How to Cite:
Mahajan, B., Sahota, J. K., & Ettishree, E. (2021). Assessment of serum and salivary lactate dehydrogenase and uric acid levels in oral squamous cell carcinoma patients. *International Journal of Health Sciences*, *5*(S2), 495–500.
https://doi.org/10.53730/ijhs.v5nS2.10852

Assessment of serum and salivary lactate dehydrogenase and uric acid levels in oral squamous cell carcinoma patients

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Abstract---Background: The present study was conducted to assess serum and salivary lactate dehydrogenase and uric acid levels in oral squamous cell carcinoma patients. Materials & Methods: 62 patients of oral squamous cell carcinoma patients of both genders were enrolled. Patients were divided into two groups. Group I had SCC patients and group II had normal subjects. In all, serum and unstimulated saliva samples obtained and subjected to assessment of lactate dehydrogenase and uric acid levels. Results: The mean serum LDH level (U/L) in group I was 342.8 and in group II was 246.0. The mean salivary LDH level (U/L) in group I was 652.8 and in group II was 248.4. The difference was significant (P< 0.05). The mean serum uric acid (mg/dl) in group I was 6.98 and in group II was 5.12. The mean salivary uric acid in group I was 5.92 and in group II was 5.26. The difference was significant (P< 0.05). Conclusion: OSCC patients had elevated level of serum and salivary LDH and uric acid.

Keywords---oral cancer, lactate dehydrogenase, Uric acid

Introduction

Oral cancer (OC) is the leading cause of cancer mortality among men in India. The aetiology of OC has been linked to cigarette smoking, human papillomavirus

infection, and ultraviolet radiation.[1] OCs have the ability to metastasise to regional lymph nodes before metastasising to distant sites, and this ability to metastasise to regional lymph nodes in patients with oral cancer is recognised as a factor that governs and influences the “disease survival rate” in patients with oral squamous cell carcinoma (OSCC).[2] Development of oral cancer has been linked to high glycolytic activity with a shift from aerobic glycolysis to anaerobic glycolysis. An increase in level of lactate dehydrogenase (LDH) may also occur along with increased glycolytic activity in neoplastic tissues of the thyroid, stomach and prostate.[3] LDH is a biomarker for cancer detection, which is found in almost all cell types. Increased serum levels of LDH isoenzymes have been reported in different cancer types such as the lung, breast, cervical, nasopharyngeal, hematopoietic, and stomach cancers.[4] Similarly, uric acid, found in human blood plasma, is a potent anti-oxidant. Uric acid is produced as a result of purine metabolism, which is catalysed by the enzyme xanthine oxidoreductase (XOR).[6] This anti-oxidant effect of uric acid is evident in a multitude of disease conditions.[7] The present study was conducted to assess serum and salivary lactate dehydrogenase and uric acid levels in oral squamous cell carcinoma patients.

Materials and Methods

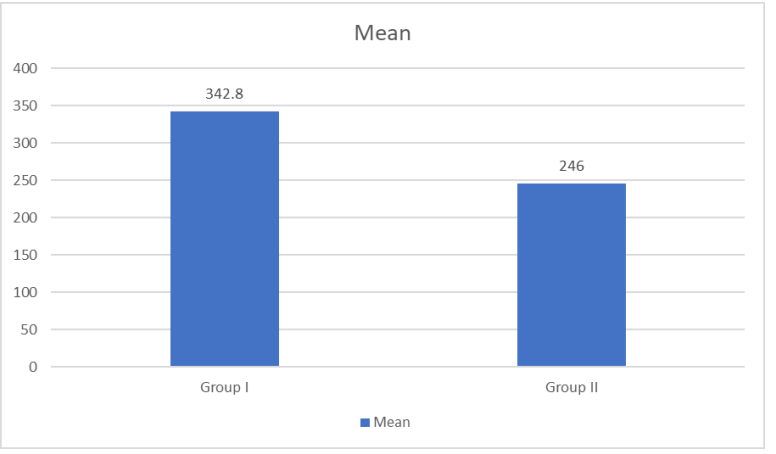
The present study comprised of 62 patients of oral squamous cell carcinoma patients of both genders. The consent was obtained from all enrolled patients. Data such as name, age, gender etc. was recorded. Patients were divided into two groups. Group I had SCC patients and group II had normal subjects. In all, serum and unstimulated saliva samples obtained and subjected to assessment of lactate dehydrogenase and uric acid levels. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table I
Comparison of serum LDH level

Groups	Mean (U/L)	P value
Group I	342.8	0.04
Group II	246.0	

Table I, graph I shows that mean serum LDH level (U/L) in group I was 342.8 and in group II was 246.0. The difference was significant (P< 0.05).

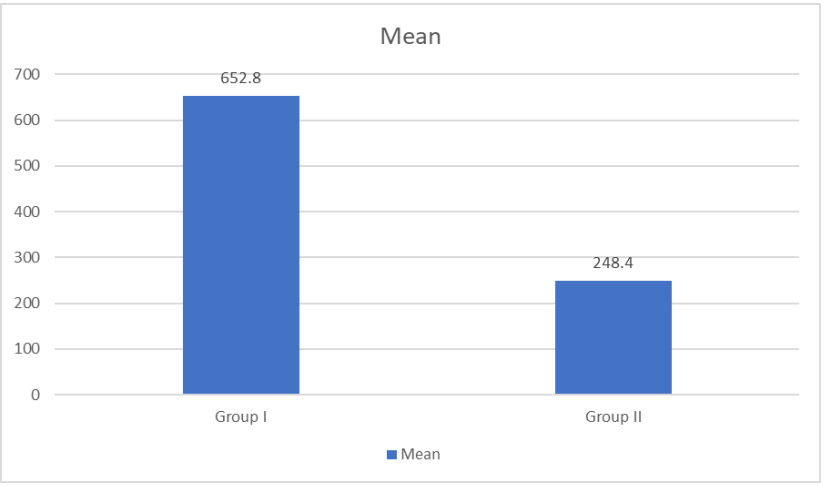


Graph I. Comparison of serum LDH level

Table II
Comparison of salivary LDH level

Groups	Mean (U/L)	P value
Group I	652.8	0.001
Group II	248.4	

Table I, graph I shows that mean salivary LDH level (U/L) in group I was 652.8 and in group II was 248.4. The difference was significant (P< 0.05).



Graph II. Comparison of salivary LDH level

Table III
Comparison of uric acid in both groups

Groups	Group I	Group II	P value
Serum uric acid (mg/dl)	6.98	5.12	0.01

Salivary uric acid (mg/dl)	5.92	5.26	0.17

Table III shows that mean serum uric acid (mg/dl) in group I was 6.98 and in group II was 5.12. The mean salivary uric acid in group I was 5.92 and in group II was 5.26. The difference was significant (P< 0.05).

Discussion

Many salivary biomarkers have been explored for early detection and diagnosis of OSCC, such as protein biomarkers [interleukin-6 (IL-6), interleukin-8 (IL-8), interleukin 1a (IL-1a), interleukin 1b (IL-1b), TNF-a, tissue polypeptide antigen (TPA), secretory leukocyte peptidase inhibitor (SLPI), cystatin A, keratin 36, thioredoxin, haptoglobin (HAP), salivary zinc finger etc. LDH plays a vital role in the Warburg effect, which is a phenomenon typically used by cancer cells in which tumour cells convert from an aerobic to a predominantly anaerobic metabolism, in which glucose is converted to lactate.[8] Elevated lactate concentrations have been shown to predict tumour malignancy, recurrence, survival, and metastasis in cancer patients. The Warburg effect appears to be a frequent feature of malignant cells, which is critical for their tumourigenic potential and is one of the most significant features that arise during the development of OSCC patients.[9] The present study was conducted to assess serum and salivary lactate dehydrogenase and uric acid levels in oral squamous cell carcinoma patients.

We found that mean serum LDH level (U/L) in group I was 342.8 and in group II was 246.0. Anitha et al[10] compared and correlate LDH and uric acid levels in serum and salivary samples of OSCC patients and healthy individuals. LDH levels and uric acid levels were measured using an enzymatic method in serum and salivary samples of OSCC cases (n = 18) and healthy individuals (n = 18). This study indicated statistically significant elevated levels of LDH in serum and saliva samples of OSCC patients when compared to healthy individuals. Furthermore, serum and salivary uric acid were higher in OSCC patients than in controls. This increase levels of uric acid was significant only in serum but not in saliva samples. However, salivary uric acid was found to be co-relating with serum uric acid. In addition to this, the receiver operating characteristic (ROC) curve when plotted to assess combined diagnostic abilities of all the investigations to predict OSCC, indicating the diagnostic ability to be 77%

We found that mean salivary LDH level (U/L) in group I was 652.8 and in group II was 248.4. Gholizadeh et al[11] assessed the level of total LDH in the saliva and serum of patients with oral squamous cell carcinoma (OSCC), OLP and OLRs. In this case–control study, the participants were divided into four groups (n = 25) of healthy controls, OLP, OLRs, and OSCC. The serum and stimulated/unstimulated salivary levels of LDH were spectrophotometrically measured using standard LDH kits (Pars Azmoun). The serum and salivary levels of LDH in OSCC patients were significantly higher than that the corresponding values in other groups (P = 0.0001). The serum level of LDH in OLR group was significantly higher than that in the control and OLP groups (P = 0.0001), but the difference in salivary level of LDH was not significant. The ROC analysis showed

that both the serum and salivary levels of LDH had significant diagnostic ability for detection of OSCC and OLRs. Significant associations were noted between the serum and salivary levels of LDH.

We found that mean serum uric acid (mg/dl) in group I was 6.98 and in group II was 5.12. The mean salivary uric acid in group I was 5.92 and in group II was 5.26. Dhankhar R et al[12] showed significantly higher levels of uric acid in patients with head and neck cancers. These findings of the study may be attributed to the small environmental exposures, genetic background diet, habits, time of collection and sample size considered. Serum and salivary LDH and uric acid may serve as diagnostic marker in patients with SCC. However, large scale studies are required.

Conclusion

Authors found that OSCC patients had elevated level of serum and salivary LDH and uric acid.

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