

**Evaluation of Salivary and Serum
Oxidative Stress and Neuronal Damage
Markers as Potential Parameters in
Prediction of Ischemic Stroke from Stroke-
Related Diseases**

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BY

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Abstract

Background:

Stroke is considered as the third leading cause of death and an important cause of long-term disability. Ischemic stroke (IS) accounts for 80% of all strokes. Oxidative stress is one of the mechanisms involved in neuronal damage induced by free radical production due to ischemia-reperfusion. The measurement of oxidative stress in stroke would be extremely important for better understanding of its pathophysiology and for identifying targeted therapeutic intervention. The measurement of oxidative stress in the saliva has to be discovered, evaluated and measured in stroke-prone patients to be used as a potential diagnostic aid since the serum and especially the CSF sampling is an invasive, complicated procedure. Moreover saliva like CSF is an ultra-filtrate of serum and using saliva as a diagnostic fluid meets the demands for inexpensive, noninvasive, and accessible diagnostic methodology.

Aim of Study:

To assess the value of saliva as diagnostic tool in addition to serum, in IS patients and to early detect or predict IS from the risk group (RG) patients (hypertension (HT), diabetes mellitus (DM) and heart diseases (HD)) that are highly susceptible for IS attack through measuring the oxidative stress and neuronal damage markers in serum and saliva.

Subjects, Materials and Methods:

One hundred fifty individuals were employed in this study: Fifty of them were patients having IS; Seventy five were sex and age-matched RG patients for IS which involved: twenty five patients with uncontrolled HT, twenty five patients with uncontrolled type 2 DM and twenty five patients with HD; other twenty five were sex and age-matched apparently healthy control individuals. Malonaldehyde (MDA), uric acid (UA), glutathione (GSH), superoxide dismutase (SOD) and neuron specific enolase (NSE) were assessed and measured for all individuals employed in this study.

Results:

The mean levels of serum and salivary MDA, UA, SOD in IS and RG patients were significantly higher than that of healthy control, whereas the mean level of serum GSH in IS and RG patients were significantly lower than that of healthy controls, however, salivary GSH level showed no significant differences. The mean levels of serum NSE in IS and DM patients were significantly higher than that of healthy controls whereas HT and HD showed no significant NSE differences. Salivary NSE level in IS patients, but not RG patients, was significantly higher than that of healthy controls.

Receiver Operating Characteristic (ROC) test results showed that serum MDA, UA, NSE and Salivary MDA, GSH, SOD were significantly accurate in differentiating IS patients from healthy controls and Salivary UA, NSE and serum GSH, SOD was significantly accurate in differentiating IS from both RG patients and healthy controls. However, serum MDA, UA, NSE and salivary MDA, GSH and SOD were not accurate in differentiating IS patients from the whole RG patients.

Conclusions:

1. Saliva can be used as a valuable adjunctive diagnostic tool for measurement of the oxidative stress and neuronal damage in IS patients and RG patients
2. IS and RG (HT, DM and HD) patients are associated with increased oxidative stress which indicated by serum and salivary markers: MDA, SOD, UA, GSH and NSE.
3. The most powerful predictors of IS from RG (according to the significant statistical levels) were serum GSH, serum SOD, salivary UA and salivary NSE.
4. Serum GSH & SOD and Salivary UA & NSE levels should be used as a potential warning markers in stroke-prone individuals which help in preventing those individuals from developing stroke attack through providing a necessary preventive measures.