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INR IN PEDIATRIC PATIENTS WITH ACUTE DENTAL INFECTIONS: A PILOT STUDY.

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ABSTRACT:.Background : Patients with congenital or acquired coagulopathies are common in the general population. Dentists should have access to the patients' appropriate and current laboratory values to prevent bleeding complications during and after invasive dental procedures. A laboratory test called an INR(International Normalized Ratio) measures the time it takes for blood to clot and compares it to an average. Many drugs can change the INR such as aspirin, ibuprofen and Antibiotics the most common drugs used for treating acute dental infections. **Aims**: To determine whether there is any change in bleeding tendencies of pediatric patients with acute dental infections also to evaluate the utility of testing INR in patients who have to receive invasive dental treatments especially those with acute dental infections. **Method:** 10 patients, 7 boys and 3 girls, with acute dental infections were randomly selected from the patients arriving at Department of Pedodontics. Blood sample was collected through venepuncture and was immediately sent for prothrombin time tests. Using these values INR was calculated. **Results**: The mean INR value for the study was 1.194. The Mean INR among boys was **1.164** and Mean INR among girls was **1.29.** The Mean Prothrombin Time was **14.39** sec. The Mean Prothrombin time among the boys was found to be **13.98** secs. The Mean Prothrombin time among the girls was found to be **15.33** sec. **Conclusion**: There was no significant change in INR in patients with acute dental infections.

KEYWORDS: prothrombin time, Acute dental infections

INTRODUCTION

Infections and inflammation almost invariably lead to haemostatic abnormalities ranging from insignificant laboratory changes to severe disseminated intravascular coagulation (DIC). Systemic inflammation results in activation of coagulation due to tissue factor mediated thrombin generation, down regulation of physiological anticoagulant mechanisms and inhibition of fibrinolysis.[1] The relevance of the interaction between coagulation and inflammation as a response to infections is becoming increasingly clear.[2, 3] Although many studies and literature are available co-relating systemic infections and blood coagulopathies, we hardly find conclusive literature on variations in coagulation in association with acute dental infections.

It has long been known that acute inflammation in response to infections can lead to altered state of blood coagulation system.[4, 5] Also, patients with congenital or acquired coagulopathies are common in the general population.[6] Different systems and standards are available to measure and determine hematocrit values for an obtained blood sample. One such method is the Prothombin time (PT). Historically PT or partial prothrombin time (PTT) have been the standard by which clinicians have evaluated anticoagulation levels. In 1983, the World Health Organization committee on Biological Standards released a technical report presenting the INR as a means of standardizing the PT.[7]

The INR is a ratio of PT that adjusts for the sensitivity of the thromboplastin reagents. Human Brain Thromboplastin was designated by WHO as the international standard for comparisons of thrombopastins.[8] An International sensitivity index(ISI) was established to quantify the sensitivity of the thromboplastin, Brain thromboplastin was assigned a value of 1.0.

The INR is calculated from the ratio of the patient's PT and the control PT, raised to the power Of the ISI value.

INR = (patient's PT/control PT)ISI

A patient with a normal coagulation profile would have an INR OF 1.0

Aims and Objectives

Monitoring the INR values can be an important step in managing the health care .Needs for pediatric patients with acute dental infections.

Table No.1:sex, prothrombin time and INR values of the study group.

Sex	Prothombin time (sec)	INR
Male	14.7	1.24
Male	15.1	1.28
Male	13.5	1.24
Female	17.4	1.47
Male	13.8	1.16
Male	14	1.18
Female	14.4	1.21
Female	14.2	1.2
Male	13secs	1.1
Male	13.8	1.18

The aim of this study was

1. To determine whether there is any change in bleeding tendencies of pediatric patients with acute dental infections.
2. To evaluate the utility of testing INR in patients who have to receive invasive dental treatments especially those with acute dental infections.

Methodology

For this pilot study, 10 pediatric patients , 7 boys and 3 girls, with acute dental infections such as periapical abscess and space infections, and free of any systemic conditions, were randomly selected from the OPD of dept. of Pediatric and Preventive Dentistry. 5 boys and 3 girls presented with acute periapical infections and 2 boys presented with buccal space infections. This study was approved by Ethical committee board, NET. The Blood sample was collected through vene puncture by a qualified nurse only after obtaining written consent from the patient's parent. The collected blood sample w as then immediately sent to the Department of Pathology, Navodaya Medical College and PT was determined. This test assesses the extrinsic and common coagulation pathways. The clotting of plasma after addition of exogenous source of tissue thromboplastin and Ca+ ions was measured in seconds. Using this determined prothrombin time, INR was calculated.

Statistical Analysis

We determined descriptive statistics including mean INR value, mean INR value for boys and girls and number of patients. Simple't' test was used to determine the 'p' value for significance.

Results

A total of 10 patients were evaluated in the present study among which 7 boys and 3 girls were recorded with acute dental infections. However who in turn were further categorized based on type of infections , the distribution of the same is presented in Graph no.1. In the present study , the total of 10 individuals on evaluation showed the Mean Prothrombin Time as **14.39** sec. The Mean Prothrombin time among the boys was found to be **13.98** sec. The Mean Prothrombin time among the girls was found to be **15.33** sec.

In our study the evaluation of the Mean INR among all subjects were found to be **1.194**. The Mean INR among boys was **1.164** and Mean INR among girls was **1.29.** The distribution of the prothrombin and Inr of all the individuals is presented in **Table no.1.** Using the simple 't' test we compared the mean INR values of our study to the standardized mean INR value of 1.The calculated 't' value for the study was 1.4774, which was less than the probability for degree of freedom at any given point of 't'. We found no significant difference in INR values($p>0.05$) .

Discussion

Much of our knowledge on the mechanisms that play in infection-associated activation of coagulation comes from observations in clinical and experimental infectious disease. A bidirectional relationship exists between inflammation and infection and coagulation.[1] In the present study an attempt was made to evaluate the relationship of infection and coagulation. The parameters used to evaluate the relationship were prothrombin time and INR which in the most of the cases will give a clear picture or the coagulation cascades which has already been proven by the literature.[9]

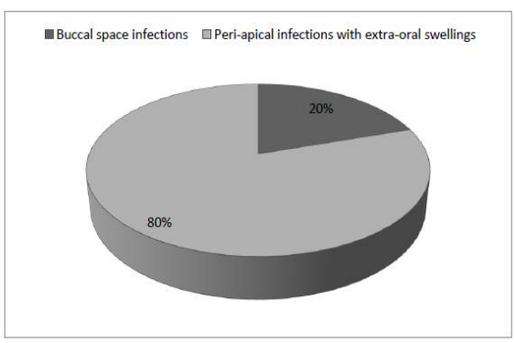
In our present study a total of 10 patients showed a mean prothrombin time of 14.39 seconds and mean INR of 1.194 in the presence of acute dental infections. These finding are suggestive of no marked variation of the coagulation cascade in relation to the acute dental infections i.e. the tissue thromboplastin or other coagulation factors were not varied in the presence of acute dental infections these are not in concurrent with other studies were coagulation disorders were evaluated in relation to other infections.[1, 3, 4, 10] These findings can be supported by the theory of bidirectional relationship of

infection and inflammation and coagulation system proposed by Marcel Levite al.[1]

A bi-directional relationship between coagulation and inflammation appears to play a pivotal role in the mechanisms leading to organ failure in patients with severe infection or sepsis.[1] The endothelium plays a central role in all major pathways involved in the pathogenesis of haemostatic derangement during severe inflammation. Endothelial cells appear to be directly involved in the initiation and regulation of thrombin generation and the inhibition of fibrin removal.

Dental practitioners should make decisions based on the INR value as it will enable them to more accurately and safely manage the treatment of not only medically compromised patients but also prevent unexpected bleeding complications in healthy patients who are unaware of any underlying condition.[7]
The use of in office INR testing devices has been well documented and their use can prevent bleeding complications associated with dental procedures for patients with disease-or drug associated coagulopathies.[6] Una Solvik et. al studied the discrepancies in INR results between different in office INR testing devices and concluded significant differences in the INR values.[11]

The INR only reflects the platelets or soluble clotting factors in plasma but don't reflect the complexity of haemostasis in vivo and thus are poor predictors of bleeding despite their wide spread use.[12] Studies including generalized infectious conditions have showed significant increase in PT and INR.[13] In this study only a localized area of dental infections were included which could possibly the reason for no significant changes in INR values.



Graph .1. Distribution of types of infections included in the study.

CONCLUSION

This study was planned on a smaller sample and due to the differences in the world for the chairside INR evaluation methods the results of our study can be considered as a guide line and further study can be considered with a larger sample and standardized single INR evaluation methods for the complete evaluation of the INR in dental infections.

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