Research Article

Serum ferritin level and B12 in a sample of Iraqi recurrent aphthous stomatitis patients

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Abstract: Background: With a frequency of 50–66%, recurrent aphthous stomatitis (RAS) is one of the most prevalent conditions affecting the oral mucosa. It is unknown how common hematinic deficiencies, such as those in vitamin B12 and ferritin, affect the prevention and progression of RAS. Numerous investigations have shown that individuals with RAS have a significant frequency of hematinic deficits. This research compared patients with recurrent aphthous ulcers and healthy controls' serum levels of ferritin and vitamin B12.Subjects, Materials and Methods: Patients who need blood testing to rule out anemia between November 2020 and May 2021 provided the data. The institutional ethics committee gave its approval to the project. 5ml of blood was taken from patients and controls in educational labs after they had provided their demographic information (age, gender, occupation, and residance). The serum was then centrifuged at 3000 rpm for 10 minutes before being stored at -20°C until serum ferritin and vitamin B12 levels were determined. The information was presented as Mean ± SD. when comparing biochemical parameters between patients and controls using Students unpaired t-test.A p-value of< 0.05 was deemed statistically significant, while a p-value of< 0.001 was deemed highly statistically significant, Results: A total of 30 RAS patients and 30 healthy control with age and gender matches were included. 40% of the patients had low serum ferritin levels and 56.6% of the patients had low serum vitamin B12 levels, according to statistical analysis of the current study. Significant differences were also seen between the two groups' serum levels of ferritin and vitamin B12.Conclusion: Patients with recurrent aphthous stomatitis require serum ferritin and vitamin B12 measurements. In order to stop the recurrence of aphthous ulceration, it's crucial for people with recurrent aphthous ulcers to consume a balanced diet rich in iron and vitamin B12.

Keywords: ferritin, Serum B12, recurrent aphthous ulceration.

Introduction

One of the most prevalent conditions affecting the oral mucosa, recurrent aphthous stomatitis (RAS) is defined as the occurrence of reoccurring ulcerations exclusive to the oral mucosa. It affects 20% of the general population and up to 60% of some areas of populations [(1)]. According to its clinical characteristics, RAS is typically divided into three clinical forms: minor, major, and herpetiform ulcers. More than 80% of patients with the minor form of RAS are vulnerable to recurrences, with estimates for three-month recurrence rates as high as 50%[(2)]. they typically appear as little round or oval ulcers with erythromatous "halos" and a yellow-grey tint. They typically heal without leaving any permanent scars [(3)].

Despite numerous circumstances, the precise cause of aphthous ulcers is still unknown. Although numerous factors, including smoking, immunological issues, stress, hematological problems, hormone imbalances, infections, vitamin deficiencies, and hereditary factors, have been linked to the pathogenesis of RAS, the actual cause of aphthous ulcers is still unknown [(3,4).] It has been suggested that hematinic deficiencies, such as a deficiency in ferritin, folate, or vitamin B12, may be the cause of RAS. It is unknown how common hematinic deficiencies, such as those in ferritin and vitamin B12, are or what role they play in the prevention and progression of RAS[(5)]. While some research have found no connection between RAS and a deficit in iron, folate, or vitamin B12 [(5, 6)], other investigations have shown a significant incidence of hematinic deficits in RAS patients [(7-9)].

A globular intracellular protein called ferritin accumulates iron and releases it gradually over time. Although ferritin is mostly present in the cytosol of most tissues, it is also released in minute amounts into the serum, where it serves as an iron carrier. Serum ferritin is utilized as a diagnostic test for iron-deficiency anemia because plasma ferritin is also an indirect indicator of the total amount of iron stored in the body [10]. Since the discovery and identification of vitamin B12 more than 60 years ago and the realization of its essential role in the serious condition known as pernicious anemia, much has been learned about B12 deficiency.

Vitamin B12, also known as cobalamin, is one of the eight B vitamins [11]. RAS's pathogenesis is unclear, hence diagnosis is solely reliant on history and clinical criteria since there are no available laboratory tests to back up the finding [12]. Because there have been few studies on the association between RAS and serum ferritin and vitamin B12 levels, the current study seeks to assess ferritin and vitamin B12 levels in patients with recurrent aphthous ulcers and healthy controls.

Subjects , Materials and Methods

The data was collected from patients who needed blood analysis to exclude anemia from November 2020 till May 2021. The study was approved by the institutional ethics committee. An oral medicine specialist established the diagnosis based on the existence of round, symmetrical, yellow-white ulcers with a diameter of less than 1 cm and also an erythematous halo surrounded by a detachable membrane that healed completely without leaving any scars. There were exclusion criteria including chronic smokers and alcoholism, patients with a history of medical diseases such as Behcet's disease, hypertension, cardiac diseases, hepatic, renal, hematological disorders, Crohn's disease and ulcerative colitis, subjects on medications such as cytotoxic agents such as methotrexate, non-steroidal anti-inflammatory drugs, sulphonamides, rifampicin and vancomycin [3].

The subjects in the control group without a history of illness and without any RAS lesions at the time of data collection; these were collected from previously documented data. demographic information on patients, including their residence, gender, age, and occupation, From patients and controls, 5ml of venous blood was collected in the educational laboratories, Serum was centrifuged at 3000 rpm for 10 minutes, and it was kept at -20°C until the evaluation. Serum ferritin levels were estimated using ELISA kits from Biocheck USA and vitamin B12 was estimated using IBL kits from the USA. SPSS software, version18.0 (Chicago, Illinois, USA) was used for the statistical analysis. The data was presented as Mean± SD. when comparing biochemical parameters between patients and controls using the unpaired t-test, A P-value of < 0.05 was regarded as statistically significant while a P-value of <0.001 was considered a highly statistically significant.

Results

A total of 30 RAS patients and 30 healthy control were included in the final analysis. Table 1 displays the demographic information of the subjects.

Table 1: Demographic information of the RAS patients and controls**.**

	RAS Patients	**Healthy control**
Number of subjects	30	30
Age (mean± SD)	31.86 ± 5.88	32.4 ± 5.96
Male : Female	14 : 16	13 : 17

Low ferritin levels were seen in 12 RAS patients and 5 controls (p>0.05), While the mean estimates of normal levels of serum ferritin between patients and control were highly significant difference p<0.001. 17 RAS patients and 6 controls had serum vitamin B12 levels that were ≤ 220pg/ml. (p<0.05), It was demonstrated that there was a highly significant difference in the mean estimations of serum B12 and ferritin between RAS patients and healthy controls (p<0.001) as shown in table 2.

Table2: A comparison of serum ferritin levels and vitamin B12 levels in RAS patients and controls.

Variable	**RAS Patients**		**Healthy control**	
	Number	**Mean ± SD**	**Number**	**Mean ± SD**
Serum ferritin (ng/ml)				
Low	12	9.86 ± 4.34	5	8.98 ± 0.93
Normal	18	59.44 ± 26.63	25	91.8 ± 34.16**
Total	30	39.62 ± 32.14	30	77.99 ± 44.17**
Serum B12 (pg/ml)				
Low	17	178.58 ± 30.53	6	208.66 ± 11.57*
Normal	13	396.15 ± 154.31	24	691.5 ± 138.7**
Total	30	272.86 ± 149.6	30	580.33 ± 230.7**
Cut-off values for low levels	B 12 ≤ 220 pg/ml		Ferritin Male ≤ 10ng/ml Female ≤ 20 ng/ml	

*=p<0.05 **=p<0.001

Discussion

In the current study, the serum level of ferritin and vitamin B12 were compared between RAS patients and healthy controls.. The demographic characteristics of the patients and controls showed no statistically significant difference. The most common RAS patients affected were females and between 32- 41 years of age. The age and gender incidence are similar to other studies.

The fact that women have a significant propensity to become anemic may help to explain the increased incidence of RAS in females as indicated by previous research [13]. Several investigations have shown no link between RAS and iron, folate, or vitamin B12 deficiency [5, 6]. While other research has

shown that RAS patients have a significant frequency of hematinic deficits [7-9] . In the present research, statistically significant variations in ferritin and vitamin B12 serum levels were found between the two groups. 40% of the patients in the current research showed low serum ferritin levels., other studies have reported similar but with varying percentages of serum ferritin levels. Some have reported 60% of patients having low serum ferritin levels, while others have reported as low as 20% [3, 14, 15, 16] .

Serum B12 is required for DNA synthesis, and its insufficiency causes megaloblastic anemia, particularly in impoverished nations. Vitamin B12 deficiency inhibits cell-mediated immunity and causes abnormalities in the tongue epithelium and buccal mucosa [3, 17]. Serum vitamin B12 levels were low in 56.6% of the patients in this investigation. Other studies have also reported similar findings but with varying percentages of vitamin B12 deficiency [15, 18, 19, 20] .

Vitamin B12 insufficiency interferes with the metabolism of folate, which can cause folate deficiency [21, 22]. Therefore, in addition to Vitamin B12 measurement, serum folate level should also be measured in cases of RAS.This study also tried to classify the patients and controls into subjects with normal values or low values by specified cut-off values of kits used. Many studies had used their cutoff values in accordance with the local laboratory outcomes. However, most studies only relied on the proportions having low or high positions in the patients and control as whole groups [23, 24]. 70% of patients with recurrent aphthous ulcers improved with hematinic replacement therapy[25]. Future research should ideally have a large sample size and measure the levels of serum folate to investigate the association between RAS and serum folate.

Conclusion

In the current study, low serum ferritin levels were found in 40% of patients, while low serum vitamin B12 levels were observed in 56.6% of patients.. Serum ferritin and vitamin B12 levels must be measured in individuals with recurring aphthous stomatitis. Recurrent aphthous ulcer sufferers must also follow a healthy diet rich in iron and vitamin B12 to avoid aphthous ulcer recurrence.

Conflict of interest: None.

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مستوى الفيريتين في الدم و فيتامين ب 12 في عينة من المرضى العراقيين المصابين بالتهاب الفم القلاعي المتكرر

نور سعد محمد علي

المستخلص:

الخلفية :التهاب الفم القلاعي المتكرر (RAS) هو أحد أكثر اضطرابات الغشاء المخاطي للفم شيوعًا بمعدل انتشار يقارب 50-66٪. إن انتشار نقص الدم بما في ذلك نقص الفيريتين وفيتامين B12 ودورها في الوقاية وتطوير RAS غير معروف جيدًا. أظهرت العديد من الدراسات انتشارًا كبيرًا لنقص الدم في مرضى RAS. كان الهدف من الدراسة هو مقارنة مستويات مصل الفيريتين وفيتامين ب 12 في المرضى الذين يعانون من القرحة القلاعية المتكررة والضوابط الصحية.

الاشخاص والمواد والطريقة: تم جمع البيانات من المرضى الذين يحتاجون إلى تحليل الدم لاستبعاد فقر الدم من نوفمبر 2020 إلى مايو 2021. تمت الموافقة على الدراسة من قبل لجنة الأخلاقيات المؤسسية. بعد تسجيل التركيبة السكانية للمرضى (العمر والجنس والمهنة والعنوان) ، تم سحب 5 مل من الدم من المرضى والضوابط في المعامل التعليمية التي تم طردها عند 3000 دورة في الدقيقة لمدة 10 دقائق ،ثم تم تخزين المصل عند -20 درجة مئوية لتقييم مصل الفيريتين وفيتامين ب 12. تم التعبير عن البيانات على أنها Mean ± SD. يستخدم اختبار الطلاب غير المقيدين لمقارنة المعلومات البيوكيميائية بين المرضى وعناصر التحكم ، واعتبرت قيمة P <0,05 ذات دلالة إحصائية بينما اعتبرت قيمة P <0,001 ذات دلالة إحصائية عالية.

النتائج: تم تضمين ما مجموعه 30 مريضًا من RAS و 30 من الضوابط الصحية العمرية والجنس ، في الدراسة الحالية لوحظت فروق ذات دلالة إحصائية في مستويات المصل من الفيريتين وفيتامين B12 بين المجموعتين ، 40 ٪ من المرضى لديهم مصل منخفض مستويات الفيريتين و 56,6٪ من المرضى لديهم مستويات منخفضة من فيتامين ب 12 في الدم.

الخلاصة: قياس مستويات الفيريتين وفيتامين ب 12 في الدم ضروري لمرضى التهاب الفم القلاعي المتكرر. من المهم أيضًا لمرضى القرحة القلاعية المتكررة اتباع نظام غذائي يحتوي على الحديد وفيتامين ب 12 لمنع تكرار التقرح القلاعي.