Research Article

SERUM PROTEINS, TRANSAMINASES AND BLOOD UREA IN PATIENTS WITH ORAL SUBMUCOUS FIBROSIS- A PRELIMINARY STUDY.

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Abstract:

Background: Oral submucous fibrosis (OSMF) is a debilitating disease that causes morbidity in terms of reduced mouth opening, leading to stiffness of oral mucosa and inability to eat. Several studies have revealed OSMF to be multifactorial in etiology, thus rendering it difficult to treat; successful treatment is always a dream for the dentists in these patients. Perhaps the systemic involvement in these patients remains unexplored, as per the literature wherein there are few studies carried out in this regard. The present study was conducted with an aim to determine serum protein, transaminases(AST and ALT) and blood urea levels in OSMF patients. Objectives: To determine systemic involvement in patients with OSMF, so as to appropriately address them for treatment and increased or decreased levels of these parameters can be used as a diagnostic tool. Materials and methods: The study comprised of 30 control subjects and 50 study subjects reporting to the Department of Oral Medicine and Radiology. After obtaining an informed consent, subjects were examined clinically to be followed by histopathological confirmation. Both study and control subjects were further subjected for serum investigations to estimate total proteins, AST, ALT and blood urea using automatic ERBA Chem Pro Analyzer. Results: The hematological and serological parameters were within normal range except for significant eosinophilia(p value >0.01) and raised levels of serum AST in the study subjects with mean value of 31.5IU/L. OSMF termed as an premalignant condition, necessitates the evaluation of systemic involvement for satisfactory treatment.

Keywords: Transamnases, Blood urea, proteins, Oral submucous fibrosis.

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Introduction:

Oral submucous fibrosis (OSMF) a potentially malignant condition affecting the oral cavity and pharynx is well known from the times of Sushruta1. Identification of many systemic disorders in medicine is largely based upon laboratory analysis of biological fluid. OSMF, though a chronic disease of insidious onset necessitates a thorough evaluation of biochemical status of an individual. OSMF has a prevalence rate of 0.5%2, with a malignant transformation rate of 7.6%3 most commonly affecting persons aged 20-40 years with a peak incidence of 29.094 yrs and male: female ratio of 34:15.

The etiology of the disease remains elusive till today, with multifactorial suggestion by various researchers3, 4, 5. Various serum studies in these patients till date have revealed decreased levels of Vitamin C6, increased copper concentration7 and hyperglobulinaemia affecting mainly IgG8.

Serum transaminases(AST and ALT i.e aspartate aminotransferase and alanine aminotransferase) are present in high concentration in liver, muscle and elevations of these enzymes in blood indicates impairment of liver function and as tissue metabolism is interrelated with liver function, this in turn may affect collagen regeneration, and hyalinization of collagen tissues. Singh N(1996)9 evaluated serum SGPT(ALT) levels in 150 patients and observed raised levels in all the cases and suggested that role of systemic involvement in OSMF cannot be ignored. However a strong association was demonstrated between periodontal active sites and presence of high levels of GCF AST: thus supporting the view that AST levels of serum is an indicator of tissue destruction10, 11.

Urea is the end product of protein catabolism. Breakdown of aminoacids produces ammonia which is toxic, some of it is excreted but most of it reaches liver, where it is converted to urea and is excreted in soluble form 12. As OSMF affects the younger generation with obscure etiology and lack of satisfactory treatment, systemic
involvement has gained utmost recognition, so as to identify the influence of chewing habits.

Hence this study was undertaken to rule out any systemic involvement so as to assess severity of the disease and open new avenues for providing satisfactory treatment for these patients

Materials and methods:

The study comprised of age and sex matched 30 control subjects and 50 study subjects, reporting to the Department of Oral Medicine and Radiology. Ethical clearance was obtained from the College Review Board. 30 control subjects were subjects in the age group of 17-40 years, of either sex, with normal oral mucosa and with no history of liver, heart, kidney and muscle diseases which are known to affect AST levels. 50 study subjects were selected based on clinical and functional staging proposed by Haider SM (2000)\(^{13}\) were also free of liver, heart, kidney and muscle diseases which are known to affect AST levels. After obtaining an informed consent, case history was recorded and subjects were examined clinically to be followed by histopathological confirmation. Both study and control subjects were further subjected for serum investigations to estimate total proteins, AST, ALT and blood urea using automatic ERBA Chem Pro Analyser. The readings were read at a wavelength of 578nm for total proteins, blood urea and at 546 nm for serum AST and ALT levels.

Statistical analysis: The results were tabulated and subjected to statistical analysis by using \(t\) test for two groups and ANOVAF-test for multiple group comparison.

Results and Observations:

In the present study, 30 control and 50 study subjects, were investigated for the following parameters: hemoglobin percent, total and differential count, ESR, bleeding time, clotting time, serum proteins, transaminases (AST, ALT) and blood urea.

The age range in present study was 16-50 years with a mean of 27.3±7.8 years. They were divided into 4 age groups. There were 46(92%) males and 4(8%) females with male to female ratio being 11.5:1.

The hematological values recorded in the study were within the physiological limits except that there was increase of ESR in 13 study subjects, with mean of 13.7±6.4 mm/hr in study group and 14.0±10.8mm/hr in the control group but the difference was insignificant.

There was significant elevation of eosinophil count with a mean of 2.1%±1.12 in control group and 2.84%±0.98 in the study group with a p value of <0.01 (Table 2).

The mean levels of total proteins in the control group was 6.95±0.67gm% and in study group was 7.17±0.75gm%. The mean level of AST in the control group was 24.8±11.2IU/L and in study group was 31.5±17.1IU/L which was slightly higher in study group but was statistically insignificant. The mean level of ALT in the control group was 25.3±10.8IU/L and in study group was 29.2±3.7IU/L. The mean level of blood urea in the control group was 19.0±4.3mg% and in study group was 20.0±5.3mg% (Graph 1).

The serological parameters in study and control subjects were within physiological limits except for AST levels which were elevated in the study group.

Serum AST levels when assessed in relation to duration of chewing habit showed a significant decrease with value of 46.7IU/L at < 1 year to 27.7IU/L at > 5 years. (Graph 2)

Discussion

OSMF is a crippling disease that starves the patients and exposes them to the hazards of poor oral hygiene. OSMF commonly is seen in younger age group and about 5 million cases of OSMF are presently reported in
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The study subjects had a mean age of 27.3 years which is comparable to 29.1 years of Sinor PN et al(1990) 14, 30.6 years of Trivedi CR et al (2000) 15, 21-40 years of Ahmad MS (2006) 16 and in contrast to 45.8 years of Canniff JP (1986) 17 and 52 years in Ernakulam reported by Bhonsle RB et al(1987) 18. This shift of age range towards younger age could be due to readily available attractive betel nut preparations commercially.

The mean hemoglobin percent in study group was 12.9 gm% which was similar to 13 mg% of Hamner JE (1974) 4, Laskaris (1980) 19 and 12 gm% of Kalpana A(2011) 20. However for the Indian standards a mean hemoglobin of 12.9 gm% would not be the lower limit and also depends upon socioeconomic and nutritional status of study subjects.

Mean ESR was 14.6 mm/hr which was more than 10 mm/hr of Phatak AG (1979) 21 and less than 20 mm/hr as observed by Shah (1994) 22. Rise in ESR is seen in collagen disorders and was evaluated here as an indirect marker of immune-inflammatory diseases 23. Eosinophil count was significantly raised and was similar to Hayes PA (1985) 24, Canniff JP (1986) 17, Rajendra (1994) 25. Eosinophils may be due to histamine release from mast cells, hypersensitivity to capsacin or ingredients of pan, as all the subjects in the study chewed arecanut.

Mean values of total protein levels was 7.1 gm/dl which was comparable to 7 gm/dl and 8.3 gm/dl as reported by Phatak AG (1979) 21 and Anuradha CD (1993) 6 respectively but contrast to Kalpana A (2011) 20 who observed decrease in serum proteins with value of 4.96 gm/dl. This difference may be due to the fact that as the severity of disease increases the patient is nutritionally deprived leading to hypoproteinemia, whereas in our study most of the subjects were in Stage I (with mouth opening of >20 mm as per Staging of Haider et al 18).

AST values, though raised were not statistically significant. The value was in contrast to 9 microl of Hamner (1974) 4, and similar to 30 units of Phatak AG (1984) 26. AST is an intracellular enzyme which upon cell death is released extracellularly and is a biochemical marker to distinguishing between active and inactive disease sites 10, 11. As in OSMF there would be no necrosis, rather fibrosis in the connective tissue, AST

Mean ALT value in the study was in comparison to 38 units of Phatak AG (1979) 21 and contrast to 46 units of Phatak AG (1984) 26. Raised ALT levels show an impairment of liver function and tissue metabolism. This impaired metabolism may affect collagen regeneration which in turn results in hyalinization in all stages of OSMF 5. Hence role of ALT cannot be ignored though a small sample size evaluated, is supported by the study of Singh N(1996) 9 who evaluated serum SGPT(ALT) levels in 150 OSMF patients and observed raised levels in all the cases. Further, Anuradha CD (1998) 27 demonstrated that there was a significant increase in the activities of transaminases in OSMF patients, and correlated the increase in the advanced stage where patients had co-existing carcinoma. None of our study subjects had oral carcinoma with OSMF.

Blood urea level in present study was within physiological limits but more than 10 mg/100ml of Hamner JE (1974) 4. As the proteins are within the physiological limit, no elevation of blood urea was observed as urea is the end product of protein catabolism.

One interesting observation was significant decrease in AST levels as there was increased duration of arecanut chewing habit from 1 to 5 years. With an increase in duration of chewing habit there is concomitant increase in severity of disease and increase in tissue fibrosis, and hence AST levels have decreased.

This study was a preliminary one, was conducted on a small sample size, and is definitely a food for thought to conduct further longitudinal studies to demonstrate true association between OSMF and systemic involvement. However, rise in transaminases levels can be used as a diagnostic tool to assess the severity of OSMF.

References:

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