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Pathophysiology & Treatment of Geographic Tongue: A Mini Review

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Abstract

Geographic tongue is a disorder of the tongue. It leads to no fatal consequences and so it is considered benign. Almost 3% of world population is reported to be effected by this disorder. This is basically a painless inflammatory disease of the tongue. It appears to be of a particular map like pattern and hence derives its name as the 'Geographic tongue'. The disease is known to effect women more than men and children are not generally affected by this disease. This disease is associated with loss of loss of tongue filiform papillae while the other types of papillae remain unaffected. Patients normally come up with complain of red patterns on the tongue with white raised border. The conditions are painless but often patients complain of irritation at the spots which increases with consumption of salty, tangy hot or spicy foods. This is not a transmissible disease and if asymptomatic mostly doesn't need any treatment.

Keywords: Geographic Tongue; Filiform Papillae; Tongue; Disease; Asymptomatic

Introduction

Geographic tongue is basically a benign disease condition of the tongue in which the upper surface of the tongue is affected resulting in los of small cells from the surface mainly the filiform papillae [1]. Geographic tongue is a chronic inflammatory condition of the tongue. It was first reported in 1931 [2]. The other names for geographic tongue are migratory glositis, andannulus migrant, erythema migrants etc. In other words, geographic tongue is basically migratory rash of the tongue. Red patches appear on the tongue with irregular raised white borders and these appear like a typical map [3]. The patches persist for some days to some months in individuals. Then they disappear and appear again at some other spot of the tongue [4,5]. During remission, no scar is left on the tongue. It is reported to be mostly restricted to the dorsum of the tongue [5]. Multiple well demarcated patches with lost papillae may appear in individuals with geographic tongue. The pattern and duration of persistence of the patches varies in person to person [5]. Studies reveal that certain people may have predisposition for occurrence of this disease. People with diabetes have four fold risk of occurrence of geographic tongue compared to non-diabetic people [6]. Also, deficiency of certain vitamins like vitamin B6, B12 and vitamin D [7]. Studies report that lesions on the lateral and dorsal surface of the tongue are often associated with geographic tongue. Extra-lingual lesions i.e., lesions outside the mouth like on the lips etc may also be seen with geographic tongue. Lesions on the floor of the mouth, the buccal mucosa and on the upper palate may also occur with geographic tongue [4]. Studies report that geographic tongue occurs more prevalently in patients with ill mental

health than in normal individuals [8]. Though the condition of geographic tongue is painless and doesn't require much treatment protocols yet a detailed knowledge about the pathophysiology of the disease necessary to prevent and treat the pathological condition of the mouth which leads to loss of papillae from the tongue. Geographic tongue not only may cause distortion of the gustatory sensation but also may lead to various other complications including severe phychosomatic conditions in the patient.

Pathophysiology of Geographic Tongue

As evident from various case reports, geographic tongue is basically a migratory erythamatopus harmless patch of the tongue which causes loss of small cells of the filiform papillae of the tongue. The condition is mostly painless but comes up with prominent symptoms.

The most pronounced symptom of geographic tongue is appearance of a pattern of smooth, radish spots on the tongue specially on the lateral or dorsal surface with white or grey raised borders [2,4,5]. In general the tongue remains covered papillae. Papillae are tiny, hair- like pink bumps on the surface of the tongue. There are primarily 4 different types of papillae. Each has different shape, size and location [9]. The four different types of papillae are fungiform, circumvallate, foliate and filiform papillae. Among these fungiform, circumvallate and foliate papillae contain taste buds and hence they are termed as gustatory papillae [10]. The filiform papillae doesn't contain taste buds but it acts as a covering of the tongue surface and is recognized as a sensory apparatus of the tongue [11]. People with geographic tongue are reported to have fewer papillae on tongue. Specially the filiform papillae are affected in geographic tongue. People with geographic tongue complain of tingling or burning sensation on consumption of spicy or acidic food [12]. Worsening of the lesion of geographic tongue with dental treatments in children are also known [13]. Thus , in most cases though geographic tongue is associated with painless patches on the tongue , in some cases patients may experience burning and irritation on the tongue specially while eating. This may not only negatively impact the food intake of the individual but also may interfere with the day to day life of the person.

The exact cause of geographic tongue is not yet known; several factors like emotional stress, physiological factors, habits, allergies, diabetes and hormonal disturbance etc., have been reported as the background etiology of geographic tongue. A relationship between geographic tongue and psoriasis (a skin disease) is also reported. Heredity is also considered to be associated with geographic tongue [14]. People with family history of allergy such as asthma are reported to be more prone to geographic tongue [15]. Studies show that people with geographic tongue often have other associated disorder termed as fissured tongue. This fissured tongue has the appearance of the deep grooves called fissures, on the surface of the tongue [16]. People with geographic tongue have been reported to have low level of salivary zinc [17]. People with certain diseases like eczyma, psoriasis, reactive arthiritis etc. are more likely to develop geographic tongue [12]. Thus the pathophysiology of geographic tongue is not much complicated but is multifaceted. Proper understanding of the pathophysiology of geographic tongue is important and essential for proper treatment to eradicate the pathological condition in an individual.

Diagnosis of Geographic Tongue

Diagnosis of geographic tongue is based primarily on certain factors like detailed patient history, clinical evaluation, on the appearance of the pattern of the lesion etc [18]. In Rare cases geographic tongue diagnosis needs histological confirmation. The diagnosis of geographic tongue is also based on the characteristic histology of migration of the patches, the circinate appearance of the patches. Lack of significant pain (as opposed to burning) is considered a significant subjective complaint for the diagnosis of geographic tongue [19,20]. Histological studies of geographic tongue is reported to give no significant or specific microscopic features except that it is characterized by the loss of filiform papillae from the tongue. Histological studies also reveal that loss of papillae leaves a flattened mucosal surface with irregular rege pegs. The white circinate lines depict show acanthosis and peripheral hyperkeratosis [21]. Suprapilary thinning is also reported. The central erythamatous region of the patch reveals desquamation of parakeratin and exocytosis of lymphocytes and polymorphonuclear leukocytes into the epithelium, degeneration of epithelial cells and microbases formation near the surface [21]. Also, infiltration of lymphocytes, plasma cells and neutrophils are observed in the underlying connective tissue [21]. Theses histological features help to differentiate geographic tongue from other pathological conditions of the tongue namely candidiasis, leukopia, oral thrush, contact allergy, lichen planus etc.

Treatment Options of Geographic Tongue

Geographic tongue doesn't require as such any medical treatment. Specially if the disease remains in painless stage, no treatment is required. In some cases and at some stages, geographic tongue may sometimes cause discomfort on tongue [22]. Though geographic tongue is a harmless condition yet some treatment methods are conventionally adapted to combat the uncomfortable symptoms reported in some cases. Any pain or painful irritation caused due to geographic tongue can be mitigated using over the counter available analgesic medicine. These include ibuprofen,

naproxen etc. Doctors often prescribe a corticosteroid rinse or mouthwash n order to reduce the pain and irritation [23]. Avoiding foods that can cause problem in geographic tongue needs to be avoided. Foods like spicy, tangy, sour hot foods needs to be avoided in cases of geographic tongue to avoid any kind of irritation or discomfort on tongue [24] (Figure 1). A bland or less spicy diet is recommended for people with the stage of irritation or burning sensation in geographic tongue. Flavoured toothpastes needs to be avoided in geographic tongue because highly flavoured toothpastes contain added astringent cleaning agents which may increase the irritation on tongue [25]. Besides all these, over the counter pain relievers, mouth rinses with aesthetics, antihistamine and corticosteroid mouthwashes, corticosteroid ointments and vitamin B supplementation in some cases may be beneficial and effective in treating the discomfort and irritation conditions associated with geographic tongue [26,27] (Figure 1).

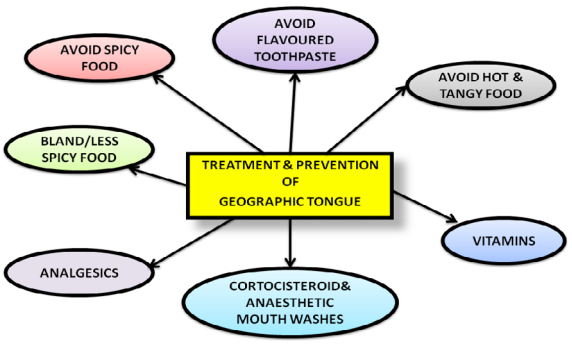

Figure 1: Methods of treatment and prevention of geographic tongue.

COVID 19 and Geographic Tongue

Studies Reveal that patients suffering from COVID 19, develop a clinical condition of the tongue. Their tongue is reported to show patterns of patches on their tongue, experience pain and irritation. Experts are of the opinion that infection of Corona virus causes various condition o the tongue one of which is reported to be geographic tongue. This particular specific condition of the tongue associated with COVID 19 infection is termed as "COVID-19 tongue" [28]. COVID tongue is also reported to cause symptoms of swelling and sores on the tongue [28].

Conclusion

Geographic tongue is thus a harmless pathological condition of the tongue which may in some cases be painful and discomfortable. Healthy lifestyle, maintenance of oral hygiene, good food habit, inclusion of vitamin and mineral rich foods, and dietary fibres in daily diet may help to prevent occurrence of geographic tongue. People with family history of geographic tongue are more prone to get the condition and hence needs to be cautious and maintain certain preventive measures for geographic tongue. Also, inclusion of green leafy vegetables, fruits and vegetables in regular diet may fulfill the need for vitamins and minerals and thus may be helpful to prevent disorders like geographic tongue which is reported to be associated often with deficiency of these vitamins and minerals. Unfortunately the exact cause of geographic tongue is still unknown, hence the condition is completely preventable. Anyways, certain precautionary measures can be undertaken to avoid occurrence of geographic tongue. Also, initial stages with painless patches in geographic tongue may be prevented from further progression and reaching the uncomfortable irritating stage of pain and burring by simply avoiding the possible irritants like certain foods, flavoured tooth pastes, consuming bland and less spicy foods and maintaining proper oral hygiene (Figure 1). More detailed research and insights into the pathophysiology and etiology of geographic tongue is required to fight back the condition and heal patients with this recurring chronic condition of tongue forever.

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