



Impact of stress on Geographic Tongue In Iraqi population

Dr. Suzan M. Abdulraheem, B.D.S, M.Sc., Assistant Lecturer.

Abstract

Background:Geographic tongue or erythema migrans is fairly common benign condition that primarily affects the lateral aspect and dorsum of the tongue. The pattern of the lesion give the surface of the tongue the appearance of a map, the lesion persists for a short period in one area, disappears within a few days, and then recurs in another area with no apparent reason Although the etiology of the condition is unknown, it may be related to psychological factors. The aim of this study is to evaluate the association between geographic tongue and stress.

Method:This study was performed on 110 individuals; 60 cases with GT and 50 cases without GT. All of them filled a questionnaire of perceived stress scale (PSS) and evaluated by a psychologist.

Results:Among 120 patients selected, 60 persons suffered from geographic tongue, showed significant relationship between the occurrence of geographic tongue and stress especially among females at their third decade.

Conclusion:According to the results, there is a significant association between stress and GT and decreasing stress in GT patients can lead to the healing of the lesion.

Key words: Geographic tongue, stress score, PSS, fissured tongue, smoking.

Introduction

Benign migratory glossitis or geographic tongue (GT) is common benign disorder of unknown etiology, it is usually an asymptomatic inflammatory disorder of multiple sites on the tongue and mostly on its dorsal surface ⁽¹⁾, and the lesion is rarely located in buccal vestibule and labial mucosa. The condition is characterized by migratory erythematous patches, representing atrophy of the filiform papillae that sometimes includes raised whitish peripheral margins that recover spontaneously ⁽²⁾. GT is relatively common and mostly seen among females ⁽³⁾ with considering problems such as burning sensation and sharp pain in tongue ⁽⁴⁾, decreasing taste

sensation, cancer phobia ⁽⁵⁾ and esthetic problem which require treatment. The exact etiology and pathogenesis of geographic tongue is still unknown ⁽⁶⁾, but numerous investigations suggested a number of possible causes ^(7, 8) such as vitamin deficiency ⁽⁹⁾, emotional stress ^(3, 10), family history ⁽¹⁰⁾, fungal and bacterial infections, allergic reactions ^(9,11), hormonal disturbances ⁽¹²⁾, and coincidences with diseases such as psoriasis ^(13, 14), dermatitis, Reiter's syndrome have also been reported ^(15, 16).

Geographic tongue is characterized by periods of remission and exacerbation of varying durations last for days, months or year ^(17, 18). During

remission, the condition resolves without residual scar formation and when recurs, it tends to occur in new locations, thus, producing the migratory pattern. Geographic tongue is usually asymptomatic but discomfort, pain or burning sensation in some cases, most often related to eating hot spicy salty or acidic foods as well as alcoholic drinks^(10, 19), with severity of symptoms varies at different times depending on the disease activity. The problem often resolves spontaneously but may recur later on and never become cancerous and patient will have to learn to live with it. Some studies demonstrated a relationship between geographic tongue and fissure tongue^(3, 6, 10), fissure tongue is asymptomatic condition which appears as grooves on the dorsal surface of the tongue⁽¹⁰⁾. Geographic tongue may occur at any age with no apparent racial predilection⁽²⁰⁾ but according to some investigators; it is more prevalent in younger individuals^(21, 22) whereas Jankittivong and Lanlais stated that the highest incidence of GT in the third decade⁽²³⁾, however, others have found most cases were over 40 years⁽¹⁾.

Regarding gender frequency, geographic tongue was noted more among women as observed by Jankittivong and Langlais who showed that female to male ratio is 1.5:1 between ages of 9 and 79 in Thailand population⁽²³⁾. On the contrary, some authors reported that this condition occurs more frequently in boys^(24, 25) whereas other authors observed no definitive sex predilection^(21, 26, 27).

Psychosomatic factors appear to play a significant role in the etiology of geographic Tongue^(28, 29) as it has been reported that GT lesions arise in connection with pronounced emotional stress. Redman et al found a higher prevalence of geographic tongue in mentally ill patients than in university

students and they also noted that under emotional stress, the student group with GT tended to have more severe lesions⁽²⁹⁾. Such findings support the possible role of psychological factors in the etiology of geographic tongue as confirmed by Alikhan et al who suggest that psychological factors may represent a potentially modifiable risk factor that could influence the frequency of recurrence of GT in adults⁽³⁰⁾.

Patients and methods

The study was performed during the period from September 2014 to February 2015, a study sample from Iraqi population in Bagdad where 120 cases were collected from patients visited specialist in Oral Medicine in Al-Mustansiriya College of Dentistry Clinic, Al-Karamu Dental Clinic, and Al-Yarmulke Dental Clinic. Ten cases were excluded because they were uncooperative and 60 cases were diagnosed with GT based solely on the history and clinical features^(31, 32) and another 50 matching cases were taken as a control group from visitors for routine dental care. Those diagnosed with GT were included in this study regardless of the lesions being symptomatic or not and all of them were healthy and have no family history of GT.

All GT patients were interviewed for their medical history, symptoms, and the nature and migratory pattern regarding the lesions. The clinical evaluation covered any complains of pain and burning sensation and the variations in clinical appearance, location of the lesions, and the association with tongue fissures and ulceration along with exclusion of any case where there was a clear etiological factor for those associated findings. The diagnosis was based on the history

and clinical features without histopathological workup.

An informed consent of participants in the study is obtained and both patient and control groups filled the questionnaires of perceived stress scale (PSS) ^(33, 34) followed by a psychologist evaluation of the results. Perceived Stress Scale score of 13 - 20 points was considered an average score and PSS score of 21 - 40 points was considered a high score.

Pearson chi square test by SPSS software (version 17 Chicago, IL, USA) was used to compare the differences between the geographic tongue and control groups. Significance for the differences between groups was set at $P < 0.05$.

Results

The age range of the study group was between (21 – 59) years and geographic tongue is most prevalent among patients with high PSS in their third and fourth decades with mean age of 28.8 years (table 1). There were 39 women (65%) and 21 men (35%) but 15 males with statistically significant difference for those associated with high PSS ($P < 0.05$) (table 2).

In comparison to control group with mean stress score of 14.8, geographic tongue is significantly associated with stress among patients with mean score of 29.7 which difference was statistically significant ($P < 0.001$) (table 3).

Fissuring of tongue is frequent among patients (65%) and in 18 cases of them were associated with high stress score but its absence is statistically significant ($p < 0.001$) among those with high stress score figures (table 4).

Most frequent location of GT was on the lateral site (45%) and lateral-dorsal (25%) with the former showed the high rates of stress score but no

statistically significant difference between the recorded sites and stress scores (table 5).

Smoking is less frequently recorded among patients (table 6) but burning sensation (35%), ulceration (15%), and pain (20%) were associated with high stress score but not significant statistically (tables 7, 8, 9).

The clinical patterns of GT included a typical form (atrophic patch bounded by a circinate line) and atypical form (atrophic patch without a circinate line). Atrophic GT lesion with circinate borders was most frequent recorded shape (80%) but without statistically significant association with high stress score.

Discussion

Geographic tongue is a transient and recurrent condition characterized by periodic localized loss of epithelium particularly of the filiform papillae on the lateral and dorsal sides of the tongue. The pattern of the red map like areas with white borders which occasionally migrate across the tongue gives an abnormal appearance resembling a map and may involve buccal mucosa ⁽¹⁷⁾. Several factors proposed as possible causative agents of geographic tongue, which include local factors, hormonal disturbances, systemic diseases and psychological factors. Geographic tongue has a wide spectrum of appearance, symptomatology, and clinical presentation varies from asymptomatic to painful and burning ulceration. Management of GT depends upon the clinical presentation and the underlying etiology.

The findings of this study are consistent with earlier reports of western world. The highest frequency of GT in this study was recorded among individuals in their third and fourth decades which is consistent with

studies that approve that the highest incidence of geographic tongue in individuals below 29 years⁽²¹⁻³⁵⁾ and also the highest stress score recorded was among those at their third decade (25.3) which confirm the role of stress rather than the age as the determining factor which finding has been supported by observation of other studies that the prevalence rates of GT lesion have no definite correlation with the age⁽³⁶⁾.

In this study, geographic tongue is seen more frequently among females which corresponds to studies by Mumcu and Jainkittivong who stated that higher female prevalence can be attributed to the influence of hormonal disturbance and oral contraceptive pills to develop or intensify GT lesion^(1, 6, 23, 35-42), whereas some studies reported that GT occurs more frequently in boys^(24, 25) and other studies observed no definitive gender predication^(21, 26, 27).

Stress has been regarded as an important etiologic factor in GT⁽³⁾; however, it may represent also an outcome of GT. This study found a statistically significant correlation ($p < 0.05$) between GT and psychological factors which finding agrees with Alikhani et al who stated that stress may represent a potentially modifiable risk factor that could influence the occurrence and recurrence of GT among adults⁽³⁰⁾. Shulman and Carpenter found no significant relationship between stress and GT⁽¹⁾ which discrepancy may be explained by the fact that Shulman and Carpenter did not use physiological measures of stress such as serum cortisol levels or Slanderer questionnaires for directly addressing stress.

In this study, 39 patients (65 %) with the geographic tongue suffered from the fissured tongue at the same time despite being not statistically significant relationship and such association agrees with Miloglu and

Shulman^(1, 6, 42) which may be explained on genetic basis as showed by Voros – Balog et al and Ghose et al^(24, 25).

In this study, geographic tongue lesions located more frequently on lateral border of the tongue which finding agrees with other studies^(1, 2, 23, 27).

This study showed that geographic tongue is less prevalent among smokers which finding agrees with other studies^(1, 6) that could suggest the protective effects of cigarette on incidence of GT in similar manner to the lower incidence of smoking in cases with recurrent aphthous stomatitis where tobacco products protect the oral mucosa against the irritants as proved through cytological changes of oral mucosal epithelium of increased cellular proliferation and keratinization index. Furthermore, nicotine reduces production of TNF α , Interleukin – 1 and Interleukin – 6 by activating nicotinic receptors on the macrophages. It also reduces inflammation by activation of hypothalamic-pituitary-adrenal (HPA) axis and the autonomic nervous system and production of glucocorticoids⁽¹⁾.

In this study few patients with variable symptoms of mild discomfort, increased salivation, burning sensation and pain which correspond to the activity of the lesion as stated in previous studies^(3, 23) but this association was statistically not significant association with stress score which may highlight the activity of the lesion is not modified by stress management unlike the occurrence of GT. Also 48 cases (80%) of cases manifested atypical appearance of central atrophic area bounded by raised white circinate line, of which 27 cases showed association with high stress score despite being statistically not significant.

Conclusion

This case control study proves there is clear association between GT and stress especially among non-smoker females in their third decade regardless of lesion symptoms, shape, and association with tongue fissuring and decreasing stress can lead to the healing of the lesion.

Further studies are recommended to concentrate on objective stress parameters like physiological measures and corticosteroids among GT patients

References

- 1- Shulman JD, Carpenter WM. Prevalence and risk factors associated with geographic tongue among US adults. *Oral Dis.* 2006; 12:381-386.
- 2- Assimakopoulos D, Patrikakos G, Fotika C, Elisaf M. Benign migratory glossitis or geographic tongue: an enigmatic oral lesion. *Am J Med.* 2002;113: 751-75.
- 3- Neville B, Damm D, Allen C, Bouquet J. *Oral & Maxillofacial Pathology.* 7th ed. W.B. Saunders co; London: 2002. pp. 677–679.
- 4- Greenberg MS, Glick M, DMD. *Burket's oral medicine, diagnosis & treatment.* 10th ed Philadelphia: BC Decker. 2003:115-6.
- 5- Scully C, *Handbook of oral disease, diagnosis & treatment.* 1st ed. UK, Martin Duniz Ltd. 1999; 367-72.
- 6- Miloglu O, Goregen M, Akgul M. The prevalence and risk factors in 7619 Turkish dental out patients. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2009; 107: 29–33.
- 7- Cawson RA. *Essentials of oral pathology & oral medicine,* Elsevier science. 7th ed, 2002: 216-42.
- 8- Murrah VA. Diabetes Mellitus & associated oral manifestations: a review. *J Oral Pathology* 1985; 14: 271-81.
- 9- Redman RS, Shapiro BL, Gorlin RJ. Hereditary component in etiology of benign migratory glossitis. *Am H Hum Genet* 1972; 24: 124-33.
- 10- Greenbreg M, Glick M, Ship J. *Burket's Oral Medicine.* 12th ed. BC Decker; London: 2008. 103–4.
- 11- Regezi J A, Sciubba J. *Oral pathology clinical pathology correlation.* 3rd ed. W.B. Saunders. 1999: 113-14.
- 12- Kullaa - Mikkonen A, Kotilainen R, Alakuijala P. Sialochemistry in mucosal lesions of the tongue: electrolytes and total protein. *Int J Oral Maxillofac Surg* 1986; 15: 318-21.
- 13- Zhu JF, Kaminski MJ, Pulitzer DR. Psoriasis: pathophysiology and oral manifestations. *Oral Dis* 1996; 2:135-44.
- 14- Zargari O. The prevalence and significance of fissured tongue and geographical tongue in psoriatic patients. *Clin Dermatol* 2006; 31:192-5.
- 15- Pimlott SJ. Salicylic acid in alcohol in the superficial migratory glossitis treatment of benign. *J Oral Med* 1984; 39: 192-3.
- 16- Boozer CH, Langland OE, Caillory MB. Benign migratory glossitis associated with lichen planus. *J Oral Med* 1974; 29: 58-9.
- 17- Marks R, Radden BG. Geographic tongue: a clinicopathology review. *Aust J Dermatol* 1981; 22: 75-9.
- 18- Aree Jaikittivong, Robert P. Langlais. Geographic tongue: clinical characteristics of 188 cases. *J Contemporary Dental Practice* 2005; 113 (1).
- 19- Jahanbani J, Sandvik L, Lyberg T, Ahlfors E. Evaluation of oral mucosal lesions in 598 referred Iranian patients. *Open Dent J.* 2009; 3: 42–7.
- 20- Halperin V, Kolas S, Jefferis KR, et. al. The occurrence of fordyce spots, benign migratory glossitis, median rhomboid glossitis, and fissured tongue in 2,478 dental patients. *Oral Surg Oral Med Oral Pathol* 1953; 6: 1072-1077
- 21- Sedano HO, Carreon Freyre I, Garza de la Garza ML, et. al. Clinical orodental abnormalities in Mexican children. *Oral Surg Oral Med Oral Pathol* 1989; 68: 300-311.
- 22- Darwazeh AM, Pillai K. Prevalence of tongue lesions in 1013 Jordanian dental outpatients. *Community Dent Oral Epidemiol* 1993; 21: 323-324
- 23- Jaikittivong A, Langlais RP. Geographic tongue: clinical characteristics of 188 cases. *J Contemp Dent Pract* 2005; 1:123-35.
- 24- Chosack A, Zadik D, Eidelman E. The prevalence of scrotal tongue and geographic tongue in 70,359 Israeli schoolchildren. *Community Dent Oral Epidemiol* 1974; 2: 253-257
- 25- Voros-Balog T, Vincze N, Banoczy J. Prevalence of tongue lesions in Hungarian children. *Oral Dis* 2003; 9: 84-89.
- 26- Redman RS. Prevalence of geographic tongue, fissured tongue, median rhomboid glossitis, and hairy tongue among 3,611

- Minnesota school children. *Oral Surg Oral Med Oral Pathol* 1970; 30: 390-395.
- 27- Konis AB. Geographic tongue. A case report. *N Y State Dent J* 1992; 58: 28-29.
- 28- Saprio SM, Shklar G. Stomatitis areata migrans. *Oral Surg Oral Med Oral Pathol* 1973; 36: 2833
- 29- Redman RS, Vance FL, Gorlin RJ, et. al. Psychological component in the etiology of geographic tongue. *J Dent Res* 1966; 45: 1403-1408.
- 30- Alikhani M, Khalighinejad N, Ghalaiani P, Khaleghi MA, Askari E, Gorsky M. Immunologic and psychological parameters associated with geographic tongue. *Oral Surg Oral Med Oral Pathol Oral Radiol.* 2014;118:68-71
- 31- Van der Waal I, Pindborg J. *Diseases of the tongue.* Chicago: Quintessence Publishing: 1986; 43-46.
- 32- World Health Organization. Guide to epidemiology and diagnosis of oral mucosal disease and conditions. *Community Dent Oral Epidemiol* 1980; 8: 1-26.
- 33- Cohen, S., Kamarck, T., Mermelstein, R. A global measure of perceived stress. *Journal of Health and Social Behavior.* 1983; 24, 385-396.
- 34- Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States. In S. Spacapan & S. Oskamp (Eds.), *The social psychology of health: Claremont Symposium on applied social psychology.* Newbury Park, CA: Sage.
- 35- Banoczy J, Rigo O, Albrecht M. Prevalence study of tongue lesions in Hungarian population sample. *Community Dent Oral Epidemiology* 1993; 21: 224-226.
- 36- Richardson, E.R. (1968). Incidence of geographic tongue and median rhomboid glossitis in 3,319 Negro college
- 37- Yarom N, Contony U, Gorsky M. Prevalence of fissured tongue, geographic tongue and median rhomboid glossitis among Israeli of different ethnic origins. *J Dermatol.* 2004; 209 (2):88–94.
- 38- Mumcu G, Cimilli H, Sur H, Hayran O, Atalay T. Prevalence and distribution of oral lesions: A cross- sectional study in Turkey. *Oral Dis.* 2004; 11:81–7.
- 39- Hashemipour M, Rad M, Dastboos A. Frequency, Clinical Characteristics and Factors Associated with Geographic Tongue. *Shiraz J Dent.* 2008; 9(1):83–92.
- 40- Banoczy J, Szabo L, Csiba A. Migratory glossitis: a clinical histologic review of seventy cases. *Oral Surg Oral Med Oral Pathol.* 1975; 39: 113-121.
- 41- Waltimo J. Geographic tongue during a year of oral contraceptive cycles. *Br Dent J* 1991; 171: 94-6.
- 42- Eidelman E, Chosack A, Cohen T. Scrotal tongue and geographic tongue: polygenic and associated traits. *Oral Surg Oral Med Oral Pathol* 1976; 42: 591-6.

Table 1: Age and PSS in geographic tongue patients

Age group	No. (%)	High	Average	P value
20 – 29	24 (40)	18	6	0.012 (*)
30 – 39	15 (25)	3	12	0.018 (*)
40 – 49	12 (20)	9	3	0.08
50 – 60	9 (15)	6	3	0.32
Total	60	36	24	0.12

(*) : significant

Table 2: Gender and PSS in geographic tongue patients

Gender	High	Average	Total (%)	P value
Male	15	6	21 (35)	0.04 (*)
Female	21	18	39 (65)	0.6
Total	36	24	60	

(*) : significant

Table 3: Relationship between of GT patient and control with PSS

Presence of GT	High	Average	P value
Present (patient)	44	16	0.0001 (*)
Absent (control)	11	39	0.001 (*)
P value	0.0001 (*)	0.0002 (*)	

(*): significant

Table 4: Association of fissure in geographic tongue with PSS

Fissure	High	Average	No. (%)	P value
Present	18	21	39 (65)	0.6
Absent	18	3	21 (35)	0.0006 (*)

(*): significant

Table 5: Localization of GT with PSS

Site of GT	High	Average	No. (%)	P value
Lateral	18	9	27 (45)	0.08
Dorsal	3	6	9 (15)	0.3
Lateral – anterior	6	3	9 (15)	0.3
Lateral – dorsal	9	6	15 (25)	0.4

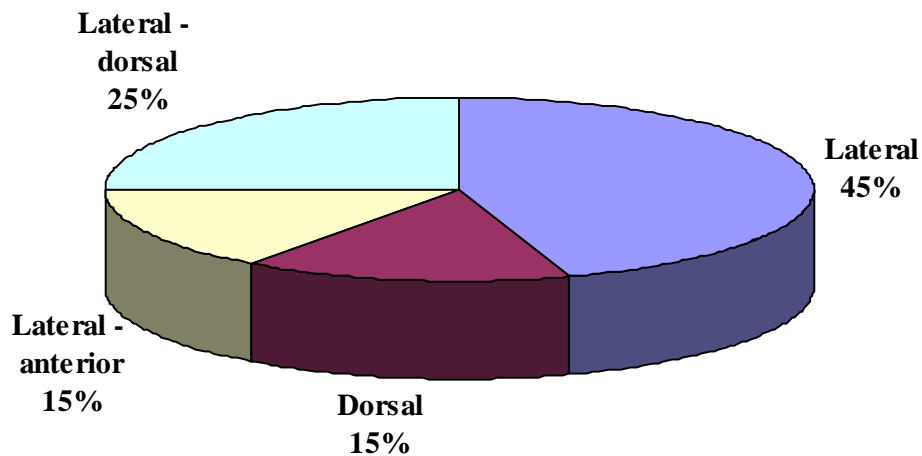


Table 6: Association of smoking with GT patient

	Patient	Control	P value
Smoker	23	28	0.06
Non smoker	37	22	
P value	0.08	0.4	

Table 7: Association of burning sensation with PSS

Burning	High	Average	No. (%)	P value
Present	15	6	21 (35)	0.4
Absent	21	18	39(65)	0.6

Table 8: Association of ulceration with PSS

Ulceration	High	Average	No. (%)	P value
Present	6	3	9 (15)	0.3
Absent	30	21	51 (85)	0.2

Table 9: Association of pain with PSS

	High	Average	No. (%)	P value
Painful	6	6	12 (20)	1
Painless	30	18	48 (80)	0.8

Table 10: Association of clinical patterns of GT lesion with PSS

Type of atrophic GT lesion	High	Average	No. (%)	P value
With circinate borders	27	21	48 (80)	0.3
Without circinate borders	9	3	12 (20)	0.8

	Never	Almost Never	Sometimes	Fairly Often	Very Often
B.1. In the past month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
B.2. In the past month, how often have you felt unable to control the important things in your life?	0	1	2	3	4
B.3. In the past month, how often have you felt nervous or stressed?	0	1	2	3	4
B.4. In the past month, how often have you felt confident about your ability to handle personal problems?	0	1	2	3	4
B.5. In the past month, how often have you felt that things were going your way?	0	1	2	3	4
B.6. In the past month, how often have you found that you could not cope with all the things you had to do?	0	1	2	3	4
B.7. In the past month, how often have you been able to control irritations in your life?	0	1	2	3	4
B.8. In the past month, how often have you felt that you were on top of things?	0	1	2	3	4
B.9. In the past month, how often have you been angry because of things that happened that were outside of your control?	0	1	2	3	4
B.10. In the past month, how often have you felt that difficulties were piling up so high that you could not overcome them?	0	1	2	3	4