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Research Paper

Upgraded micro - marsupialization with suture thread modification for the management of ranula in a pediatric patient- A case report

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ABSTRACT: *The management of ranula is a polarising topic of discussion with conflicts regarding best treatment modalities. Regional complexities in the anatomical location of ranula makes it challenging. Upgraded micro-marsupialization is minimally invasive with shorter procedural time, and only topical anaesthesia over the lesion needs to be applied, favouring cooperative behaviour in children. The nature of the suture applied in micro-marsupialization has been rarely explored.Silk suturescause an intense and prolonged inflammatory reaction in oral mucosa and bacterial invasion.Resorbable synthetic sutures are inert, nonantigenic and nonpyrogenic, its absorption occurs by hydrolysis in a uniform and predictable manner thereby avoid the necessity to remove them, which may be an advantage in paediatric patients.This case report describes the management of ranula in a 11year old female child with the upgraded micro-marsupialization technique recommended by Sandrini et al using absorbable synthetic suture material as proposed by Arruda et al.*

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I. INTRODUCTION:

Mucocele ranks among 17th most common oral lesion and second most benign soft tissue lesion with an incidence of 2.5 per 1000 individuals.[1] When mucocele is located on the floor of the mouth it is called ranula, derived from the Latin 'rana' for frog, due to its resemblance to the aerated vocal sac of a frog. It is mobile, painless, fluctuant on palpation with a size ofabout 4 to 10 cm in diameter.[2] The most frequent occurrence is in the first two decades of life, with slight predilection for females.

Ranulas may be classified as oral(simple) ranula or plunging (cervical) ranula.[3] Ranulas are mucus extravasation phenomena which develop by means of ruptures within the salivary duct, with mucin spillage into the sublingual glands or due to change in the drainage system of the salivary glands.[3]

An increase in size of the lesion is often associated with restricted movement of tongue and difficulties in swallowing and phonation necessitating a treatment.[4] The tightly – netted vital structures and regional complexities of the anatomical location makes it challenging to the dental surgeon in terms of management.

The management of ranula is a polarizing topic with conflicts of interest regarding the best treatment modalities.[5] These include excision of ranula with or without gland marsupialization, micro- marsupialization, cryosurgery, laser ablation, sclerotherapy with OK-432 (Picibanil, an immunotherapy agent), laser excision, homoeopathy, or even no treatment.[6]

Radical treatment such as excision of sublingual gland and ranula under general anaesthesia in children carries the potential risk of haemorrhage from the lingual and sublingual vessels, lingual nerve, and Wharton duct damage with the possibility of stenosis leading to obstructive sialadenitis.[7]A less aggressive approach for the management of ranulas is needed, especially in children. Suitable non-invasive alternatives that have been suggested includes micro- marsupialization or upgraded micro-marsupialization.

An important factor observed is that only topical anesthesia over the lesion needs to be applied, a fact that greatly favors cooperative behavior on the part of children and the required procedure time is approximately 5 min with no tissue damage or inflammation. Opting for micromarsupialization, not only reduced the surgical

time, but also saved the patient from day care surgical procedure causing minimum patient discomfort.

Arruda et al in 2012 proposed modifications inthe thickness of the suture thread, to-and-fro movement with suture thread, as well as drainage of mucus with a dental sucker and slight manual pressure on the lesion.[6]Increasing the thickness of the suture thread to 3.0mm improves mucous drainage and epithelialization of the mucosa around the suture thread, creating "new ducts" for spilling mucus.[6]

In 2021 Arruda et al reported the use of synthetic suture material instead of a silk suture as it is inert, non-antigenic and non-pyogenic. Its absorption occurs by hydrolysis in a uniform and predictable manner with no need for professional removal of the suture thread which is an added advantage in pediatric patients.[6] The nature of the suture applied in micro-marsupialization has been rarely explored.

Hence this case report describesthe management of ranula in a 11year old female child with the upgraded micro-marsupialization technique recommended by Sandrini et al using absorbable synthetic suture material as proposed by Arruda et al.

II. CASE REPORT:

A 11 year old female patient was reported to the Department of Paediatric & Preventive Dentistry, Government Dental College Thiruvananthapuram in August 2020 , with a complaint of a painless swelling on the floor of the mouth which gradually increased in size since 2 weeks . Child reported a similar swelling but of smaller size about one month back, which gradually decreased in size and disappeared without any treatment. On palpation mild tenderness was observed in the submandibular chains and the mass did not reveal cervical extension.

Examination revealed a fluctuant swelling measuring 2.5 x 2 cm extending from the distal aspect of the mandibular first molar up to the mesial aspect of canine, in the left sublingual region of the floor of the mouth (Fig 1). The swelling was non-tender, non-compressible and of flaccid consistency with a smooth surface, mucosa- like colour and a sessile base. Seo et al demonstrated that the intraoral ranula greater than 2 cm would not reduce in size spontaneously and in paediatric patients it will cause discomfort, which brings more frequent intentional rupturing of the ranula.[8]Hence under the diagnostic hypothesis of the ranula, the upgraded micro-marsupialization technique with suture thread modification was planned as a therapeutic measure.

The area was disinfected with povidoneiodine 0.1 solution; a topical anaesthetic gel (lignocaine hydrochloride gel LOX - 2%jelly) was applied over the entire lesion for approximately 3 min. A total of four interrupted sutures were placed in the mucosa with absorbable synthetic suture material, vicryl 3-0 (braided coated polyglactin 910 violet , 3/8 circle reverse cutting needle) were placed. The first suture was placed in the dome of the lesion and others at a distance of 3–5 mm from each other (Fig :2). To and fro movement of the suture was made in order to enlarge the mechanical pathway. Surgical knots were made by leaving a space between the knot and the lesion to avoid necrosis of tissue in between. When the lesion was punctured, there was drainage of mucin, which confirmed our diagnosis of ranula. On postoperative care, the child and her mother were instructed for regular use of 0.2% chlorhexidine mouth rinse to avoid secondary infection. Since absorbable suture thread was used, the sutures were not removed and were absorbed within 30 days (Fig : 3). Follow up was made on the 3rd day, 7th day and 30th day and showed no signs infection or recurrence and is under regular follow up (Fig: 4).

III. DISCUSSION

Redish reported that the placement of a wire suture through the lesion is a method of treatment that may be utilized for ranulas.[9] Simple marsupialization has fallen into disfavour primarily because of the excessive number of failures as reported in the literature, from 61 % to 89%, with clinical evidence of recurrence appearing between 6 weeks to 12 months.[10]Baurmash et al in 1992 advocated marsupialization with packing of the cyst cavity and the recurrence approximately dropped from 60 to 10%.[11]

Morton and Bartley in 1995, described the management of ranula by placing a silk suture in the dome of the cyst.[9] Castro suggested micro- marsupialization for mucoceles more than 1 cm and for ranulas.[9]Deldbem et al in 2003 performed micro- marsupialization technique using topical anaesthetic on the entire lesion for 3 min and a single long 4.0 silk suture is passed through the internal part of lesion through its greatest diameter which forms the epithelialized tract through which the accumulated saliva gets drained.[12]

According to Sandrini et al the lesions treated by only a single suture along their widest diameter and for periods of less than 15 days did not heal or reappeared within 30 days. Sandrini et al in 2007 proposed modifications to micro-marsupialization technique which includes placement of maximum number of sutures, decreased distance between the entry and exit of the needle, and sutures maintained for long duration.[13] The quantity of new epithelialized drainage pathways can be increased by placing as many sutures as possible. The decreased distance between the entrance and exit of the needle is to reduce the length of the drainage tracts there by facilitating epithelialization.[13] Long duration of suture maintenance for 30 days permits the formation of a

new permanent epithelialized tract along the path of the suture.Excessive compression of the tissue should be avoided while placing knots, otherwise leads to necrosis of the tissue and early loss of sutures.

Micro-marsupialization has been indicated in selected cases with the following characteristics: the lesion should be larger than 10mm, superficially located with a sessile base,of translucent colour, and recent evolution time.[9] This technique is particularly recommended for adults with disabilities or children, who find it difficult to withstand prolonged clinical procedures,since it is simpler, minimally invasive, and does not require local infiltration of anaesthesia. Furthermore, micro-marsupialization has a lower rate of postoperative complications, no recurrence and is well-tolerated bypatients.[3] The technique is contraindicated for lesions of fibrous consistency, with a traumatized surface and pedicle base, and for those found on the palate and buccal mucosa.[9]

Hegde S et al in 2017 reported a case of ranula treated using the modified micro- marsupialization technique with no recurrence even 12 months after the procedure.[7]Zhi et al recommended an observation period of 6 months in case of paediatric oral ranulas. [14]

When different suture materials were compared, silk sutures were found to cause an intense and prolonged inflammatory reaction in oral mucosa and bacterial invasion. Resorbable sutures, including synthetic materials such as polyglactin 910are inert, nonantigenic and nonpyrogenic, and its absorption occurs by hydrolysis in a uniform and predictable manner inducing less plaque accumulation when compared to silk suture.Polyglactin 910 is an absorbable synthetic suture thread of glycolic acid monomer composed of multiple filaments which has good handling strength during manufacture of the knot.[6]Among synthetic suture threads, nylon has excellent biocompatibility, monofilament and is less prone to saturation with oral fluids, decreasing the likelihood of bacterial growth on the spot but can leave rigid ends that may cause trauma to the oral mucosa and therefore is not recommended for use in micro- marsupialization. [6]

The preferred thread of choice for the suture of the oral mucosa involves other types of synthetic suture thread, such as polyester, polyglactin910 and polyglycolic acid. Resorbable sutures avoid the necessity to remove them, which may be an advantage in paediatric patients although the cost of resorbable sutures may be higher than that of silk sutures.Micro-marsupialization does not enable a biopsy to be conducted, and the diagnosis remains purely clinical. Additional randomized controlled trials should be carried out to determine the best suture thread to be used in micro- marsupialization of oral mucoceles and ranulas.

IV. CONCLUSION

Upgraded micro-marsupialization technique with absorbable synthetic sutures is a viable alternative instead of the more invasive options &can be recommended for the treatment of oralranulas especially in paediatric patients.

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Fig 1: A ranula consisting of a sessile bullous lesion with a smooth surface, mucosa coloured, 2.5 * 2 cm insize, on the left side of the floor of the mouth
Fig 2: upgraded micro-marsupialization technique with polyglactin 910, 3-0 suture material
Fig 3: clinical appearance after 30 days of follow-up.
Fig 4:clinical healing and no signs of recurrence in 6 months follow-up period

Pictures

Fig 1:

Fig 2:

Fig3:

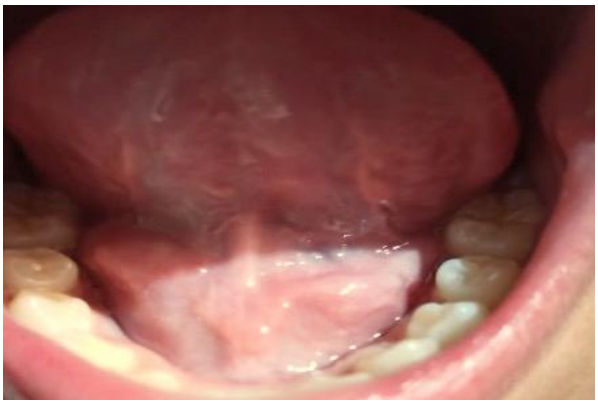

Fig 4: