Dental Anxiety and it's Relation to Serum Cortisol Level Before Dental Surgical Treatment

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Abstract

Background: Dental anxiety is still prevalent, despite advances in treatment methods, and it affects the utilization of health does not only decrease the pain threshold, but actually leads to the perception of painless stimuli as painful. services. Cortisol is an important hormone in the body, secreted by the adrenal glands and involved in many functions.

Objectives: To evaluate the relation between the level of serum cortisol and increase anxiety in dental patients before minor oral surgery.

Materials and Method: Sixty patients were included in this study were attended Alkatana Specialized Dental Center from October/4/2010 till December/1/2010, their age ranged from (16-54 years) 27 patients were females and 33 were males. They were divided into two groups, 30 of them as controls (they didn't need any dental surgery) who match the other 30 patients study group in age, sex and their general health status but they needed minor oral surgery. Blood samples were collected from all patients between 10-11 Am., and about 5 minutes before surgery to the patients of the study group. Serum cortisol level was measured by using radioimmunoassay analysis.

Results: A total of 60 patients were enrolled in this study. Regarding the control group 15 were females and 15 were males while for the study group patients12 were females and 18 were males. Serum cortisol level was significantly different between two groups the mean was13.05 ±6.51 for control patients and 23.62 ±10.12 respectively and the Coefficient correlation (r)between serum cortisol level and pulse rate in both groups were 0.16 ($p>0.05$) for the control patients and 0.58 ($p<0.01$) for the study group patients. When serum cortisol concentrations in study group were distributed according to the age of the sample, there was a highly significant positive correlation between these variables ($r=0.36$, $p< 0.05$). Also pulse rat in study group was found highly positive association with age ($r=0.55$, $p < 0.01$).

Conclusions: It is concluded that the study group patients exhibited significantly higher levels of serum cortisol and pulse rate than that of the control group. This deference is suggested to be due to phobia from dental surgical work. As recommendation we suggest giving patient 5 mg of diazepam at the night before the operation.

Keywords: dental anxiety; pain; cortisol.

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Introduction:

Dental treatment may cause pain and discomfort. Eventhe expectation of pain increases dental anxiety, thus maintaining the number of dentally anxious persons [1,2].

Dental fear, anxiety, and phobia have consistently been reported as widespread problems that persist despite the technological advances that have made dentistry less painful and less uncomfortable.

It is well documented that dental fear has a significant impact on dental care utilization behaviors [3,4,5].

Anxiety not only lowers the pain threshold, but actually leads to the perception of painless stimuli as painful. Cortisol is an important hormone in the body, secreted by the adrenal glands and involved in many functions like: Proper glucose metabolism; Regulation of blood pressure; Insulin release for blood sugar maintenance; Immune function and inflammatory response [6].

Prolonged high levels of cortisol can lead to heart disease and other health problems. Treatments for dental fear often include a combination of behavioral and pharmacological techniques [7].

The Aim of the Study is To evaluate the level of serum cortisol in dental patients before minor oral surgical procedure and it is relation to increase anxiety.

Materials and Method:

Sixty patients were included in this study were attended Alkatana Specialized Dental Center from October/4/2010 till December/1/2010, their age ranged from (16-54 years) 27 patients were females and 33 were males. They were divided into two groups, 30 of them as controls (they didn't need any dental surgery) who match the other 30 patients study group in age, sex and their general health status but they needed minor oral surgery. Single female experimenter, measured blood pressure and pulse rate for all the patients and then she started to collect blood samples from them between 10-11 Am., about 5 minutes before surgery to the patients of the study group.

A 5 ml. blood samples were placed immediately in heparinized tubes containing sodium meta bisulfate as an antioxidant then centrifuged at 5000 r.p.m. for three minutes.

Plasma samples were immediately pipette into tubes containing 0.5 ml. of iced 4N per chloric acid and then frozen. Serum cortisol level was measured by radioimmunoassay analysis using Cortisol Ria Kit / Iso date 20 / 20 Gamma Center / USA according to manufacture instructions.

For Statistical analysis, Chi-square tests ($\chi 2$) with Yates' correction were used to compare the distribution of subjects in the categorical variables. Data of serum cortisol levels are presented as mean values and standard deviation (SD). Serum cortisol concentrations were log-transformed, which normalized distribution of cortisol measures. Student's *t*-tests were used to compare continuous variables. Correlations were explored by means of the Pearson correlation coefficient. Correlations involving pulse rate and serum cortisol level were analyzed by means of Spearman correlation coefficient. Statistical significance was accepted at $P < 0.05$.

Results:

A total of 60 patients were enrolled in this study. Regarding the control group 15 were females and 15 were males while for the study group patients12 were females and 18 were males. Serum cortisol level was significantly different between two groups the mean was13.05 ±6.51 for control patients and 23.62 ±10.12 respectively and the Coefficient correlation (r) between serum cortisol level and pulse rate in both groups were 0.16 ($p>0.05$) for the control patients and 0.58 ($p<0.01$) for the study group patients as shown in figures 1 and 2.

When serum cortisol concentrations in study group were distributed according to the age of the sample, there was a highly significant positive correlation between these variables ($r=0.36$, $p< 0.05$). Also pulse rat in study group was found highly positive association with age ($r=0.55$, $p < 0.01$).

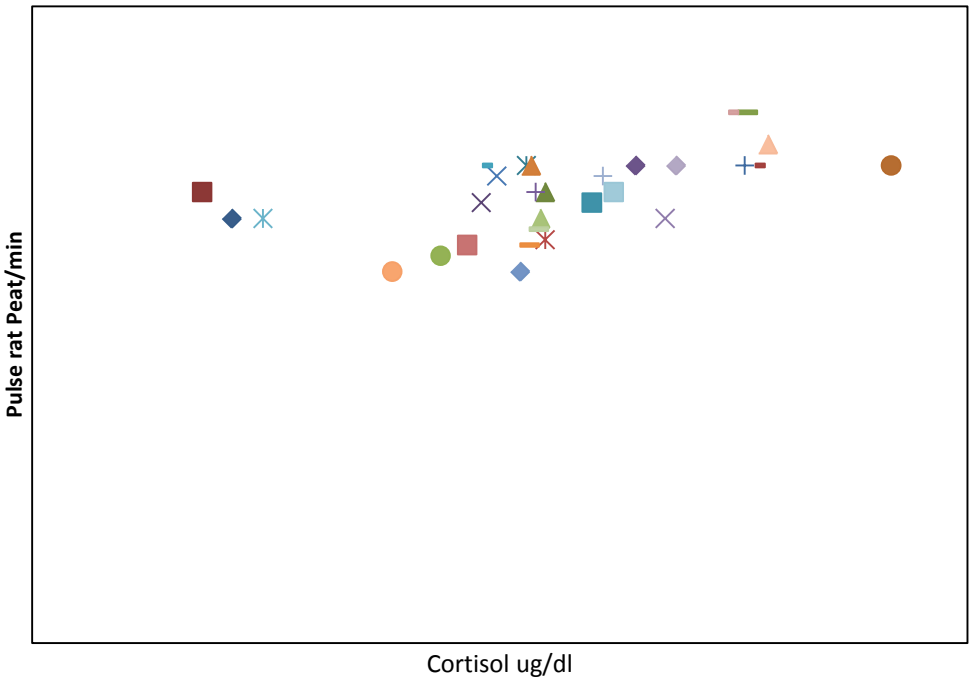

Figure-1 shows the relation between pulse rate and serum cortisol level in control group patients.

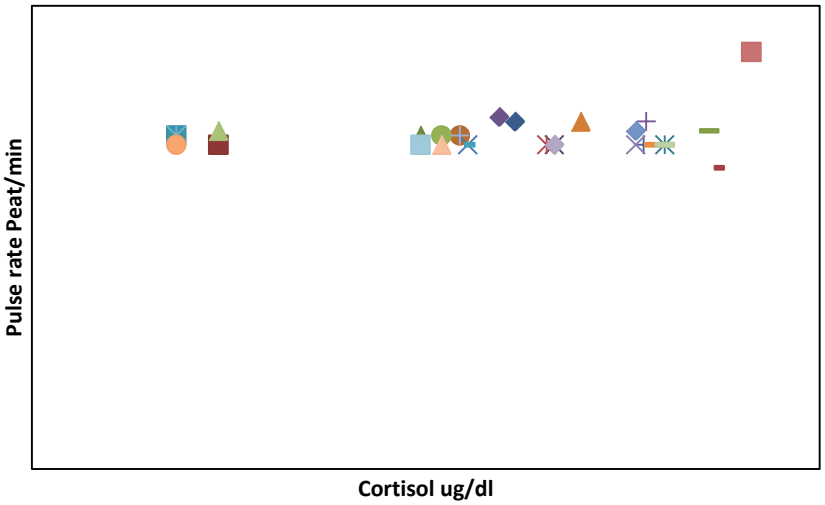

Figure-2 shows the relation between pulse rate and serum cortisol level in study group patients.

Discussion:

In present study show dental anxiety or stress increases serum cortisol secretion as a result of increased corticotrophin releasing hormone (CRH) secretion and increase sympathetic tone therefore, cortisole play a role in body response to stress (activation of energy metabolism, increase in cardiac performance).Also cortisole increase myocardial contractility and vasoconstriction, these are described as permissive effects of cortisole.Cortisol increases the synthesis of epinephrene in the medulla & angiotensinogen in the liver[8]. Researchers such as Chapman and Kirby-Turner (1999) suggest that there is a relationship between general and dental anxiety [9]. It should be borne in mind that the origins of dental anxiety are numerous and complex and have been shown in other parts of the world to be associated with a, irregular attendance pattern, history of extractions, having a dentally anxious parent and is also related to memory distortions and personality types. Highly anxious dental patients tend to overestimate the intensity of aversive dental events even if they have never experienced the particular experience before [10,11,12,13].
Emergency dental situations involve a high prevalence of fear and anxiety, and it is important for the dentist to be able to recognize such patients [14]. Normally, cortisol present in the body at higher levels in the morning, and at its lowest at night. Although stress isn't the only reason that cortisol is secreted into the blood stream, it has been termed "the stress hormone" because it's also secreted in higher levels during the response to stress, and is responsible for several stress-related changes in the body.Cortisol potentiates production of Catecholamines and regulates beta-adrenergic receptors[15,16,17].

Direct experience is the most common way make people develop dental fears. Dental anxiety has been associated with avoidance of dental care and affects not only general health, but also it is lead to the sleep disturbance, and social interactions with work performance [18]. People who are dentally fearful tend to avoid treatment and are much more likely to attend the dentist when prompted by pain and their avoidance removes opportunities for learning, as does the dental profession's emphasis on the use of sedation or general anesthetic with fearful patients [19,20,21]. Milgrom et al. reported that younger subjects were more anxious than older ones [22], while, in the present study dental anxiety was correlated with age. This may be due to small number of patient's age more than 50 who seek care. Zimmer et al. and Kirsch Baum et al. demonstrated that the pain is a stimulus that results in significant increases of salivary cortisol [23] .The present results are in concordance with these studies, in which dental anxiety in study group patients exhibited significantly higher levels of serum cortisol due to phobia from dental surgical work because , stress increases serum cortisol secretion and increase sympathetic tone .

Moreover, the pulse rat in study group was found highly positive association with age immediately prior to the dental checkup. This is in agreement with Rayen et al. the results clearly showed a significant change in the systolic pressure and heart rate in all the situations in the dental operatory area [24]. However the present study showed a significant increase in pulse rate in almost all the dental procedures when compared with normal. It could be because the treatment had been started without any behavior management.

Conclusions and Recommendations:

It is concluded that the study group patients exhibited significantly higher levels of serum cortisol and pulse rate than that of the control group. This deference is suggested to be due to phobia from dental surgical work. As recommendation we suggest giving patient 5 mg of diazepam at the night before the operation.

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