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AN OVERVIEW ON DEVELOPMENTAL DISTURBANCES OF THE TONGUE

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ABSTRACT

Tongue is a vital organ present in the oral cavity. Besides the important functions of speech and deglutition, it may act as an index for underlying systemic diseases. Although it is easy to examine the various developmental anomalies of the tongue clinically still some anomalies may present a diagnostic and therapeutic dilemma.

INTRODUCTION

Tongue is a muscular organ present in the oral cavity which apart from its functions of speech, deglutition of food is known to play a part in the development of the facial structures i.e jaw, alignment of teeth. The muscular pressure contributes in development and shape of jaws and establishment of occlusion of teeth.[1] Developmental anomalies are the disturbances occurring during the growth and development may result in altered structures ranging from mild to severe malformations.[2] According to variousstudies tongue diseasesare known to show a high frequency among the mucosal lesions, although prevalence of these usually varies in different parts of the world.[3] Various inherited, congenital, and developmental anomalies of tongue have been reported. In some casesthe clinical significance is minor whereas some other may be of major significance and cause discomfort to the patient and may also affect their normal living pattern.[4] Anomalies of the tongue are frequent finding in syndromic patients, but isolated tongue anomalies have also been reported.[1]

Development of the tongue begins at the 4th week of gestation when a swelling termed the tuberculum impar is formed at the fusion site of the 1st and 2nd pharyngeal arches. Between the 4th-8thweeks, anterior two- third of the tongue develops by the fusion of the two lingual swellings and tuberculum impar. The posterior 3rd of the tongue is known to develop from the hypobranchial eminence.[5] Thedisturbances of tongue may show varied clinical presentations and a biopsy is often not needed in such cases, but for educational purposes various histological features of these disturbances are noted in the literature. (Table I) [6,7,8]

Aglossia

It is a rare and sporadic congenital malformation seen in children. It may be present as an isolated disorder or may be seen in association with other congenital deformities which include cranio-facial anomalies like partial or complete anodontia, microstomia, cleft palate, micrognathia, eye-lid defects, facial asymmetry, and cranial nerve palsies.[1]

Aglossia is defined as the complete absence of tongue since birth.[4] These abnormalities are probably thought to be the disruptive consequences of hemorrhagic lesions during fetal development (vascular disruption around the fourth embryonic week).[1] Patients with aglossia usually encounter difficulty in eating and speaking.[8] Such patients do not usually need reconstruction of tongue; as feeding, swallowing adaptation are often shown by the patient with increasing age.

Microglossia

It is a very rare condition with about an approximate of 50 cases reported in literature till date.[5] This condition was first described by de Jussieu in 1718. Microglossia is an uncommon developmental condition characterized by an abnormally small tongue. This disorder is a frequent finding in association with limb abnormalities where it is grouped as a hypoglossia -hypodactilia syndrome. Microglossia frequently is known to be linked with hypoplasia of the mandible, and the lower incisors may be missing.[7]

Table I: Histopathologic features of anomalies of the tongue.

ANOMALY	HISTOLOGY
Macroglossia	When Microglossia is due to tumor, a neoplastic proliferation of a particular tissue can be found (e.g., lymphatic vessels, blood vessels, neural tissue). In the patient with amyloidosis, an abnormal protein material is deposited in the tongue.
Fissured Tongue	Hyperplasia of the rete pegs, loss of keratin on the surface of filliform papillae may be seen Papillae are usually separated by grooves Microabscess in upper epithelium may be seen Polymorphonuclear leukocytes migrating into the epithelium are seen.
Median Rhomboid Glossitis	Smooth or nodular surface covered by atrophic stratified squamous epithelium overlying a moderately fibrosed stroma with somewhat dilated capillaries. Fungiform and filiform papillae are not seen, Surface nodules may mimic or A mild to moderately intense chronic inflammatory cell infiltrate may be seen within sub epithelial and deeper fibrovascular tissues. Chronic candida infection may result in excess surface keratin or extreme elongation of rete processes and premature keratin production with individual cells or as epithelial pearls (dyskeratosis) deep in the processes.

Erythema Migrans	These inflammatory cells often produce small micro abscesses, called **Monro's abscesses,** in the keratin and spinous layers. Rete ridges are typically thin and considerably elongated, with only a thin layer of epithelium overlying connective tissue papillae. Chronic inflammatory cells can be seen in variable numbers within the stroma and silver or PAS staining will often demonstrate candida hyphae or spores in the superficial layers of the epithelium.
Lingual varices	Dilated vessels with presence of smooth muscle and elastic fibers. Secondary thrombosis may lead to occluded lumen with platelets and erythrocytes
Lingual thyroid nodule	Normal thyroid tissue or thyroid tissue of embryonal or fetal type is seen Incomplete / poorly defined capsule Follicular cells sometimes atrophic may be seen.
Hairy tongue	hyperplasia of the rete ridges and loss of the keratin "Hairs" on the surface of the filiform papillae. The papillae Vary in size and often are separated by deep grooves. Polymorphonuclear leukocytes can be seen migrating into the epithelium, often forming microabscesses in the upper epithelial layers. A mixed inflammatory cell Infiltrate is present in the lamina propria.

Macroglossia

Macroglossia (Tongue hypertrophy, prolapsus of the tongue, enlarged tongue, pseudo Microglossia) 6 in general terms may be referred to the enlargement of the tongue which may lead to functional and cosmetic problems. Historically, Virchow described it as a form of elephantiasis.

In the last 100 years, Butlin and Spencer attributed it to the dilation of lymphatics, muscle hypertrophy, or inflammation.[6] Most frequently observed in infants, but the size of tongue usually remains above normal in children and adolescents. Examination of the tongue often reveals a scalloping appearance of the lateral borders/margins of the tongue caused by impact against the teeth.[9]The microscopic appearance of Macroglossia depends on the specific cause. Macroglossia observed in association with, hypothyroidism, Down syndrome, tuberculosis, sarcoidosis, amyloidosis, multiple myeloma, infections (syphilis), neurofibromatosis, and angioedema or allergic reaction.[10]In the patient with amyloidosis, an abnormal protein material is deposited in the tongue.

Considering Macroglossia as a sign of an underlying disorder is important to proceed with focused diagnostic testing, including possible biopsy. Treatment should be directed at the underlying disorder.[11]

Ankyloglossia

Ankyloglossia also known as Tongue-tie occurs in approximately 1.7% of all neonates without preference for either gender and is reported to be transitory.[6]Ankyloglossia is a congenital anomaly characterized by an abnormally short lingual frenum, which usually restrict the tongue tip mobility.[12] Sometimes slight clefting of the tip may be seen. The sequele of Ankyloglossia is controversial,suggested complications include:[13]

(1) Lower incisor deformity.
(2) Gingival recession.
(3) Malocclusions.

The existence of Ankyloglossia in the new-born may result in breastfeeding difficulties, including ineffective latch, maternal nipple pain and inadequate milk transfer.[12]In some children, tongue-tie may also result in speech defects, especially articulation of some common sounds: l, d, r, t n, th, sh, and z.[6] Frenectomy ("clipping" or simple release of the frenulum)[7] is superior and recommended procedure implicated rather than education and lactation support alone.[14,15,16]

In a situation where the child is able to extend his/her tongue sufficiently far to moisten the lower lip, then frenectomy is not indicatedusually.[17]

Fissured Tongue

Often known by the terms Scrotal tongue, lingua plicata[6]is less common anomaly present in children than in adults; however, it presents as a common finding in syndromic children (Down syndrome).[17]Melkersson Rosenthal sundrome.[18,19]More in males.Fissured tongue has known to be seen in association with, acromegaly, psoriasis, and Sjogren syndrome.[20]

Fissured tongue usually presents as one marked central fissure, anterioposteriorly, from which smaller fissures radiate laterally. Vitamin B-complex deficiency has known to be associated with fissuring. A strong association has been found between fissuredtongue &geographic tongue,with many patients having both conditions.

Clinical Features[17,21]

- Shallow or deep fissures.
- On the dorsum of tongue - Have a symmetrical pattern.
- Fissures may be longitudinal or at right angles to the margin of the tongue.
- Food debris may become trapped in deep fissures, leading to inflammation or secondary fungal infections.

Aggravating factors:

Fissuring has known to be increased with age with certain factors associated to increased age including salivary hypo function, deficiency of vitamins and candidiasis[2]

Treatment is usually not needed unless there is a mild inflammation present at the base of fissures. Brushing of the tongue & improved oral hygiene often aid in reducing the inflammation and soreness.[21]

Median Rhomboid Glossitis

Typically seen on the dorsum of the tongue Median rhomboid glossitis (Central papillary atrophy of tongue) is a well-circumscribed central papillary atrophy of the tongue which is present in the midline anterior to the circumvallate papillae.[22]Mostly seen in adults but sometimes it can be seen in teenagers and younger adults with a high prevalence in hiv positive children.[21] The lesion surface appears smooth and glossy.Pain, irritation, and pruritus have been reported in few cases but in most it is asymptomatic; however, few researchers categorize Median rhomboid glossitis as a candidial infection rather than a developmental anomalies.[23]

Clinical features

- The lesion is flat, nodular, slightly raised
- It stands out distinctly from the rest of the tongue because of the absence of filiform papillae.
- This atrophic area is usually asymptomatic.
- Males are affected three times more[9]but according to few studies it occurs in females.[2]
- The condition is usually asymptomatic, but burning or itching is possible.[24]

Treatment

Use of topical antifungal agents is appropriate. Median

rhomboid glossitis is commonly associated with a candida infection and responds to antifungals (e.g., nystatin, clotrimazole, fluconazole) delivered as a suspension or oral troche.[25-26]

Erythema Migrans

Erythema migrans (Geographic tongue/Benign migratory glossitis)[6] is a benign condition of thetongue which involves the dorsaland lateral borders of the anterior two thirds of the tongue. Rahamimoff and muhsan observed a 14% prevalence of migratory glossitis in 5000 children 2 years old and younger. Kleinman and colleagues reported a prevalence of geographic tongue of 0.6% in 39,260 children aged 5-17 years.

Benign migratory glossitis appears as a well-configured map like appearance due to the well-defined depapillated Erythmatous regions that are surrounded by white borders.Geographic tongue continuously changes patterns, creating a migratory appearance on the tongue.[22] The lesions are usually asymptomatic but may be painful when inflamed.

Clinical features[21]

- Red, smooth areas devoid of filliform papillae.
- Margins of lesion- well developed, slightly raised.

Treatment

The condition is self-limited and oftenno treatment is indicated other than reassuring the patient.[17]

Lingual Varices: Lingual/Sublingual Varicosities[6]

Varicosity is a condition that indicates an enlarged and tortuous vein, artery, or lymph vessel. Orally, varicosities are seen as purple to red shot like clusters.[27] Age appears to be an important etiologic factor because varices are rare in children butcommon in older adults.[7]Sublingual varixis considered to be the most common type of oral varicosity. Sublingual varicosities classicallypresent as multiple blue-purple, elevated or popular blebs on the lateral and ventral surfaces of the tongue. Lips and buccal mucosa are less common sites[28]The lesions are usually asymptomatic, except in rare instances when secondary thrombosisoccurs. Caviar tongue is a widely used name that has been given to them, given its typical feature of multiple, round little masses of purplish blue[29]colour. However, it has been given several denominations, including phlebectasia linguae,[30] caviar tongue, spots or lesions, lingual andsublingual varicosities.[31] According to Colby et al. (1961) people with varicosities of the legs were more likely to develop varicosities on the tongue.[32] Sublingual varicosities are typically asymptomatic, andno treatment is indicated. Solitary varicosities of thelips and buccal mucosa may need to be surgicallyremoved to confirm the diagnosis, because of secondarythrombus formation or for aesthetic purposes.

Lingual Thyroid Nodule:

It is a developmental disturbance in whichfollicles of thyroid tissue are found in the tongue, possible reason being a thyroid anlage that has failed to'migrate' to its predestined location or from anlage remnantsthat have become detached and were left behind.It typically appears as asmooth nodular mass of tissue located in the midline ofthe posterior dorsal surface of the tongue.[33]70% of patientspresenting lingual thyroid are known to have hypothyroidism.[34]The chiefsymptoms of the condition may vary, but the presentingcomplaint is often dysphagia, dysphonia, dyspnea, haemorrhage with pain, or a feeling of tightness or fullness inthe throat.[6]Symptoms are more common during increasedmetabolic demand, such as in adolescence or pregnancy.[35]

Diagnosis is best established by thyroid scan usingiodine isotopes or technetium-99m. Computed tomography(CT) and magnetic resonance imaging (MRI) canbe helpful in delineating the size and extent of thelesion. Biopsy is often avoided because of the risk ofhaemorrhage and because the mass may represent thepatient's only functioning thyroid tissue.No treatment except periodic follow-up is required forpatients with asymptomatic lingual thyroids. In symptomaticpatients, suppressive therapy with supplementalthyroid hormone often can reduce the size of thelesion[7]

Surgical excision is often advisedfor patients with a lingual thyroid and normal thyroidfunction; however, this may lead to a need for postoperativethyroid replacement because the lingual thyroidis usually the only functioning thyroid tissue in thesepatients.[11]

Cleft Tongue:

A completely cleft or bifid tongue is a rare condition that isapparently due to lack of merging of the lateral lingualswellings of this organ. Partial clefting of the tongue ismore common & often manifested as adeep groove in the midline of the dorsal surface.[6]Syndromic cases like Opitz G/BBB syndrome, Klippel–Feil anomaly, oral–facial–digital syndrome type I and Larsen syndrome often present a bifid tongue.[36,37] Literature also gives a reference of bifid tongue as a complication of tongue piercing.[38]Patients with slight notching may not require a treatment but in case of a partial or complete cleft of the tongue surgical correction is often indicated.

Hairy Tongue

(Lingua nigra, lingua villosa, lingua villosa nigra, black hairy tongue)[6]

Hairy tongue is characterized by marked accumulation of keratin on the filiform papillae of the dorsaltongue, resulting in a hair like appearance.[7]Accumulation of excess keratin on the filiform papillae of the dorsal tongue leads to the formation of elongatedstrands that resemble hair.[11]The condition is most often known as black hairy tongue (lingua villosa nigra); however, hairy tongue may alsoappear in different colours including brown, green, pink, white, or any other hue. It basically depends on specific etiology and other secondary factors involved (e.g. use of colored mouthwashes, candies, breath mints etc).[6]Because of the similarity in names, care should betaken to avoid confusing hairy tongue with hairy leukoplakia.[7]

A frequentcomplain of tickling sensation is reported usually in the soft palate and theoropharynx region during swallowing. In severe cases, patientsmay often complain of a gagging sensation. Retention oforal debris between the elongated papillae may result inhalitosis. Most patients are asymptomatic,but some have halitosis or abnormal taste. Notreatment is required, but gentle daily debridement witha tongue scraper or soft toothbrush can remove keratinize dtissue.[39]

CONCLUSION:

The developmental disturbances of the tongue show varied clinical presentations.Although these disturbances are easily recognizable still some of them can possess diagnostic challenges.So, the aim should be diagnosing the condition properly and rule out any systemic conditions or syndromes associated.

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