hours prior the procedure. A crash cart with all emergency equipment and an Anesthesiologist were available at hand to monitor the patient throughout the procedure. The nasal hood was placed, and titration of nitrous oxide was started after two minutes of 100% oxygen. The titration of nitrous oxide was done in increments of 10% was gradually raised from zero to 60 % at a flow rate of 5 liters per minute. Once signs of minimal sedation and anxiolysis were elicited such as reduced pupillary blink rate and tingling sensation over the extremities the titration was stopped. All throughout the patient remained responsive to the verbal commands, retained control of her reflexes. At this stage local anesthesia, 2% lignocaine with 1:80,000 adrenaline 1.8 ml of local anesthetic agent was infiltrated on the right-side lateral border of the tongue mucosa around the lesion uneventfully, without the child showing any kind of negative behavioral. The patient was entirely cooperative during injection of local anesthesia. Thereafter, the soft tissue diode LASER 980-nm was used for complete enucleation of the lesion. As the lesion was on the lateral border of the tongue there was minimal bleeding despite use of diode LASER for excision, two sutures were applied with 3-0 vicryl for achieving complete hemostasis (Figure 3). On completion of the surgical excision of the lesion, the

tissue sample was sent for histopathological examination. The histopathological examination revealed polypoidal tissue lined by stratified squamous epithelium with focal areas of ulceration (Figure 4). Sub epithelium was composed of lobules of small capillaries with plump endothelial cells having round to oval nuclei along with large central feeder vessels. No atypia was seen. The surrounding fibrous tissue was infiltrated by mixed inflammatory infiltrate comprising of lymphocytes, polymorphs and plasma cells. This histopathological picture gave us the definitive diagnosis suggestive of LCH. The patient was evaluated after one week. The healing was found to be satisfactory (Figure 5).



Figure 3: Post-surgical excision site.

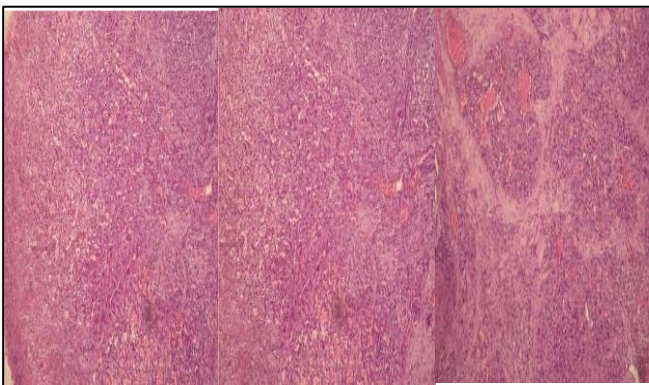


Figure 4: Histopathological slide of the biopsy specimen.



Figure 5: Well healed surgical site.

DISCUSSION

The mainstay of pediatric dentistry practice is the ability to encourage and instill a positive attitude towards dental treatment in children and guide behaviour to help improve oral health.⁹ The most common barrier to providing quality oral care to children has been fear and anxiety towards dental treatment.¹⁰ The level of anxiety among children will determine the type of behaviour management technique required and it is important to assess and evaluate behavioural responses, personal and psychological traits of the child prior to treatment.¹¹ Evaluation of behaviour will greatly facilitate quality of treatment provided, the Frankl behaviour rating scale is one of the most reliable tools for behaviour rating of children in dental setting.¹² The use of inhalational sedation with N₂O an odourless and colourless gas with anxiolytic, analgesic, and amnesic properties with rapid onset and recovery is useful in providing anxiolysis in such children.¹³ Its advantages are rapid uptake and excretion from the lungs, leading to rapid onset and recovery (two to three minutes). In sub-anaesthetic concentrations in which it is used in dentistry it produces only analgesic and anxiolytic effects without unconsciousness with minimal impairment of any reflexes, thus protecting the cough reflex. This is mainly due to depression of the central nervous system (CNS) and euphoria without any major consequence on the respiratory system.¹⁴ In order to prevent hypoxia and ensure proper oxygenation during the procedure the N₂O is delivered by the machine in combination with O₂ and concentration of both gases can be titrated to a maximum concentration of 70:30 N₂O/O₂.¹⁵ The safety index of N₂O/O₂ is excellent with the use of the present failsafe equipment for its administration acute and chronic adverse events are extremely rare, most common ones being nausea and vomiting.¹⁶ However this can be overcome by following the international guidelines for pre-sedation fasting which recommends a light meal at least two hours prior to the procedure.¹⁷ The recommendation for clinical monitoring includes observing the patient's level of consciousness, responsiveness to verbal commands and physical stimulation, mucosa/skin colour and breathing rhythm/rate with the help of a pulse oximeter or multipara monitor. A pre anaesthetic check-up prior to the procedure and availability of emergency crash cart and anaesthesiologist to manage any unforeseen adverse outcome or emergency is desirable.¹⁸ LCH are a commonly occurring benign vascular lesion of the oral cavity and 80% of them occur as single lesions.⁴ It has been observed that 30% of these lesions commonly occur after trauma, chronic irritation, defective fillings in proximity of the lesion, food impaction, improper tooth brushing and deleterious oral habits as was seen in the patient described here.¹⁹ There are many treatment modalities available for excision of vascular anomalies of the oral cavity, however lasers present a significant advantage of negligible haemorrhage, disinfection of surgical wound and less post operative complications

which are advantageous in pediatric patients.²⁰ The combination of laser with N₂O sedation minimizes pain during surgery and postoperatively, provides anxiolysis and normally negates the need for sutures thereby enhancing patient comfort and improving surgical outcome in children.²¹ As there was a minimal amount of post operative oozing present, considering the age of the child 3-0 vicryl sutures were placed to avoid any post operative discomfort.

Clinical significance

This case report highlights the importance of proper use of pharmacologic methods in behaviour management as well as surgical techniques for better management of these vascular lesions in children. The combination of N₂O and soft tissue diode laser in management of LCH on the lateral border of the tongue in an uncooperative child where behaviour management was achieved using N₂O and surgical excision was done using soft tissue laser minimizing hemorrhage and improving post operative healing.

CONCLUSION

Lobular capillary haemangioma is a non-neoplastic growth commonly seen in the oral cavity. Early detection and biopsy are crucial in determining the clinical progression of the lesion and potential complications. The treatment approach should be planned according to the diagnosis, location of lesion and prognosis of the vascular malformation. The successful diagnosis and management of this lesion is very important as it poses additional challenges in an uncooperative child. The type of behaviour management technique will become crucial to obtain best surgical outcomes in such a child. Since excisional surgery is the treatment of choice for these lesions newer techniques like diode lasers offer improved compliance and results in these children. A novel technique of combining inhalational sedation with N₂O along with lasers would improve clinical outcomes not only from the surgical point of view but also from the behaviour management aspect. When practiced with due care taken to follow the safety guidelines in vogue it can provide enhanced treatment avenues to a young anxious patient.

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REFERENCES

1. Eversole LR. Clinical outline of oral pathology: diagnosis and treatment. BC Decker, Hamilton. 2002;3:113-4.
2. Greenberg MS, Glick M. Burket's oral medicine: diagnosis and treatment. BC Decker, Hamilton. 2003;10:141-2.
3. Jafarzadeh H, Sanatkhan M, Mohtasham N. Oral pyogenic granuloma: A review. J Oral Sci. 2006;48:167-75.
4. Neville BW, Damm DD, Allen CM, Bouquot JE. Soft tissue tumors. In: Oral and Maxillofacial Pathology. Philadelphia: W. B. Saunders. 2004;2:437-95.
5. Ashley PF, Chaudhary M, Lourenço-Matharu L. Sedation of children undergoing dental treatment. Cochrane Database Syst Rev. 2018;12(12).
6. Popescu SM, Dascalu IT, Scriciu M, Mercut V, Moraru I, Tuculina MJ. Dental anxiety and its association with behavioral factors in children. Curr Health Sci J. 2014;40(4):261-4.
7. Soldani F, Manton S, Stirrups DR, Cumming C, Foley J. A comparison of inhalation sedation agents in the management of children receiving dental treatment: a randomized, controlled, cross-over pilot trial. Int J Paediatr Dentistry. 2010;20(1):65-75.
8. Pisano M, Sammartino P, Di Vittorio L. Use of Diode Laser for Surgical Removal of Pyogenic Granuloma of the Lower Lip in a Pediatric Patient: A Case Report. Am J Case Rep. 2021;22.
9. McDonald RE, Avery DR, Dean JA. McDonald and Avery's Dentistry for the Child and Adolescent. Elsevier Inc. 2010;9:212-24.
10. Klingberg G, Broberg AG. Dental fear/anxiety and dental behaviour management problems in children and adolescents: A review of prevalence and concomitant psychological factors. Int J Paediatr Dent. 2007;17:391-406.
11. Shindova MP, Belcheva AB. Behaviour evaluation scales for pediatric dental patients review and clinical experience. Folia Med (Plovdiv). 2014;56:264-70.
12. Sharma A, Tyagi R. Behavior Assessment of Children in Dental Settings: A Retrospective Study. Int J Clin Pediatr Dent. 2011;4(1):35-9.
13. American Academy of Pediatric Dentistry. Use of Nitrous Oxide for Pediatric Dental Patients. Pediatr Dent. 2018;40:281-6.
14. American Dental Association. Oral Health Topics- Nitrous oxide: dental best practices for nitrous oxide oxygen. 2019. Available at: <https://www.ada.org/en/member-center/oral-health-topics/nitrous-oxide>. Accessed on 25 May, 2022.
15. Ruixiang Y, Danny W, Chay PL, Vivian Yung YW, Chai Kiat C, Marie Therese H. Nitrous oxide inhalation sedation in dentistry: An overview of its applications and safety profile. Singapore Dental J. 2019;39.
16. Clark MS. Contemporary issues surrounding nitrous oxide. In: Malamed SF, ed. Sedation: A Guide to Patient Management. 6th ed. St. Louis, Mo. Mosby Elsevier. 2018:253-63.
17. Standards in Conscious Sedation for Dentistry. Report of an independent expert working group. London: Society for the Advancement of Anaesthesia in Dentistry. 2000.
18. Australian Dental Association. Policy statement 6.17 conscious sedation in dentistry. Including the ADA recommended guidelines for conscious sedation in

- dentistry and guidelines for the administration of nitrous oxide inhalation sedation in dentistry. 2017.
19. Pilch BZ. Head and Neck Surgical Pathology. Philadelphia: Lippincott Williams and Wilkins. 2001;389-90.
 20. Genovese WJ, Santos MT, Faloppa F, Merli LA. The use of surgical diode laser in oral hemangioma: A Case Report. Photomed Laser Surg. 2010;28:147-51.
 21. Gokhale ST, Naik NS, Singla D, Singh A, Bhattacharya D. The Combined use of Diode LASER and Conscious Sedation in the Excision of

Pyogenic Granuloma in A Nine-Year-Old Patient. J Clin Diagn Res. 2015;9(12):ZD01-02.

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