Original Article

Assessment Of Total Serum Creatine Phosphokinase And Serum Lactate Dehydrogenase Levels In Patients With Oral Cancer And Oral Leukoplakia

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Abstract

Background: Oral Squamous cell carcinoma (OSCC) is a multistage process, from normal to dysplastic cells (precancerous lesions) and ultimately to squamous cell carcinoma. The present study was conducted to assess total serum creatine phosphokinase and serum lactate dehydrogenase levels in patients with oral cancer and oral leukoplakia.

Materials & Methods: 50 patients of oral cancer and oral leukoplakia of both genders were included. Oral cancer patients were kept in group I (25) and oral leukoplakia in group II (25). 25 healthy controls were kept in group III. 5 mL of venous blood was collected and biochemical estimation of serum CK and LDH levels using Siemens autoanalyzer was done.

Results: Group I had 15 males and 10 females, group II had 16 males and 9 females and group III had12 males and 13 females. The mean LDH level in group I 314.5 IU/L, in group II was 289.4 IU/L and in group III was 140.7 IU/L. The difference was significant ($P< 0.05$). The mean CPK in group I was 70.4 IU/L, in group II was 76.8 IU/L and in group III was 104.5 IU/L. The difference was significant ($P< 0.05$).

Conclusion: Quantification of serum LDH and CK can be potentially used as a biochemical marker, as it is a simple, non-invasive procedure in patients with OSCC and Oral cancer.

Key words: Oral cancer, Oral Squamous cell carcinoma, LDH

Introduction

The term oral cancer encompasses all malignancies that originate in the oral tissues and remains a major public health problem throughout the world as an important case of poor health and illness.[1] The disease is characterized

by high degree of morbidity and mortality (about 50%). Head and neck cancer account for 9.8% of the estimated 644,600 incidental cancer cases in India. Oral Squamous cell carcinoma (OSCC) is a multistage process, from normal to dysplastic cells (precancerous lesions) and ultimately to squamous cell carcinoma.[2]

Classic features may include a white lesion, red lesion, mixed red/white lesion, lump, ulcer with fissuring or raised margins, pain or numbness, loose tooth, unhealed extraction socket, induration, fixation of a lesion to deeper tissues, lymph node enlargement, dysphagia, and weight loss. Many tumor markers and enzyme analyses have been used earlier to aid in the diagnosis of malignancies and premalignant lesions.[3] Blood has become the media of choice for the study of the biochemical markers among all the body fluids. Markers such as carcinoembryonic antigen (CEA), lactate dehydrogenase (LDH), and phosphohexose isomerase (PHI) have been found to be elevated in certain malignancies like in large gut malignancies, hemangiopericytoma, and adenocarcinoma.[4] The enzyme creatine phosphokinase (CK) has been hypothesized as a marker for many cancers like lung, colon, and liver carcinomas.[5] The present study was conducted to assess total serum creatine phosphokinase and serum lactate dehydrogenase levels in patients with oral cancer and oral leukoplakia.

Materials & Methods

The present study comprised of 50 patients of oral cancer and oral leukoplakia of both genders. All gave their written consent for the participation in the study.

Data such as name, age, gender etc. was recorded. Oral cancer patients were kept in group I (25) and oral leukoplakia in group II (25). 25 healthy controls were kept in group III. 5 mL of venous blood was collected from the antecubital vein and was then centrifuged at 3000 rpm for 10 minutes to separate the serum. The serum, thus obtained was utilized for biochemical estimation of serum CK and LDH levels using Siemens autoanalyzer. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table I Distribution of patients

Groups	Group I	Group II	Group III
Status	OSCC	Oral leukoplakia	Control
M:F	15:10	16:9	12:13

Table I shows that group I had 15 males and 10 females, group II had 16 males and 9 females and group III had12 males and 13 females.

Table II Assessment of LDH

Groups	Mean (IU/L)	P value
Group I	314.5	0.01
Group II	289.4	
Group III	140.7	

Table II, graph I shows that mean LDH level in group I was 314.5 IU/L, in group II was 289.4 IU/L and in group III was 140.7 IU/L. The difference was significant (P< 0.05).

Graph I Assessment of LDH

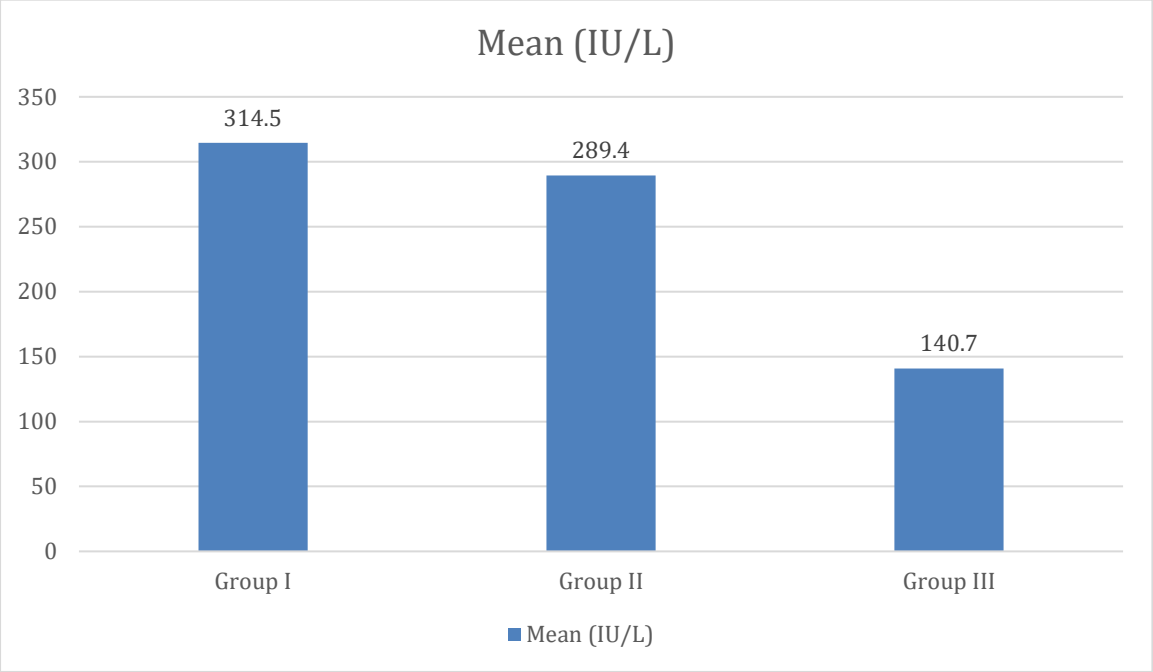
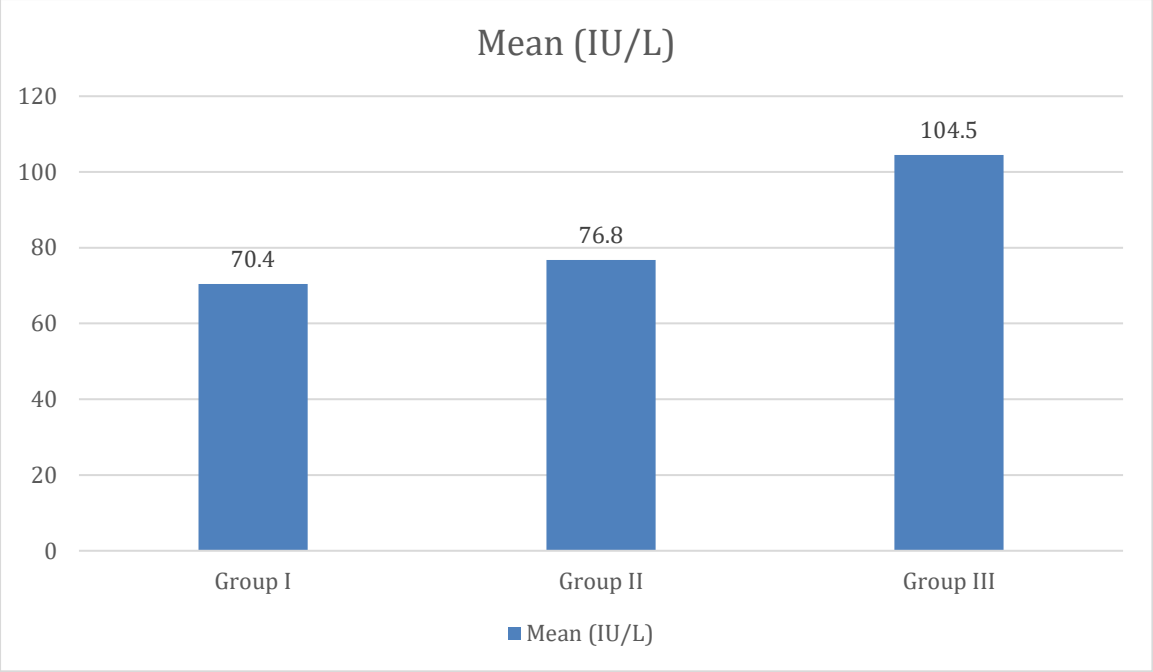


Table III Assessment of serum creatine phosphokinase

Groups	Mean (IU/L)	P value
Group I	70.4	0.01
Group II	76.8	
Group III	104.5	

Table III, graph II shows that mean CPK in group I was 70.4 IU/L, in group II was 76.8 IU/L and in group III was 104.5 IU/L. The difference was significant (P< 0.05).

Graph II Assessment of serum creatine phosphokinase



Discussion

Oral Squamous cell carcinoma (OSCC) is a multistage process, from normal to dysplastic cells (precancerous lesions) and ultimately to squamous cell carcinoma.[6] Oral leukoplakia (OL) is the most commonly occurring precancerous lesion (OPC) of the oral cavity representing 85% of such lesions. The development of cancer is associated with a high glycolytic activity with a shift from aerobic to anaerobic glycolysis.[7] With the increase in the glycolytic activity the concomitant increase in lactate dehydrogenase (LDH) enzyme may be reflected in certain tissues.[8] The present study was conducted to assess total serum creatine phosphokinase and serum lactate dehydrogenase levels in patients with oral cancer and oral leukoplakia.

We found that group I had 15 males and 10 females, group II had 16 males and 9 females and group III had12 males and 13 females. Bhayya H et al[9] included clinically and histopathologically diagnosed oral leukoplakia and oral cancers with 20 patients in each group. The control group consisted of 20 healthy patients without lesions or tobacco-related habits or any systemic diseases. It was found that total serum CK levels were statistically significantly decreased in both oral leukoplakia and oral cancer when compared with that of the control group. Total serum LDH levels were statistically significantly increased in both oral leukoplakia and oral cancer when compared with that of the control group.

We found that mean LDH level in group I 314.5 IU/L, in group II was 289.4 IU/L and in group III was 140.7 IU/L. Swei H. Tsung[10] measured total creatine kinase (CK; EC 2.7.3.2) activity and isoenzyme pattern in normal and neoplastic tissues. Found that CK activity was detected in all the examined tissue and concluded that total CK activity was very low in most tumor tissues.

We found that mean CPK in group I was 70.4 IU/L, in group II was 76.8 IU/L and in group III was 104.5 IU/L. According to Patra S et al.[11], CK activity gradually decreased progressively in the muscle with the progression of malignancy and even undetectable in the final stage of dedifferentiation. Shetty SR et al[12] determined the changes in the salivary alterations in lactate dehydrogenase (LD) levels oral leukoplakia (OL) and oral cancer (OC). Seventy-five patients reporting to department of oral medicine and radiology, were enrolled into the study which includes 25 patients each of oral leukoplakia, 25 of oral cancer and 25 healthy controls (HC). The mean salivary lactate dehydrogenase levels were higher in males in comparison to females in all three study groups OL, OC and HC. The salivary lactate dehydrogenase levels in the controls group, oral leukoplakia group and oral cancer were 79.50 ± 4.67 IU/L, 136.46 ± 3.36 IU/L and 148.77 ± 4.83 IU/L, respectively. There was a significant difference in the mean salivary levels of the above groups.

Shpitzer T et al[13] in a study, involving five salivary parameters, elevated salivary LDH levels were observed in tongue cancer patients when compared to healthy controls. C-C. Liaw et al[14] found higher serum LDH levels in nasopharyngeal carcinoma, and more cases with elevated values were seen in patients with metastatic disease.

The limitation the study is small sample size.

Conclusion

Authors found that quantification of serum LDH and CK can be potentially used as a biochemical marker, as it is a simple, non-invasive procedure in patients with OSCC and Oral cancer.

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