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DETERMINATION OF SERUM C- REACTIVE PROTEIN LEVELS IN PATIENTS WITH ACUTE PERIAPICAL ABSCESS- A CASE CONTROL STUDY

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ABSTRACT

Background and objective: The circulating value of CRP has long been thought reflects ongoing inflammation more accurately than other laboratory parameters, but very few studies have been done to prove this for acute periapical abscess cases and hence this study was conducted. The objectives included to quantitatively determine the level of C- reactive protein (CRP) in patients with acute periapical abscess, to evaluate the level of C-reactive protein after the treatment of acute alveolar abscess and to prescribe the therapeutic regimen based on the C reactive protein value during the acute phase. **Materials and methods**: The sample consisted of 50 patients of which 40 patients had acute periapical abscess and 10 acted as controls. **Results:** The prevalence of Serum CRP was found to be Highly Significant between controls and abscess subjects with the p value being 0.000. The prevalence of Serum CRP was not found to be statistically significant between control and Postoperative abscess subjects with p value of 0.300. On comparing the Serum CRP levels mg/dl in preoperative and post operative subjects, P- value of 0.000 is found to be statistically Very Highly Significant. **Conclusions:** Our present study concluded that serum CRP is a marker for inflammation in patients with periapical abscess and that the CRP value drastically reduces once the infection is brought under control.

KEY WORDS: C-reactive protein, acute periapical abscess, inflammation, infection.

INTRODUCTION

Inflammation is a protective reaction of vascular connective tissue to any damaging stimuli. The term “acute phase” refers to all local and systemic events that accompany inflammation.[1] An acute-phase protein is defined as one, whose plasma concentration increases or decreases by at least 25 % during an inflammatory process.[2]

Acute phase proteins includes C- Reactive Protein (CRP), Erythrocyte Sedimentation Rate (ESR), Transport proteins (haptoglobin, cerulosplasmin), The Coagulation proteins (fibrinogen,prothrombin etc) and Complement components(such as C3, C4, C5, etc).[1] C- Reactive Protein is an acute phase protein produced by the liver and adipocytes. C- reactive protein is a member of the pentraxin family of proteins. C-reactive protein was originally discovered by Tillet and Francis in 1930. [3] Various analytical methods are available for CRP determination which includes ELISA, rapid immunodiffusion, visual-agglutination immunoturbidimetry and nephlometry. In healthy young adult volunteer blood donors, the median concentration of CRP is about 0.8 mg/l, the 90th percentile is 3.0 mg/l, and the 99th percentile is 10 mg/l. [4]

The circulating value of CRP reflects ongoing inflammation or tissue damage more accurately than do other laboratory parameters of the acute-phase response, such as plasma viscosity and the erythrocyte sedimentation rate. In most, though not all, diseases, the circulating value of CRP reflects ongoing inflammation and/or tissue damage much more accurately than do other laboratory parameters of the acute-phase response, such as plasma viscosity and the erythrocyte sedimentation rate. [4]

Moreover as a patient's condition worsens or improves, the ESR changes relatively slowly, whereas plasma CRP concentration change rapidly and ESR also increases steadily with age but the plasma CRP concentrations do not increase with age. Hence in this study the effect of dental treatment provided to the patients with acute periapical abscess was done by evaluating the value of serum C reactive protein in patients before and after treatment.

METHODOLOGY

ETHICAL CLEARANCE

Permission from the ethical committee of Dental Hospital was obtained before the starting the study.

SAMPLE SELECTION: The sample consisted of 50 patients, of which 40 patients had acute periapical abscess and 10 acted as controls.

PROCEDURE

This study was a cross sectional hospital based study. 1000 patients were screened at outpatient department of our college, of which 50 patients were included in study. Patients with diseases that affect the CRP levels or with any other active acute infection were excluded from the study.

A detailed history of the patient including the demographic details, history and duration of smoking was recorded, following which a thorough clinical examination was done and findings recorded. Intra-oral periapical radiographs are taken to aid in the diagnosis and treatment planning for study group. The patients who were selected on the basis of the above said criteria were taken to the clinical laboratory and 3 ml of venous blood was drawn from those patients under aseptic conditions and stored in a vaccu-tube and sent for blood investigations that included complete blood count, differential blood count and C- reactive protein levels. The same was repeated for patients after the treatment of the acute abscess conditions. Complete blood count and differential blood count was done assess if acute periapical abscess can cause a significant variation in blood counts.

STATISTICL ANALYSES: Data obtained was entered and the analyses was done using SPSS software version 10.05. Student t test and chi square tests were used for analyses.

RESULTS

The study population consisted of 40 patients with periapical abscess and 10 normal healthy patients. Control subjects included 6 males and 4 female subjects, while the study group consisted of 25 males and 15 females. Of the total 50 patients 28 were between the age of 19-25 and 22 patients were between 26-35 years of age . [Figure-1]

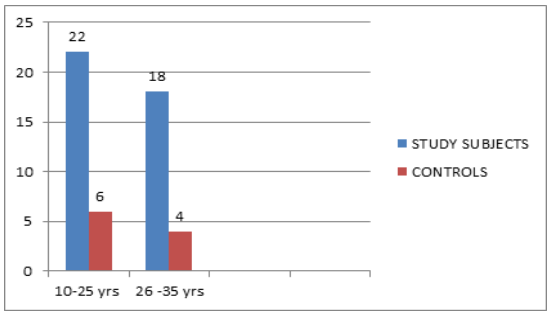

Figure-1 Age wise distribution of subjects

The Serum CRP levels [Figure-2] were found to be highly significant preoperatively between control and abscess subjects with the P value being 0.000. There was statistical significance between Serum CRP values in Preoperative abscess subjects with respect to age (P value -0.018). There was no statistical significance in CRP values of preoperative subjects between Males genders as the p value was 0.348 which is not statistically significant. There was no significant relation between CRP values in preoperative abscess subjects with the habit of smoking and non smokers. (P value-0.132) The prevalence of polymorphs%, (P value-0.36) lymphocytes %, (P value-0.369) and Eosinophil % (P value-0.094) were not found to be statistically significant between control and abscess subjects.

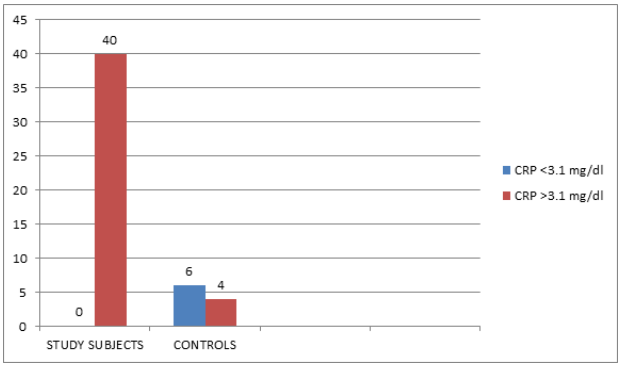

Figure-2 Serum crp (mg/dl) in control and abscess subjects

The Serum CRP [Figure-3] was not found to be statistically significant between control and Postoperative abscess subjects with p value of 0.300. There was statistical significance between Serum CRP values in Postoperative abscess subjects with respect to age (P value-0.058). The prevalence of Serum CRP value in post operative abscess subjects between genders was significant (P value-0.048). On comparing Serum CRP levels in Post operative abscess subjects with the habit of smoking and non smokers, p value of 0.000 is found to be Very Highly Significant.

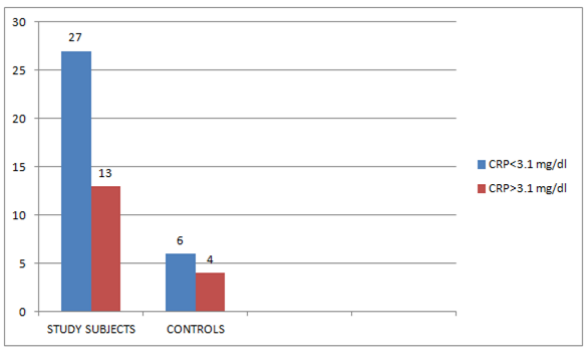

Figure 3: Serum C-Reactive Protein (mg/dl) in control and abscess subjects postoperatively

On comparing the Serum CRP levels mg/dl in preoperative and post operative subjects, p- value of 0.000 is found to be statistically very highly significant.

DISCUSSION

In the present study out of the 40 cases with acute abscess, 0% had serum CRP less than 3.1 mg/dl, as against 60% in control group. The p - value was found to be 0.000 which indicated a very significant correlation between the prevalence of serum CRP levels in patients with acute abscess. This result was similar to results obtained by Boucher et al, [5]Ren et al, [6] and Drazic R [7] probably as similar type of subjects was used in the study.

On comparing the pre operative and post operative levels of serum CRP in acute abscess subjects the difference was found to be statistically highly significant which was similar to results obtained by Ren et al.[6] Drazic et al [7] This difference clearly indicates that treatment of acute periapical abscess leads to reduction in levels of CRP within a very short duration of time and gives it an edge over other investigating tools.

The post operative CRP level was significantly higher in male's postoperatiely than female's and this difference was statistically significant. But the present study result is non-analogous to the results of the study conducted by Khera [8] and Lakoski 2006[9] in which serum CRP level was higher in females in contradiction to our present study, where it is high in males. This variation may be due to the fact that most of the males included in our study were smokers and the effect of smoking may have superseded the rise in CRP values in females. It may be concluded if equal number of male and female without the habit of smoking would have been studied in present study; it would have been possible to achieve a rise in CRP value in females**.**

In Pre operative abscess subjects when CRP levels were subjected to age there was statistically significant difference between the age groups. This result is contrary to results obtained by Wester et al [10] probably because acute periapical abscess is caused primarily by Staphylococcus and Streptococcus while his study dealt with infections mainly of Escherichia coli and Streptococcus pneumoniae origin.

The post operative CRP levels when subjected to age, showed statistical significance between the ages and showed a considerable reduction in CRP levels in patients between 26-35 years of age which was similar to results obtained by Almeida et al.[11]

In smokers and non smokers of the pre- operative abscess group there was no significant differences in the serum CRP levels as both smoking and non smoking group had 80% cases had high CRP range of 26 -45 mg/dl, and the p value being 0.132. This is in contradiction to the previous studies conducted by Frolich et al[12] and Chien et al [13] as they suggested a strong association between smoking and rise in CRP levels in general population. This contradiction is probably due to the fact both conducted their studies in general population without any acute inflammatory process. But in our study, the effect of acute abscess on CRP value may have overshadowed the effect of smoking. The values when compared post operatively among smokers and non smokers the results were statistically significant and were similar to results obtained by Frolich et al[8] and Chien et al [9] indicating that smoking does influence values of CRP.

CONCLUSION

Our present study showed that CRP can be used as an acute marker for acute periapical abscess but its high cost and some instances of false negative and positive restricts its use.

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