CASE REPORT

Treatment of geographic tongue with topical tacrolimus

Jigar M Purani,¹ Hiral J Purani²

¹Department of Oral Pathology,
Faculty of Dental Science,
Nadiad, Gujarat, India
²Department of Periodontia,
Faculty of Dental Science,
Nadiad, Gujarat, India

Correspondence to
Dr Jigar M Purani,
puranijigar@rediffmail.com

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SUMMARY

Geographic tongue is an inflammatory condition of the dorsal surface and lateral border of the tongue, which may be asymptomatic. This article presents a case of geographic tongue in a 6-year-old child. Successful management was achieved with topical application of 0.1% tacrolimus.

BACKGROUND

Geographic tongue was first reported by Rayer in 1831. Other terminologies used for this condition are benign migratory glossitis, wandering rash of the tongue, marginal exfoliative glossitis, transitory benign plaque of the tongue and exfoliatio areata linguae.^{1 2} Owing to inflammation of the lingual mucosa, some areas of filiform papillae lose their architecture and an appearance of irregular erythematous patches or ulcers become evident.³ Although the dorsal surface is non-ulcerated, it gives an ulcerated appearance due to the lack of keratinisation and depapillation of filiform papillae. The red areas are surrounded by white, grey or yellow bands, which may be slightly elevated from the surface. The reasons for white bands are the accumulation of keratin and neutrophils and regeneration of filiform papillae. These erythematous patches and white bands change their location, size and appearance over a period of time and so 'migratory', 'migrans' or 'wandering' terminologies are used to describe the condition.¹ The word 'geographic' is used to describe this disorder because the changing pattern of red and white areas on the dorsal surface of the tongue looks like a map.² When the same condition occurs in other areas of the oral cavity, various terminologies such as geographic stomatitis, erythema migrans, annulus migrans, erythema areata migrans and areata stomatitis migrans have been used.^{1 4} Aetiology of this disorder is still not known. The possible reasons are congenital, hereditary, emotional stress, allergic tendency, hormonal disturbances, nutritional deficiency, psychological disturbances, anaemia and spicy foods. This condition may coexist with certain other diseases such as psoriasis, pityriasis, seborrhoeic dermatitis, juvenile diabetes, lichen planus, candidiasis or Reiter's syndrome. Remarkable evidences have not been established between the suggested aetiological factors and geographic tongue until now.¹⁻⁵

CASE PRESENTATION

Parents had brought their 6-year-old boy who presented with an abnormal appearance of the tongue.

On general clinical examination, the child appeared normal, healthy, well nourished and well developed. On intraoral clinical examination, there was a presence of irregular erythematous patches suggestive of denuded filiform papillae circumscribed by slightly elevated white keratotic bands on the dorsal surface of the tongue that could not be scraped off ([figure 1](#)). There was no symptom of oral discomfort such as burning, pain or increased salivation. All other areas of oral cavity were normal. His skin examination did not reveal any pathological condition. The patient's mother reported the lesion on her child's tongue since his first year. However, the lesion regressed and recurred intermittently, so she neglected the condition. The lesion had now remained stationary for a few days so, with anxiety, she reported her child. There was no significant medical history of major illness, skin lesions or hormonal disturbances. The patient was not allergic to specific food, flavouring agents or medications. There was no history of such a condition in any other family members. As the condition was asymptomatic, treatment was not administered. The parents were assured about the nature and behaviour of the lesion and were asked to visit again if the lesion made the child uncomfortable.

After 10 months, the parents brought the child back to us with the same condition, but with pain. There was a presence of denuded filiform papillae at the tip and centre with irregular white keratotic bands on the dorsal surface of the tongue ([figure 2](#)). The erythematous tip of the tongue, burning sensation and long-standing lesion without regression made his mother worried. There was no significant

Figure 1 Clinical photograph showing areas of denuded filiform papillae bound by white keratotic bands 1 year earlier.

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Figure 2 Clinical photograph showing areas of denuded filiform papillae with keratotic bands before topical application of tacrolimus.

Figure 3 Clinical photograph showing the improved dorsal surface of tongue after topical application of tacrolimus.

history of major illness, medications or allergy in the last 1 year. A non-steroidal anti-inflammatory drug was prescribed to treat the condition but it did not give any significant results. Thereafter, topical application of 0.1% tacrolimus ointment (Tacroz Forte) was suggested twice daily for 10 days and remarkable improvement in the condition was achieved.

INVESTIGATIONS

Blood investigations confirmed that the child was not anaemic or a juvenile diabetic. Exfoliative cytology ruled out fungal infection. Biopsy was not performed as asymptomatic clinical appearance with history of migratory pattern over a period of time itself was sufficient for diagnosis, thus the child was spared discomfort from an invasive procedure.

DIFFERENTIAL DIAGNOSIS

In this case, migration of erythematous patches with white bands on the dorsal surface of the tongue over a period of time with photographic records was sufficient for the diagnosis. All the same we had to rule out certain lesions or conditions such as chemical burns, candidiasis, neutropaenia, psoriasis, lichen planus, squamous cell carcinoma and Reiter's syndrome. According to history given by the child's mother, there was no evidence of chemical burns, which would have healed in a few days; and there are no chances of recurrence in chemical burns without exposure to stimuli. The child was healthy and well developed with very good oral hygiene without having a major illness until now, so occurrence of candidiasis was not possible and exfoliative cytology did not show an evidence of it. Blood investigations suggested that the child was not suffering from anaemia, juvenile diabetes or neutropaenia. General examination confirmed the absence of psoriatic skin lesions, which are usually associated with geographic tongue. Lichen planus, squamous cell carcinoma and Reiter's syndrome are very rare oral findings in children and the lesion in this case showed the episodes of healing and recurrence. There were no evidences of characteristic Wickham's striae for lichen planus and long-standing non-healing ulcer or cervical lymphadenopathy, suggestive of squamous cell carcinoma.

TREATMENT

When the patient came 1 year earlier, no treatment was given as the condition was asymptomatic and the parents were informed about the innocent nature of the lesion. When the child came in

pain 10 months after the first examination, treatment with a non-steroidal anti-inflammatory drug was not successful. Finally, therapy with 0.1% tacrolimus ointment (Tacroz Forte) twice daily for 10 days was recommended.

OUTCOME AND FOLLOW-UP

After using a topical application of 0.1% tacrolimus ointment for 10 days, significant improvement was observed in the patient's condition (figure 3). On clinical examination, the filiform papillae became normal and the architecture of dorsal surface of tongue appeared quite healthy.

DISCUSSION

About 1–3% prevalence of geographic tongue has been reported in the general population with higher frequency in women with a ratio of 2:1.⁵ Very few cases have been reported in children^{4 5} and we found this condition in a 6-year-old child with a history of the lesion since first year of age. Patients may report of oral discomfort such as burning, pain, excessive salivation and unpleasant taste.^{1 5} The patient was asymptomatic a year earlier to recovery, which was a similar finding with other studies.^{4 5} Then he developed pain which was also noticed by Sigal and Mock¹ in two children. Treatment is not recommended if this condition is asymptomatic, however, the patient should be informed about the benign and self-limiting nature of the disorder.^{1 4} Topical anaesthetic rinses or gels, or non-steroidal anti-inflammatory drugs for symptomatic care, antihistamines in case of evident allergic aetiology, topical corticosteroids for ulcerative type lesion, antifungal rinses with candida infection, or antibacterial or sodium bicarbonate rinses are various treatment options for geographic tongue.^{1 5} Two children with oral pain due to benign migratory glossitis were treated successfully with topical and systemic antihistamine by Sigal and Mock.¹ In the present case, treatment with a non-steroidal anti-inflammatory drug did not succeed in resolving the condition. As there was no evidence of ulcer, infection or allergy, other above-mentioned treatments were not administered. Owing to the presence of an irregular circinate and psoriasiform pattern over the dorsal surface of the tongue, we recommended topical application of 0.1% tacrolimus for 10 days; as a result, the clinical condition improved significantly. Until now, only one study has been reported in literature by Ishibashi *et al*,³ who successfully treated persistent and painful geographic tongue with 0.1% tacrolimus ointment in two adult patients. The remission of the

condition may be a natural course but we believe that a long-standing painful condition was definitely cured by topical tacrolimus. With the help of some animal studies and a few case reports, the Food and Drug Administration has issued the information about a potential cancer risk with the use of tacrolimus.⁶ Several studies were performed to examine the efficacy of tacrolimus in oral lichen planus and plaque psoriasis and some of them also got promising results with long-term intraoral usage without malignant transformation.^{7–15} All the reference studies of the carcinogenic potential of tacrolimus suggest that systemic long-term usage or long-term topical application of the drug either cutaneously or orally may lead to carcinoma.^{16–18} However, in the present case, tacrolimus was used only for 10 days. As short term application of tacrolimus can cure geographic tongue without any adverse effect or patient discomfort, this medication was recommended intraorally. We also recommend a clinical trial to study the efficacy of tacrolimus in geographic tongue but the incidence of the lesion is so low that to perform a clinical trial would be difficult.

Learning points

- Comparison of photographic records over a period of time for tissue changes on the dorsal surface of the tongue is sufficient to confirm the diagnosis of geographic tongue.
- Topical application of 0.1% tacrolimus is helpful in the treatment of geographic tongue.
- Geographic tongue may be symptomatic in children.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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