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Review Article **Dentistry**

Management of Paediatric Geographic Tongue: Systematic Review

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Abstract

Geographic tongue (GT) is a benign condition with uncertain etiology that affects the tongue and form filiform papillae giving it a patchy appearance. It is also called benign migratory glossitis. Various terminologies are used to describe this condition i.e.; benign migratory glossitis ((BMG), wandering rash, annulus migrans and erythema migrans. The clinical presentation of GT may different from asymptomatic to burning and painful condition. The aim of this review is to find the possible treatments/management for BMG to treat the pediatric patients with this disease. A search was carried out using different terms to find the related articles. Total 6 studies were used which described the possible managements of GT. there is no proper scientifically prove treatments is present, however application of tacrolimus and good oral hygiene can be recommended in symptomatic conditions. Asymptomatic condition needs no treatment while to reduce pain in symptomatic GT various managements can be prescribed.

Keywords: Geographical tongue, benign migratory glossitis, etiology, asymptomatic, oral hygiene.

INTRODUCTION

Geographic tongue can be defined as a benign migratory lesion that usually found in middle as well as sides at the backside of tongue, it can also found at the base of tongue but with low frequency and incidence. This condition is not only limited to children, it is also found in middle-aged and young adults; it can be seen at early age from 2-40 years. GT (Geographic tongue) is a harmless benign oral condition [1, 2]. Various terminologies are used to describe this condition i.e.; benign migratory glossitis (BMG), wandering rash, annulus migrans and erythema migrans. When this condition occurs in oral cavity other than tongue, then following terminologies like erythema areata migrans, annulus migrans, erythema migrans, areata stomatitis migrans, erythema areata migrans and geographic stomatitis are used [3, 4].

GT was reported first time by Rayer in 1831. Due to presence of white and red patches on tongue in this condition (that looks like a map), to describe this disorder, the word 'geographic' is used. The lesions of GT are dynamic, because within an hour they change morphologically, this condition is self-limiting and heal in weeks or just days and has chances of reoccurrence [5, 6].

Etiology

The exact cause of GT is unknown till now but many possible reasons have been reported in patients who have a family history of this disorder and GT is frequently found in people that underlying immune diseases and after administering several treatments. Emotional stress, hormonal disturbance, heredity, nutritional deficiency, anaemia, allergic tendency, psychological disturbances, and use of spicy foods are the other reasons which may cause the geographical tongue. Some other disease i.e., seborrhoeic dermatitis, psoriasis, lichen planus, pityriasis, juvenile diabetes and Reiter's syndrome may also co-exist with GT. Notable evidences that showed link between geographic tongue and suggested causing factors have not been found until now. In 1966, emotional stress was demonstrated and etiological factor for geographic tongue [9], it has also been related with avitaminosis deficiencies and allergies in children as well [7-9].

Many studies linked GT with emotional stress, chronic trauma, bacterial or fungal infection, family

history, drug use, zinc and vitamin deficiency, atopy, burning mouth syndrome, psoriasis, Diabetes Mellitus, Reiter's syndrome and seborrheic dermatitis and other diseases but none of them proved exact cause,, so etiology of this condition still remains controversial [10-13].

Management

Asymptomatic conditions of GT require no treatment except the reassurance of self-resolving and benign nature of the lesions. Even in symptomatic conditions, no scientifically proven treatment is available [14]. Avoidance of sour, hot and spicy food, coarse food, acidic beverages and fruits, tobacco and alcohol may be advised. To reduce the pain and discomfort, anti-histamines, anti-inflammatory, oral analgesics, mouth rinses and anesthetic gel like lidocaine can be prescribed. Topical tretinoin, topical corticosteroids like betamethasone, nutritional supplements like Vitamin A, K2 and zinc have been used to treat GT. The use of topical tacrolimus and cyclosporine to treat geographical tongue successfully has been reported [15, 16].

METHODOLOGY

The literature search performed from 2000 to 2020. The search was performed in the PubMed/ Science Direct, web of science, Cochrane and Google Scholar databases, as they include most of the publications in this area.

Inclusion Criteria

Published articles cross sectional or designed studies, case control and cohort studies and randomized clinical trials were included in this review. These articles should be written in English language, accompanied or not, by other languages.

Exclusion Criteria

Letters to editors, epidemiological or prevalence studies, congress contributions (presentations, conferences and posters) and reviews were excluded. Articles written other than English language also not included.

Search Strategy

The search was conducted on Web of Science, Science Direct, PubMed, and Cochrane databases. Different keywords like Geographic tongue, pediatric geographic tongue, management of GT, Benign migratory glossitis, treatment of benign migratory glossitis were used to search the articles.

Study Selection

To exclude the duplicates, articles were identified by author and title. By using title, abstract or from the full study, relevant articles which were associated with geographic tongue in children, its symptoms and treatment of GT were selected. This screening method was performed by the author of this review. Author analyzed and fully read those articles which met the criteria.

Data Recording

Data was recorded on last name of author and publication year. Following variables were also included: the number of GT patients, gender, age, symptoms and linked diseases.

RESULTS

Results were described covering the context of clinical manifestation, diagnosis and treatment of the disease.

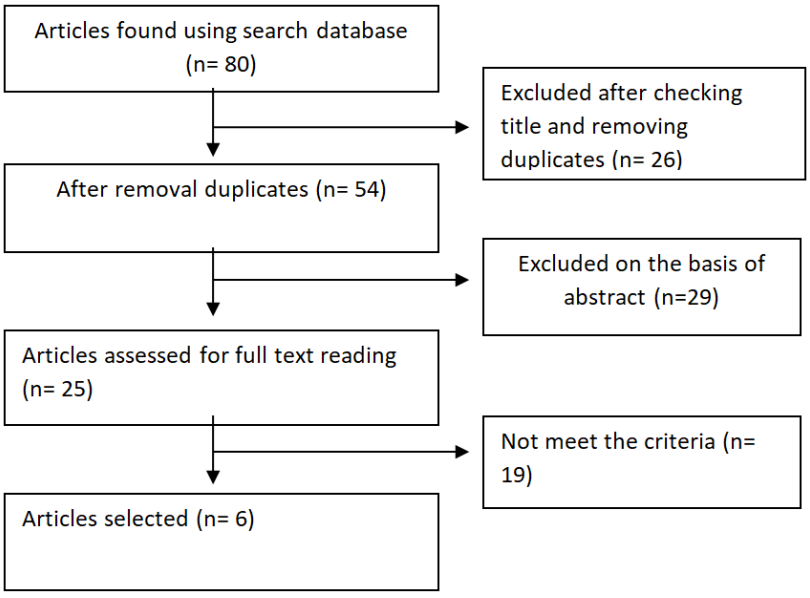

Fig. 1: Search strategy for related articles

RESULTS

The search strategy which is used during this review is shown in Fig. 1. Total six studies were included in this study in which children who diagnosed with Geographical tongue (GT) were treated using different methods. Patient's age, gender, history, related symptoms, prescribed/advised treatment with results have been described in Table 1.

Table-1: Management of Geographic tongue in Children

Reference	Age	Gender	History	Symptoms	Treatment	Results
Purani and Purani, 2014 [17]	6 years	Male	Any significant medical history for skin lesions, illness and hormonal disturbance was not observed No family history of this condition was found	On the dorsal side of tongue, irregular erythematous patches, denuded filiform papillae circumscribed by slightly elevated white keratotic bands on the dorsal surface of the tongue	A anti-inflammatory, non-steroidal drug was recommend first Then 0.1% tacrolimus ointment (Tacroz Forte) was suggested 2 times per day for 10 days	Anti-inflammatory drug did not provide significant result but improvement was found with the application of 0.1% tacrolimus.the tongue's dorsal surface appeared healthy after 10 days and filiform papillae became normal
Nandini *et al.*, 2016[18]	3 years	Male	No contributing history was elicited	On lateral as well as on dorsal surface, lesions of GT was found but with no pain or discomfort	Since this condition is self-limiting and asymptomatic, so oral hygiene, fluid intake and restoration of carious teeth was advised	Re-checkup was advised after three months but they didn't come
Carbone and Aryal, 2019[19]	6 years	Male	No Family history allergic rhinitis was observed but not having any kind of medication	On dorsal surface of tongue, many lesions in shape of incomplete rings Filiform papillae Red scaling patches with yellow or white edges Asymptomatic but sometimes painful.	Patient was asymptomatic, therefore no treatment was recommended	The lesions were completely disappeared on checkup after 15 days
Carbone and Aryal, 2019[19]	7 years	Male	No family history, medication or basic systemic diseases was found	On dorsal surface and lateral sides of tongue multiple lesions Well-defined areas of dekeratinization and flaking of fili papillae.	No treatment was recommended as it is asymptomatic and it had been told to parents that it is self-limited and has periods of exacerbation and remission	After 15 days these lesions were vanished almost completely spontaneously
Khadka *et al.*, 2020[20]	15 months	female	No medical or family history No history of any other skin conditions	Circinate and irregular erythematous patches were found on dorsolateral surface on right side of tongue	It was clinically diagnosed as BMG, parents of patient were counseled and reassured.	No re-checkup was advised as it disappear spontaneously after few days
Khadka *et al.*, 2020[21]	2 years	Female	No history of atopy, drug intake and any kind of skin diseases was found in family and child	Almost half area of tongue was covered with many erythematous circinate patches with elevated borders	The condition was diagnosed as BMG and since it was asymptomatic so maintenance of oral hygiene was recommended	No re-checkup was advised

In a study carried out by Purani and Purani, 2014, a 6 year old boy diagnosed with geographical tongue was first treated with anti-inflammatory, non-steroidal drug but it showed no significant effect. After that 0.1% tacrolimus ointment (Tacroz Forte) was suggested 2 times per day for 10 days. The patient had no medical or family history for this condition. Treatment of tacrolimus improved the tongue condition and after 10 days of treatment, it appeared healthy [17].

Nandini *et al.*, 2016 reported the management of 3 year old child, who is diagnosed with GT. Since this condition is self-limiting and asymptomatic, so oral hygiene, fluid intake and restoration of carious teeth were advised. The patient had no contributing history. Parents were advised for re-checkup after three months but they didn't come [18].

A 6 and 7 years old boy with no family history of allergic rhinitis were diagnosed with asymptomatic geographic tongue so no special treatment was recommended. However, parents were guided about the condition that it is self-limited and has periods of exacerbation and remission. After 15 days the lesions were disappeared completely [19].

Khadka *et al.*, 2020, reported 15 month and 2 years old female children. Both patients were diagnosed with BMG and had no family history of atopy, drug intake or any kind of skin disease. No family history was found. Since it was asymptomatic so maintenance of oral hygiene was recommend.

Fig-2: Geographical Tongue before and after the application of tacrolimus [17]

DISCUSSION

On the whole the prevalence of GT (geographic tongue) is 1-2.5% approximately of the population [21]. This prevalence in the pediatric population is from 0.37% -14.3% with unknown cause [22]. Literature search revealed the prevalence of geographic tongue in pediatric age group worldwide as shown in Table 2.

Table- 2: Prevalence rate of Geographic Tongue (GT)

Country	Year	Prevalence %age of GT
Brazil	2000	21
Spain	2002	4.48
Hungary	2003	5.7
Iran	2003	13.4
Turkey	2003	1.2
Iran	2003	6.2
Brazil	2004	9.8
USA	2005	1.05
Thailand	2005	39.4
Turkey	2005	1.8
Iran	2006	4.9
Iran	2008	27
India	2010	17.2
Jordan	2011	4.8
Turkey	2011	2.68
Colombia	2013	0.8
India	2013	16.4
Iran	2015	7.86

Studies from all over the world showed a great variability in prevalence of GT, which include the prevalence in United States reporting 1.8%, Iran 27%, Libya 17.2% and India 0.84 -16.4%. A study reported the 0.98% prevalence of BMG in central-southern Nepal. Due to inconsistent and asymptomatic nature of GT, it is very difficult to measure the exact prevalence in pediatric group. In children, 0.89% prevalence of geographical tongue was reported [23-29].

For the treatment of GT, application of Topical Tacrolimus has been found effective. Significant improvement was observed with the systemic administration of initial dose of 3mg/kg/day of cyclosporine microemulsion [30]. Discomfort which is caused by GT can be lessened by avoiding tobacco, alcohol, spicy, acidic beverages and fruits, sour and hot food products, salty nuts, whitening agents and toothpaste which has tartar control additives [31].

CONCLUSION

The prevalence of benign migratory glossitis (BMG) or geographical tongue (GT) is not only limited to adults but also observed in children. There is no gold standard treatment is available to treat this condition. However to reduce pain or discomfort caused by this disorder, certain drugs or management techniques like oral hygiene can be prescribed.

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