

STUDY THE CLINICOPATHOLOGICAL CO- RELATIONSHIP OF SERUM ALKALINE PHOSPHATASE AND SERUM CALCIUM LEVEL IN RADIOLOGICALLY DIAGNOSED OSTEOLYTIC LESIONS OF MANDIBLE AND MAXILLA.

Oncology

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ABSTRACT

Context: Hypercalcemia has been reported upto 4.2% to 25% of patients who have malignancy related to head and neck cancer. In Health and Diseases, alkaline phosphatase refers to the activity of serum liver and bone alkaline phosphatases that has been widely applied in routine diagnosis.

Aim- The aim of this study is to find an association of serum level of Alkaline Phosphatase and Calcium in Osteolytic Lesions of Mandible and Maxilla. To compare and evaluate the level of Serum Calcium and Serum Alkaline Phosphatase in Osteolytic Lesions of Maxilla and Mandible.

Settings and Design: A total of 20 participants (10 benign patients and 10 malignant lesions) were included in the study.

Materials and Methods: Fasting blood ALP activity was evaluated using ALP assessment kit and biochemistry analyzer. Statistical Analysis Used: The data were analyzed by SPSS-21 software (SPSS Statistics software).

KEYWORDS

Alkaline Phosphatase, Clinicopathological Parameters, Calcium, Osteolytic Lesions.

INTRODUCTION:

Hypercalcemia has been reported upto 4.2% to 25% of patients who have malignancy related to head and neck cancer. Hypercalcemia is most common who have late stage malignancies which predicts poor prognosis and primary hyperparathyroidism or granulomatous diseases serve as an additional etiology for hypercalcemia. In Health and Diseases, alkaline phosphatase refers to the activity of serum liver and bone alkaline phosphatases that has been widely applied in routine diagnosis.

This research would test the pre and post surgical serum calcium and serum alkaline phosphatase in patients with oral cavity cancers that spread to the bone and cause Jaw bone osteolytic lesion.

PROCEDURE- The study was randomized clinical trial that employed a total of twenty patients in the age group of 10-70 years of either sex, presenting definitive osteolytic lesions in the maxilla and mandible which were diagnosed radiologically and histopathologically and subjected for further evaluation.

The duration of the study was from November 2017 to August 2019. After confirmatory diagnosis established they were divided into 2 groups: 1- Lesions with Benign in nature 2- Lesions with Malignant in nature.

The patients were recalled on 7th day and 4th week post operatively day for periodic evaluation of serum calcium and serum alkaline phosphatase levels. ALP and Calcium assessment kit was used with the help of biochemistry analyzer Under all aseptic precautions, 5 mL fasting venous blood was collected from antecubital vein of both groups into plain sterile bulb.

MATERIALS AND METHODS:

SOURCE OF DATA:

The study sample comprise of patients reporting to Surya hospital and department of oral maxillofacial surgery. The present study was conducted in the Department of Oral and Maxillofacial surgery, I.T.S Dental College, Hospital & Research Centre, Greater Noida, Uttar Pradesh.

INCLUSION CRITERIA:

Age of 10-70 years.

Sex- male/ female.

Diagnosis- osteolytic lesion in mandible and maxilla

EXCLUSION CRITERIA:

Patients with an immunocompromised status.

Patients above the age of 70 years.

Patients less than 10 years of age.

Patients with pregnancy.

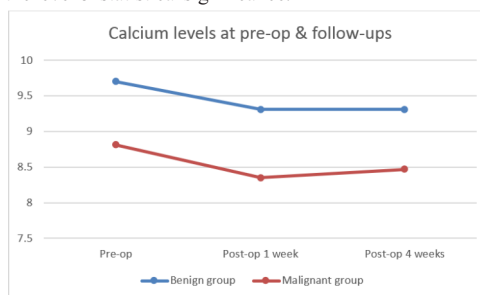
RESULTS:

Tb 1: Inter group comparison of Calcium levels at pre-op & follow-ups

Calcium levels	group	N	Mean	Std. Deviation	Pvalue
Pre-op	Benign	10	9.6980	.60018	0.03,S
	Malignant	10	8.8100	1.03005	
Post-op1 week	Benign	10	9.3120	.80688	0.009,S
	Malignant	10	8.3500	.66207	
Post-op4 weeks	Benign	10	9.3100	.71717	0.052, NS
	Malignant	10	8.4710	1.05281	

Independent t- test

Intergroup comparison of Calcium levels at pre-op & follow-ups showed that at pre-op & post-op 1 week follow up, the mean Calcium levels were significantly more among Benign group subjects as compared to that among malignant group subjects. At post-op 4 weeks follow up, the mean calcium level among benign gr subject was higher than that among malignant gr subjects but, this difference failed to reach the level of statistical significance.



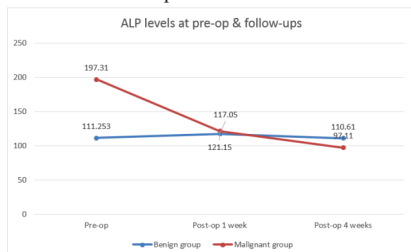
Tb 2: Intergroup comparison of ALP levels at pre-op & follow-ups

ALP levels	group	N	Mean	Std.Deviation	Pvalue
Pre-op	Benign	10	111.2530	54.11006	0.018,S
	Malignant	10	197.3100	89.17327	

Post-op 1 week	Benign	10	117.0500	45.82099	0.823, NS
	Malignant	10	121.1500	34.37038	
Post-op 4 weeks	Benign	10	110.6100	36.72808	0.325, NS
	Malignant	10	97.1100	20.73046	NS

Independent t- test

Intergroup comparison of ALP levels at pre-op & follow-ups showed that at pre-op, the mean ALP level was significantly lower among Benign group subjects as compared to that among malignant group subjects. No statistically significant difference could be found between the mean ALP levels among Benign group & Malignant group at post-op 1 week & 4 weeks follow up.

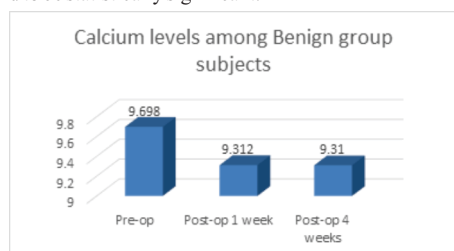


Tb 3: Intra group comparison of Calcium levels among Gr 1 subjects

Intra group comparison of Calcium levels among Gr1 subjects			
	Mean	Std. Deviation	N
a)Pre-op	9.6980	.60018	10
b)Post-op 1 week	9.3120	.80688	10
c)Post-op 4 weeks	9.3100	.71717	10
Pvalue	0.163, NS		
a.group=1.00			

Repeated measures of ANOVA

Intragroup comparison of Calcium levels among Gr 1 subjects showed that it decreased from pre-op to post-op 4 weeks, but this decrease was not found to be statistically significant.

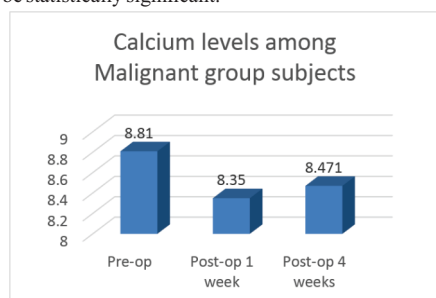


Tb 4: Intragroup comparison of Calcium levels among Gr 2 subjects

Intra group comparison of Calcium levels among Gr 2 subjects			
	Mean	Std.Deviation	N
a)Pre-op	8.8100	1.03005	10
b)Post-op 1 week	8.3500	.66207	10
c)Post-op 4 weeks	8.4710	1.05281	10
Pvalue	0.393, NS		
a.group=2.00			

Repeated measures of ANOVA

Intra group comparison of Calcium levels among Gr 2 subjects showed that it decreased from pre-op to post-op 1 week, and further increased from post op 1 week to post-op 4 weeks, but these changes were not found to be statistically significant.

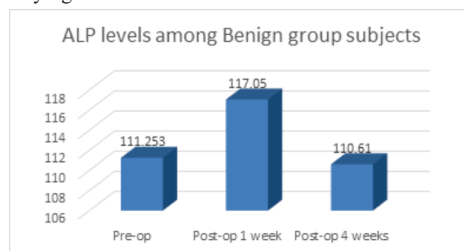


Tb 5: Intra group comparison of ALP levels among Gr 1 subjects

Intra group comparison of ALP levels among Gr1 subjects			
	Mean	Std.Deviation	N
a)Pre-op	111.2530	54.11006	10
b)Post-op 1 week	117.0500	45.82099	10
c)Post-op 4 weeks	110.6100	36.72808	10
Pvalue	0.975, NS		
a.group=1.00			

Repeated measures of ANOVA

Intragroup comparison of ALP levels among Gr 1 subjects showed that it increased from pre-op to post-op 1 week, and then further decreased from post-op 1 week to 4 weeks, but these changes were not found to be statistically significant.

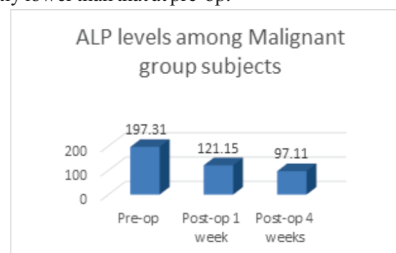


Tb 6: Intragroup comparison of ALP levels among Gr 2 subjects

Intra group comparison of ALP levels among Gr2 subjects			
	Mean	Std.Deviation	N
a)Pre-op	197.3100	89.17327	10
b)Post-op 1 week	121.1500	34.37038	10
c)Post-op 4 weeks	97.1100	20.73046	10
Pvalue	0.007, S		
Posthoc pairwise comparison	a>c		
a.group=2.00			

Repeated measures of ANOVA

Intragroup comparison of ALP levels among Gr 2 subjects showed that it decreased from pre-op to post-op 1 week, and then further decreased from post-op 1 week to 4 weeks. These changes in mean ALP levels were found to be statistically significant. Post hoc pairwise comparison showed that the mean ALP level at post-op 4 weeks was found to be significantly lower than that at pre-op.



DISCUSSION-

Hypercalcemia is not common in patients with head and neck malignancy. Other authors have reported the incidence of this increased calcium levels ranges between 4.2% to 25%. It was usually a manifestation of advanced stage of disease, with 90% being stage four. There are many possible etiologies of increased calcium levels. One is skeletal metastases, second possibility is it may be secondary to ectopic PTH production [7]. From the clinical perspective most of the malignancies occurring in the head and neck region are due to primary hyperparathyroidism. PTH depends largely include primary hyperparathyroidism, which is produced by malignant cells and familial hypocalciuric hypercalcemia. The reason for the PTH measurement includes the patients with cancer may have primary hyperparathyroidism which is sole cause of hypercalcemia. PTHrP levels are increased in cases of humoral hypercalcemia of malignancy. Diagnosis should include the history of the patient and physical examination, which is mainly focused on the measurements of the mediators of hypercalcemia. Alkaline phosphatase is an omnipresent glycoprotein-bound membrane which catalyzes phosphate monoester hydrolysis at a simple pH price. Alkaline phosphatase is categorized into four isozymes based on the expression of the tissue that can be identified as intestinal alpine, placental alp, germ cell alp and non-specific alp or liver tissue, bone, kidney alp. In routine diagnosis, the activity of liver

and bone alkaline phosphatase in serum is widely applied. The alkaline phosphatase level of the normal serum is 20 to 140U / L. According to Farah tedavi et al [21] the activation of osteoclasts and the suppression of osteoblasts are main event that occurs in multiple myeloma and other fibroosseous lesions. Bone lesions are totally lytic in patients with multiple myeloma. Osteoclasts are proliferative in nature on the resorptive sites and do not proliferate in the regions that do not have tumoral involvement. There is a relationship between the increase in serum BALP and osteoblastic activity in MM has been demonstrated in many studies [21].

CONCLUSION-

To the best of our knowledge this is the first of its kind study where serum calcium and serum alkaline phosphatase levels were compared with benign lesions and malignant lesions with various clinicopathological features. The present study showed that in cancer patients the total alkaline phosphatase enzyme was markedly increased as compared to healthy people of the same age. The result suggests that ALP levels exhibits variation with respect to many parameters such as bony involvement, tumor extension, LMN staging, to confirm its role as a tumor marker. In order to validate the present results and evaluate the isoenzyme trend in OSCC, further studies with a larger sample size should be conducted. The usefulness of tumor ALP in OSCC needs to be focused on prospective studies. Identification of tumor-related variants and their significance must be clarified early in the course of the disease.

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