

## Median rhomboid glossitis as a sign of undiagnosed diabetes mellitus - a case report

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### ABSTRACT

**Background:** Median Rhomboid Glossitis (MRG) is included in the group of nodular-plaque-like candidiasis, a subtype of chronic hyperplastic candidiasis. A lot of literature suggests that MRG is a manifestation of Diabetes Mellitus (DM), but the association between DM and MRG is unclear until now. This article reports an MRG found in an undiagnosed diabetes mellitus patient.

**Case:** In October 2019, A 71-year-old man came to RSGM Universitas Jember to fix his loose denture. In the oral examination, we found a well-bordering, atrophic oval area surrounded by thick- soft white plaque. In his leg, we found itchy papule, ulcer, and crust multiple lesions. The microscopic examination of the white plaque swab showed that the spore and hyphae were found to fill all fields of view. The direct sugar blood level test showed that the sugar blood level was 390 mg/dL. We diagnosed the patient as having an MRG associated with suspected DM. The patient was given miconazole oral gel and recommended to use it after cleaning the tongue three times a day. For diabetes management, the patient was referred to the Unit Medical Center University of Jember. The patient was diagnosed with diabetes mellitus and given oral-antidiabetics. After two weeks, the atrophic area had improved, and the white plaque had disappeared.

**Conclusion:** General practitioners must be aware if they find the MRG in their patients caused a probability of underlying undiagnosed systemic disease, particularly diabetes mellitus on them.

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## INTRODUCTION

Median rhomboid glossitis (MRG) is a type of chronic oral candidiasis. In the last classification of oral candidiasis, MRG was included in the chronic hyperplastic nodular-plaque-like subtype. MRG clinically presents as an erythematous atrophic lesion on the posterior middle line of the tongue. The lesion is formed by atrophic filiform papillae that are oval and sometimes lobulated.<sup>1</sup>

Only recently, the pathogenesis of MRG is still not known with certainty. At first, MRG was considered a growth disorder.<sup>2</sup> Furthermore, because of histopathology examination, the lesions showed the presence of hyphae, MRG was considered a type of oral candidiasis lesion. The predisposing factors of the diseases were smoking, using dentures, and inhaling steroids.<sup>3</sup> Subsequent studies have shown the relationship between MRG and immune deficiency, HIV infection, and diabetes mellitus<sup>3</sup>.

Because of the increasing prevalence of diabetes mellitus and this disease's significant influence on dental treatment, the dentist must recognize lesions that are manifestations of diabetes mellitus, especially in undiagnosed patients.

In this article, we present a case report of MRG in a patient that had not been /undiagnosed with DM. The patient came to fix a loose denture. We hope this article can be used as additional information for dentists that MRG may be a sign of DM in a patient.

## CASE REPORT

In October 2019, A 71-year-old man c came to the RSGM Universitas Jember because of his loose dentures. Due to the front office examination that a thick white plaque covered his tongue, he was referred to the Oral Medicine Department. In the anamnesis, the patient had felt the tongue was thick since two months ago. The patient has smoked in the last four years ago, about 12 cigarettes per day. The anamnesis resulted in he did not have any symptoms of systemic diseases.

The general examination resulted in the patient's BMI being 25.7 (overweight) and found no abnormalities in vital signs. On his leg, we found many scars, macules, papules, and itchy crusts on the feet. He said that the cause was due to allergies and insect bites. He never went to the doctor because of his low-income economic status.



**Figure 1.** On the patient's tongue, at the first visit on the middle posterior site, there is a well-defined atrophic papilla with a rhomboid shape, length of about 1.2 cm, smooth surface, and reddish colour. The area around of atrophy was covered with yellowish-white and soft plaque. The tip of the tongue showed an atrophic papilla without clear borders.

The intraoral examination showed atrophy on filiform papillae, well-demarcated, length of about 1,2 cm, reddish colour, smooth surface, rhomboid in shape, on the posterior of the middle tongue. Around the atrophic area was covered with white plaque, which could be scraped, but was not completed, washed out, and not painful (figure 1). The patient is edentulous, alveolar ridge and palate have thin, transparent hyperkeratosis. The one-third tip of the tongue shows filiform papilla atrophy, not demarcated, pale in colour, and painless.

After clinical examination, we diagnosed median rhomboid glossitis with a fungal infection. A direct microscopy examination of the swab on the white plaque around the atrophic lesion confirmed the diagnosis of fungal infection. The white plaque was first cleaned with a cement spatula to remove debris, then scraped directly on the lesion, placed on a glass object, dripped with KOH for fixation, and covered with a covered glass. Microscopy examination showed that candida hyphae covered 75% of the visual field with a magnification of 100 times. After cleaning the tongue, the patient was treated with miconazole oral gel three times a day.

The high B and C containing zinc multivitamins were prescribed to improve the immune system.

Because of the characteristics of the lesions on the patient's legs, the MRG, and severe oral candidiasis of the oral cavity, we suspected he had diabetes mellitus. We did a blood sugar check with a blood strip test. The result showed that the sugar blood level was 390 mg/dL. He was referred to UMC UNEJ for further DM management. The patient was confirmed to have diabetes mellitus, and the fasting blood sugar examination results were 139 mg/dL (N=70 to 130 mg/dL). The patient was given oral antidiabetics to control their blood sugar levels. The routine blood test resulted in the monocyte differential counting, which increased by 10.8% (N: 3-7%). The leucocyte count was 6,500 / $\mu$ L. The absolute monocyte count was 702/ $\mu$ L= 0,7x10<sup>9</sup>/L. The normal absolute monocyte count ranges from 0.2–0.8 × 10<sup>9</sup>/L in adults. Even the differential counting of monocyte was increased, but the absolute monocyte count was in the normal range. The absolute monocyte in man tend to be higher than in women. <sup>4</sup>



**Figure 2.** The patient's tongue at the next visit (a) At the 2nd visit, the MRG lesion was still visible, but the colour was almost like the surrounding. The plaque around the MRG lesion began to thin, and the atrophic tip of the tongue was no longer visible (b) At the 3rd visit, a week later, the atrophic MRG lesion was still in place, but the surface and colour were almost the same as the surrounding, the white plaque was no longer visible.

On the 2nd visit, the MRG lesions were still visible, but the colour was almost similar to the

surrounding. The plaque around the MRG lesion began to thin out, and the atrophic on the tip of the

tongue was no longer visible (figure 2a.) He said that he took the medicines as recommended, and they had no side effects. The Miconazole oral gel and multivitamins were continued. At the 3rd visit, a week later, the atrophic MRG lesion was still present, but the surface and colour were almost the same as the surrounding, and the white plaque was no longer visible. (Fig. 2b)

## DISCUSSION

The etiology of MRG still needs to be clarified recently. Initially, MRG was considered a growth and development disorder of the tongue.<sup>2</sup> That is believed to be a developmental anomaly due to the persistence of a midline embryonic structure known as the tuberculum impar.<sup>5</sup> Subsequent developments of research, MRG was included in one type of candida infection because many studies proved the role of candida in developing these lesions. Other paper has an opinion that MRG due to pernicious anemia (vitamin B12 deficiency), deficiency of riboflavin, niacin or pyridoxine; sprue, iron deficiency anemia, also associated with jagged teeth, ill-fitting dentures, rarely syphilis, burns and ingestion of corrosive chemicals.<sup>6</sup> Epidemiological studies showed that this disease is associated with bad smoking habits, denture users, and inhaled steroids which are local predisposing factors for oral candidiasis.<sup>1,7</sup> The later reports and studies proved the association between a decreased immune system and MRG, like HIV infection and diabetes mellitus.<sup>8</sup>

In this report, we present the MRG accompanied by chronic candidiasis in undiagnosed diabetes mellitus in old age men with low economic status. Studies have reported that diabetic patients have an increased predisposition to oral candidiasis, including MRG, denture stomatitis, and angular cheilitis<sup>9</sup>.

A study of candida colonization in diabetic patients showed that the percentage of candida colonization in the oral cavity of type 1 diabetic patients was 84%, whereas in type 2 patients was 68%, while in healthy people, is 27%. This increase is due to the xerostomia and is exacerbated if the patient's blood sugar is poorly controlled.<sup>5</sup> There is also an opinion that oral candidiasis occurs due to increased sugar levels in saliva and a decrease in the patient's immune system.<sup>10</sup> A study of 202 patients with DM in Iran showed a significantly increased incidence of MRG in diabetic patients compared to controls. MRG was detected in 6.43% of diabetic patients and only 1.53% of nondiabetic patients.<sup>11</sup>

Many studies proved the association between candida infection and MRG. In a Turkish study of 4244 patients, Candida species have detected in 90.0% of patients with MRG, significantly different from controls without MRG (46.6%). Multivariate logistic regression test showed that the MRG was related to diabetes mellitus.<sup>12</sup>

The histopathologic pattern of MRG is the bulbous, elongated epithelial rete ridges resembling psoriasis, loss of the lingual papillae, parakeratosis of the epithelium, and infiltration of inflammatory cells in the submucous area. The presence of candida hyphae in the superficial epithelium is the diagnostic feature of MRG.<sup>13</sup> Atrophic stratified squamous epithelium overlying moderately fibrotic stroma with chronic inflammation and pseudo-epitheliomatous hyperplasia (PEH) associated with chronic candida infection also showed in MRG.<sup>6</sup> The last feature is consistent MRG with the lobulated atrophic lesion.

The MRG could mimic oral squamous cell carcinoma (OSCC). It is because MRG could present histologic features of pseudo-

epitheliomatous hyperplasia (PEH), clinically present as erythroplasia. The patient could have terrible symptoms, especially in cancerphobia patients. A case report presented an 82-year-old white man with an MRG mimicking OSCC and an incisional biopsy based on the clinical diagnosis. Histopathologic analysis showed a hyperplastic of epithelial tissue, some mitotic cells, and epithelial pearl. There was no vascular, lymphatic, or perineural invasion. The immunohistochemistry analyses by Ki-67 are positive only in nuclear-positive basal cells. The histopathological features were compatible with median rhomboid glossitis.<sup>14</sup> The differential diagnosis includes erythroplasia, geographic tongue, granular cell tumour, gumma (tertiary syphilis), granuloma lesion off tuberculosis, and erythematous candidiasis .<sup>13</sup>

Diabetes mellitus is a carbohydrate metabolic disease leading to hyperglycemia. Diabetes mellitus is classified into type 1, type 2, maturity-onset diabetes of the young (MODY), gestational diabetes, neonatal diabetes, and secondary causes due to endocrinopathies, etc.<sup>15</sup> Type 1 diabetes is caused by the destruction pancreas's betta cells, usually because of autoimmune reaction and account for 5% to 10% of all cases of diabetes. Type 2 diabetes accounts for 85% to 90% or more of diabetes cases. Type 2 diabetes is the most common type of DM caused by the defect of insulin receptors associated with genetic factors. In DM, glucose is unable to enter the cell, leading to a cell lack of energy.<sup>16</sup> The consequences of that fact are impairment of cell function, proliferation, and decreased defense against injury and necrosis happen quickly.

*C. albicans* is an opportunistic microorganism in the oral cavity. The infection can occur if there is a decrease in the immune system in the oral cavity. According to the author's experience, the most common infection is a chronic

infection caused by prolonged and mild reduction of the oral immune system.

There is no significant relationship between MRG with age, gender, duration of suffering from DM, FBS, and A1c.<sup>11</sup> The A1c, known as HbA1C (hemoglobin A1c, glycated hemoglobin, glycosylated hemoglobin) test, shows an average blood sugar level over the past 90 days and represents a percentage.<sup>19</sup>

Oral manifestations of uncontrolled diabetes can include xerostomia, burning sensation in the mouth, impaired/delayed wound healing, increased incidence and severity of infection, secondary infection with candidiasis, enlargement of the parotid salivary glands, gingivitis, and/or periodontitis.<sup>16</sup> Periodontitis is easier to occur, which leads to pathological bone resorption. In addition, in diabetes, decreased immune system function can cause the wound-healing process to be disrupted.<sup>17</sup> The mechanisms of diabetes mellitus act as a predisposing factor of oral candidiasis are higher salivary glucose levels, reduced salivary flow, microvascular degeneration, the impaired candidacidal activity of neutrophils, secretion of several degradative enzymes, and even a generalized immunosuppression state of the patient.<sup>18</sup>

The prevalence of diabetes mellitus in the world in 2019 is about 9.3% (436 million people), predicted at 10.2% in 2030 and in 2045 at 10.9%. This prevalence also includes the estimated number of undiagnosed DM.<sup>20</sup> The data International Diabetes Federation (IDF), the prevalence of DM in Indonesia is the 7<sup>th</sup> out of 10 countries with highest number of diabetes patients. More than 10.8 million people were suffering from diabetes in 2020.<sup>21</sup> The authors suspect this does not represent the true prevalence considering that many patients are undiagnosed and unrecorded. Factors causing the diabetes mellitus undiagnosed

include the patient does not feel symptoms, low socioeconomic status, and educational level.

## CONCLUSION

Given the high prevalence of diabetes mellitus in Indonesia and the possibility of many undiagnosed patients from middle to lower economic groups, a dentist must always be aware of the probability of diabetes mellitus in their patient. Through both history taking or signs of diabetes intra-oral and general and extra-oral conditions of the patient, a dentist can detect and manage their patient appropriately and avoid the complication that are common in diabetic patients.

## CONFLICT OF INTEREST

All authors declare that we have no conflicts of interest.

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