

Salivary aspartate amino transferase and alanine amino transferase of non-insulin-dependents (Type2) diabetic patients

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Summary:

Background: Diabetes mellitus (DM) is a world-wide chronic metabolic disorder affects relatively high percentage of population. A few information is available in diabetes on the salivary content of enzymes GOT (AST) and GPT (ALT).

Patients and methods: we studied 19 patients (NIDDM, type 2 diabetes mellitus aged 29-67 year). Colorimetric determination of salivary GPT and GOT activity was used.

Results: In the whole saliva of non-insulin-dependent (NIDDM, n=19) diabetic patients and from age-cross-matched healthy subjects (n=19). Saliva concentrations of GOT (43.92 ± 12.8 U/L) in NIDDM patients were higherly significant ($P < 0.001$) than those observed in normal subjects (23.0 ± 8.84 U/L). GPT was higher in NIDDM than in normal subjects (15.63 ± 7.25 , 10.2 ± 7.31 U/L respectively) too.

Conclusion: Determination of cytosolic enzymes GPT&GOT in saliva may be useful for monitoring the diabetic involvement.

Keywords: GOT (AST), GPT (ALT), saliva and diabetes mellitus.

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Introduction:

Diabetes mellitus (DM) is a world-wide chronic metabolic disorder affects relatively high percentage of population (approximately 150 million and expected to rise to almost 300 million by the year 2025)(1,2). Type 2 diabetes mellitus, previously named non-insulin-dependent diabetes mellitus (NIDDM) or adult onest DM, that usually seen in adult or old age and overcome by tablets rather than insulin and in this type, the body is able to produce insulin but this insulin is not very effective (3,4). Type 2 DM is the most common form of diabetes and it is characterized by disorders of insulin action and insulin secretion. About 90-95% of people with diabetes have type 2 (5,6). Various histopathologic changes including parenchymal fatty infiltration, acinar hypertrophy foaming and stratification of duct epithelium have been found in parotid glands of diabetic patients (7,8). With all these findings available studies on saliva in diabetics have shown minor and inconstant alterations consisting of variable reduction in flow rate (9) or increased salivary concentration of potassium (10) and calcium (11). An increased secretion of epidermal growth factor in saliva has been reported in diabetics, but mainly in patients with early or established parasympathetic neuropathy (12). A few information is available in diabetics on the salivary content of enzymes GOT(AST) and GPT(ALT). Musumeci, V. et.al found these enzymes useful in

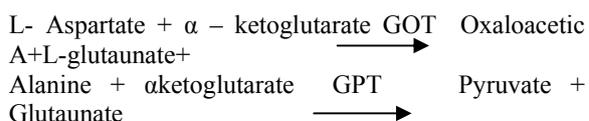
Detecting possible diabetic involvement of salivary glands (13), while Cinquini, et.al. found no significant difference in these enzymes between control and diabetic children (type 1) (14). In this study we evaluated the GOT&GPT levels of activity in saliva of diabetic patients (type 2), as possible indices of diabetic involvement of salivary glands.

Patients and Methods: We studied 19 patients with (NIDDM, type 2 diabetes mellitus aged 29-67 year, duration of disease 2 months – 13 year). And apparently healthy controls (n=19, aged 24 – 67 year). Diabetic were consecutively selected from patients refered to the out patient diabetic clinic of indocrine and diabetic medical center Hospital according to the following inclusion criteria: good oral hygiene and no sign of periodontal disease, no evidence of liver or kidney disease, no hypertension or acute cardio vascular complications, non-smoke and agreement to participate to the study.

Collection of Saliva: Saliva collection was performed 2-3 hours after the patients usual breakfast time and after thoroughly rinsing the mouth with water. Saliva was collected by standard spitting method using chewing then saliva collected in a plane tube and stored at - 20°C. Before use, it was thawed and centrifuged (10 min at 1500 xg), and the supernatant liquid was used for analysis.

GPT and GOT activity: Colorimetric determination of GPT and GOT activity was used according to the following reactions:

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The pyruvate or oxaloacetate formed is measured in its derivated form, 2,4- dinitro- phenyl hydrazone using commercial kits from Biomaghreb (Tunisia). Salivary determinations were performed in duplicate.

Statistical Methods: Data are presented as mean values \pm SD. Statistical differences between the levels in the two groups were determined according to student's t-test.

Results:

Mean values of GOT and GPT found in saliva of normal and diabetic patients are reported in Table (1). GOT concentrations were significantly higher in type 2 DM patients than in normal subjects ($p < 0.001$), salivary GPT concentrations were higher too in diabetic patients than in normal subjects ($p < 0.001$).

Table (1): Aminotransferases in saliva of normals and type 2 diabetes mellitus.

Enzyme	Diabetics (n=19) (Mean \pm SD)	Normal persons (n=19) (Mean \pm SD)	p-Value
GOT (U/L)	43.92 \pm 12.8	23.0 \pm 8.84	$p < 0.001$
GPT (U/L)	15.63 \pm 7.25	10.2 \pm 7.31	$p < 0.001$

In type 2 DM patients, salivary GOT values were correlated with GPT ($r = 0.88$, $p < 0.001$).

No correlation was found between duration of diabetes and salivary GOT and GPT, as shown in Table (2):

Table (2): salivary GOT and GPT activity in relation to duration type 2 DM.

Enzyme Mean \pm SD	Duration of disease		
	Group I <2yr., n=6	Group II 3-7yr., n=8	Group III >8yr., n=5
GOT (U/L)	47.7 \pm 17.97	44.5 \pm 12.1	47.2 \pm 6.45
GPT (U/L)	14.7 \pm 7.87	14.35 \pm 7.89	18.8 \pm 5.7

Discussion:

Whole saliva is known to contain a large number of enzymes and there is general agreement that salivary enzymes may originate not only from salivary glands but also from oral micro organisms, serum – like gingival crevicular fluid, polymorphonuclear leucocytes, epithelic cells and dietary constituents (15,16). Results of the present study showed that patients with type 2 Dm had abnormally high salivary values of Got and GPT, and these results were in

agreement with those of Musumeci, et.al. (13) Study in type 2 diabetic patients (n=16, GOT, 90.94 \pm 19.64 U/L, GPT, 42.78 \pm 14.72) with higher significant ($P < 0.05$) than those observed in normal subjects (n=33, GOT, 33.09 \pm 3.71, GPT, 6.85 \pm 1.52 U/L). Our data were disagreement with the results reported for children by Cinquini, et.al. (14) who reported no significant differences in AST and ALT levels between control and diabetic children (type 1). The correlations observed between salivary GOT and GPT suggest that a common mechanism underlies their elevation in the saliva of diabetics. The increased amount of such enzymes in saliva diabetics may be a scribed to abnormal secretion of concentrated saliva. In addition, leakage of serum macromolecules may occur through damaged basement membranes of salivary glands (17). The contribution of microorganisms, epithelial cells or polymophonuclear leucocytes to the concentration of enzymes in saliva was un minimized in our study by collecting saliva after thoroughly rinsing the mouth and by assay in clear supernatant of centrifuged saliva. Thus it may be reasonable to conclude that at least most of the increased enzymation activity of GOT and GPT found in the saliva of diabetics way come from salivary glands. GOT and GPT are enzymes widedly distributed in animal tissues. They are invariably found in the cytoplasm of cells but isoenzymes of GOT have also been found in mitochondria. Since elevation of these enzymes in serum is known to be produced by their leakage from injured tissues (18), we can assume that their increase in saliva may originate from damage to salivary cells. Changes in salivary flow have been Reported in diabetic with autonomic neuropathy (19), diabetic children (20) and histopathologic changes similar to those found in salivary glands of diabetics have been produced by experimental denervation of glands (21). In conclusion, the results of this study indicate that diabetics have elevated activities in saliva of GOT and GPT, and we need more studies in order to determine the real mechanism of this elevation.

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