Is Salivary Alpha Amylase Useful as a Biomarker of Stress in Oral Diseases?

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Editorial

Although Salivary Alpha Amylase (SAA) has been investigated during past thirty years as a biomarker of stress, still remains certain doubt regarding its utility. Additionally, there has been a lot of debate whether SAA reflects sympathetic activity solely, however, recent data suggested that this is unlikely due to the parasympathetic activity which innervates salivary glands whose product is SAA [1].

Another interesting issue regarding SAA is whether SAA could serve as a biomarker of chronic stress as it has been usually investigated in acute stress. Most of the studies performed investigated SAA as a biomarker of acute stress, i.e. while watching fearful video, participating in the “Fear Challenge Course”, during exams, jumping from plane, however, data are lacking regarding SAA as a biomarker in chronic stress sufferers [2].

Furthermore, the results of the published studies could have been biased by the certain contributing factors such as other SAA activity, SAA interaction with bacteria, salivary flow rate, method of saliva collection, systemic diseases and medications that patients took. Also, smoking leads to the decreased SAA levels, whereas, caffeine and exercise are known to increase SAA levels [3].

1. Due to the known fact that SAA initiates digestion of starch in the oral cavity, it is of utmost importance that patients refrain from eating and drinking before saliva collection. They should also refrain from exercise and smoking.

2. Another important issue is that SAA has an important bacterial interactive function [4], therefore microbial load might interfere with SAA activity. At this point, I am not sure whether determination of plaque index as well as DMFT would be useful before collecting saliva for SAA analysis.

3. Concommitant to the previous remarks, it is known that periodontal disease may affect SAA levels, therefore in every patients CPITN is to be determined and patients with periodontal disease should be excluded.

4. Another important issue is salivary flow rate and methods of saliva collection. Although some authors suggested that salivary flow rate is irrelevant factor when determining SAA levels [5], my opinion as well as from the other authors is that salivary flow rate matters when salivary constituents are analysed [1]. Additionally, methods of saliva collection might influence obtained results. It has been widely accepted that simple spitting or drooling method into calibrated tubes during five minutes [6,7] is to be employed when analyzing SAA.

5. Last but not least, SAA has diurnal pattern of excretion and its secretion is highest at 4-5 PM [8]. Collection of SAA should be performed during morning, at the same time in all participants.

6. Systemic diseases such as (asthma, diabetes) [9,10], hormonal changes [11] as well as use of certain drugs (TCA, BD) [5] are known to influence SAA levels.

The use of SAA as a biomarker of stress in oral diseases has been investigated as well. In orthodontic patients, campos et al. [12] reported that there was no correlation between SAA levels and pain intensity although the patients had significant and progressive increase in SAA levels during assessment period (i.e. after bracket bonding and initial wire insertion).

In patients with periodontal disease [13] found no differences in salivary and serum SAA levels between patients with agressive and chronic periodontitis and healthy controls. However, Rai et al. [14] reported that SAA was significantly correlated with clinical parameters of periodontal disease.

We have measured SAA levels in patients with Recurrent Aphthous Ulcerations (RAU) during acute phase and remission period. Interestingly, we found that SAA levels were increased during remission period (i.e. when patients did not have ulcerations in the mouth) compared to the period when they had ulcerations in the oral cavity. Of course, most of the patients stated that appearance of RAU was correlated to the stressful events. Furthermore, we tested the same patients with RAU regarding STAI-S and STAI-T inventories. The results have shown that RAU patients were more anxious at the time they had ulcerations when compared to the periods when they didn’t have ulcers and in comparison to the control group [15,16].

At the end, although most of the authors reported that SAA levels were increased before stressful situations, some of them reported that the SAA levels were decreased. Therefore, at this point the use of SAA as a biomarker of stress remains questionable.

References


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