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What's new for the clinician – summaries of recently published papers

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1. Stress levels of a group of dentists while providing dental care under clinical, deep sedation, and general anaesthesia

Stress, according to the World Health Organization, can be defined as a state of worry or mental tension caused by a difficult situation. Stress is a natural human response that prompts us to address challenges and threats in our lives. Everyone experiences stress to some degree. The way we respond to stress, however, makes a big difference to our overall well-being. Occupational stress, defined as when the resources of an individual are not sufficient to cope with the needs of a situation, is a leading modern health and safety challenge[1].

Health sector professionals have higher stress than other professionals, and it is usually caused by workload and patient-doctor relationships.[1] Dentistry is one of the most stressful professions and paediatric dentistry with its behaviour management issues in children, parental expectations, and parental behaviours can be even more stressful and exhausting in practice.

A child's level of cooperation and general behaviour is critical for a dentist to choose the most suitable behavioural management approaches, such as tell-show-do, sedation, and general anesthesia.[1] There are some treatment complications with both deep sedation and general anaesthesia. Ensuring and maintaining airway patency is vital in the application of sedation. In the application of anaesthesia, deep sedation is challenging in dental procedures due to the anatomical proximity of the surgical area to the airway and the risk of micro-aspiration of water, blood, saliva, and small particles of filling material when working in the open mouth[1]. Dental treatment with general anaesthesia is seen as a stressful situation for practitioners since some complications, such as neurological damage, cardiac and respiratory arrest, and even death, may occur.

In response to any stress factors in humans, two biological systems are activated: the sympathetic nervous system in the period immediately after exposure to the factor and then the hypothalamic-pituitary-adrenal system[1]. In healthy individuals, stimulation of the sympathetic nervous system at the beginning of the stress response begins with the secretion of epinephrine and norepinephrine from the adrenal medulla. These catecholamines cause the characteristic features of sympathetic nervous system activity, such as an increase in heart rate, mydriasis in the pupils, and acceleration of breathing. For this reason, sympathetic activity is measured by various evaluation methods, such as heart rate, blood pressure, and O_2 saturation[1]. Similarly, salivary cortisol has been accepted as a reliable biomarker of the hypothalamus–pituitary–adrenal system as a delayed stress response[1].

A literature review showed that very few studies have investigated occupational stress related to paediatric dentistry[1]. Esra Kızılcı and colleagues (2023) [1] evaluated the stress experienced by dentists while treating children in all three treatment protocols (clinical sedation, deep sedation, general anaesthesia) by using objective and subjective (Dentists' Stress Questionnaire) tools. The null hypothesis (H0) of this study was that there is no statistically significant difference between the stress levels of dentists while treating children with the different treatment protocols.

Methodology

The unit of interest in this study was the dentist rather than their patients. Each dentist treated 27 patients with 3 different treatment approaches, and the study resulted in a total of 108 patients.

There was standardisation of the dentists who treated the patients (all were women between the ages 30-33 with similar weight and experience) and patientS. Children with positive or definitely positive behaviour score of 3 or 4 according to the Frankl Scale, were included in the clinical treatment group. According to the clinical examination of these patients, 36 healthy children aged 5–6 years who did not require pulpal treatment and whose caries level was 1–4 according to the ICDAS (International Caries Detection and Assessment System) were selected. The type of treatment was determined as compomer fillings applied to 2 primary molars after local anaesthesia, and the duration of the treatment was limited to 30–60 min.

Children aged 48–72 months and children with negative or absolutely negative behaviour (Frankl 1, 2) according to the Frankl Scale were provided treatment under deep sedation. To provide standardization among patients suitable for sedation, 36 children whose dmft (decayed, missing, filled teeth index) score was less than their age and for whom the duration of the procedure was limited to between 30 and 40 min were included in the study. For general anaesthesia, 36 healthy children whose dmft score was equal to or higher than their age were included. In addition, patients whose treatment time was limited to 30–60 min were included.

The patients were randomly assigned to the dentists, and their treatment was carried out. The study did not include children with general health problems or children whose parents refused treatment with general anaesthesia/ sedation.

For the general anaesthesia and deep sedation group, after a minimum of 6 h of fasting, all patients were given midazolam for premedication before they were taken to the operating room. In the operating room, non-invasive standard

monitoring was performed for all patients, including heart rate, non-invasive MAP, electrocardiogram, and SpO2.

For the general anaesthesia group, 2.5mg/kg propofol, 0.6mg/kg rocuronium, and 1µg/kg fentanyl were used to induce the anaesthesia. The most appropriate cuffed endotracheal tube was used for the intubation procedure. Sevoflurane (1 MAC) and a 50% oxygen-air mixture were applied to maintain general anaesthesia.

In the deep sedation group, anaesthesia was initiated with propofol at a dose of 2mg/kg. A nasal mask was applied to all patients in this group. The pressure ventilator was used for non-invasive ventilation during the deep sedation procedure. Additional intermittent propofol was used to achieve the appropriate sedation depth at which the dental treatment and ventilation could be performed comfortably.

Non-invasive mean arterial blood pressure (MAP) and peripheral oxygen saturation (SpO2) were measured and recorded 10 min before the dental treatment, at the 25th min of the treatment, and 30 min after the treatment for all three treatment approaches. Also, saliva samples were taken from 4 dentists in the same time intervals for the study. The dentists' measurement scores compared to each other.

The Saliva Swab Sample Collection (SpeciMAX™) kit was used to collect saliva samples. The swab was placed under the tongue for 2 min, and it was ensured that the swab absorbed the saliva. Afterward, the swab was centrifuged and placed in saliva storage tubes with a perforated chamber for separating saliva and the remaining dry swab. Samples were centrifuged at 3000rpm for 15 min; the saliva was cleared of debris and then poured into the bottom of the storage tube. Then, the saliva in the plastic saliva storage tube was stored at −80°C in an upright position until measurements were made. After the saliva samples were thawed at room temperature on the day of the measurements, they were taken to the Biochemistry Laboratory for analysis.

Salivary cortisol was measured by the electrochemiluminescence (ECLIA) method using the Cobas Cortisol II kit.

At the end of each patient's treatment, after the samples were taken and the measurements were made, the dentists were asked to fill out the "Dentist Job Stress Questionnaire," consisting of 6 questions reflecting their current stress. In the questionnaire, questions were asked to measure the physician's current degree of work stress, and they were asked to choose the most suitable option for them.

Results

When the findings were evaluated according to the measurement times, systolic and diastolic blood pressure measurements for all dentists before the procedure were similar in the clinical, general anaesthesia, and deep sedation groups ($P>0.05$). Both systolic and diastolic blood pressure measurements were found to be higher in the deep sedation group ($P<0.05$). It was determined that the systolic blood pressure measurements after treatment did not differ among the clinical, general anaesthesia, or deep sedation groups ($P>0.05$), but the diastolic blood pressure measurements did. The measurements of the deep sedation group were higher than those of the clinical sedation and general anaesthesia groups ($P<0.05$). Heart rate and oxygen saturation measurements before, during, and after the treatment did not differ among the clinical sedation, general anaesthesia, and deep sedation groups ($P>0.05$). It was observed that cortisol measurements before and during treatment were not at different levels among the clinical sedation, general anaesthesia, and deep sedation groups ($P>0.05$). After treatment, the cortisol measurements in the deep sedation group were higher than those in the clinical and general anaesthesia groups ($P<0.05$)

When the systolic and diastolic blood pressure measurements were examined according to the procedure times, it was observed that the systolic and diastolic blood pressure measurements were similar before, during, and after treatment in the clinical and general anaesthesia groups ($P>0.05$). In the deep sedation group, systolic and diastolic blood pressures measured during the procedure were shown to be high.

The heart rate measurements were at similar levels before, during, and after treatment in the clinical and general anaesthesia groups ($P>0.05$). In the deep sedation group, it was determined that the heart rate measurements during the procedure were higher than those before and after the procedure ($P<0.05$).

When the authors evaluated the oxygen saturation measurements, the oxygen saturation value during the procedure was lower than that before and after the procedure ($P<0.05$).

Cortisol measurements were found to be at different levels according to the processing times.

It was determined that the stress levels obtained by using the applied questionnaire differed among the clinical sedation, general anaesthesia, and deep sedation groups. It was observed that the stress level of the dentists in the deep sedation group was higher than that of dentists in the clinical sedation and general anaesthesia groups ($P<0.05$).

In this study, there was a correlation between the stress level and systolic blood pressure values of the dentists in the clinical sedation, general anaesthesia, and deep sedation groups before and after the procedure ($P<0.05$). According to the survey results, the preprocedural systolic blood pressures of the dentists reporting high stress levels were higher.

It was determined that the stress level of dentists during the protocols and the systolic blood pressure and heart rate measurements were moderately strong and positively correlated ($P<0.05$)

The study showed that systolic and diastolic blood pressure values and heart rate measurements differed among dentists before, during, and after treatment. It was observed that the difference was because dentist-1 had higher systolic and diastolic blood pressure values and heart rate measurements than all the other dentists ($P<0.05$). Oxygen saturation and salivary cortisol measurements before,

during, and after treatment were found to be at similar levels in all dentists ($P > 0.05$)

Conclusion
The researchers found that dentists who care for paediatric patients are more stressed when applying treatment under deep sedation.

Implications for practice
The results suggest the need for more training and practice to strengthen the education given on general anaesthesia/ sedation in paediatric dentistry training.

REFERENCE
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2. Is Leukocyte- and Platelet-Rich Fibrin (L-PRF) an effective haemostatic agent in single tooth extractions? A cohort study on vitamin K antagonist (VKA) and direct oral anticoagulants (DOAC) patients

Many cardiovascular pathological conditions, such as non-valvular atrial fibrillation, valvular pathologies, myocardial infarction, stroke, pulmonary embolism, and deep vein thrombosis, require oral anticoagulant therapy as prophylaxis or life-saving pharmacological treatment[1].The purpose of anticoagulation therapy is to reduce blood clotting capacity in order to reduce the risk of thromboembolic complications in clinical conditions such as atrial fibrillation, mechanical heart valves, deep vein thrombosis and pulmonary embolism, and stroke.

Although traditional, oral anticoagulant therapy with vitamin K antagonists (VKAs), warfarin and acenocoumarin, has represented the gold standard for decades; nowadays, this drug category has been largely supplanted by direct oral anticoagulants, briefly named DOACs.

The introduction and development of DOACs was dictated by the need to overcome the several disadvantages associated with traditional oral anticoagulant therapy, such as the interactions with food and other medicaments, the long half-life, the need of individual dosages, and the mandatory regular monitoring.

DOACs include dabigatran etexilate (Pradaxa) which acts as a direct inhibitor of thrombin or factor IIa, rivaroxaban (Xarelto), apixaban (Eliquis), and edoxaban (Lixiana) which blocks blood clotting factor Xa[1].

The rationale for choosing L-PRF as a haemostatic agent lies in its intrinsic property of facilitating blood clot formation through a rapid activation of the coagulation cascade.

Berton and colleagues (2023)[1] reported on a clinical observational study that sought to assess the efficacy of L-PRF as a haemostatic agent, comparing post-operative bleeding after single simple tooth extraction in patients under treatment with vitamin K antagonists (VKAs) or direct oral anticoagulants (DOACs).

Methodology
This was an Italian study that included patients under oral anticoagulant therapy (VKA or DOACs) who needed a single tooth extraction. Patients ≥20 years; Healthy patients (≤ ASA 3); those with at least two months of DOAC therapy with dabigatran (PRADAXA) or rivaroxaban (XARELTO) or apixaban (ELIQUIS) or edoxaban (LIXIANA) OR at least three months of OAT therapy with warfarin (COUMADIN) or acenocumarol (SINTROM) for VKA group; platelet count > 50,000/dl and INR between 2.0 and 3.0 (VKA group) were included in the trial. Smokers, those with impaired renal function or who had previous head and neck radiotherapy or had the extraction that lasted longer than 15 min or had a complicated extraction were excluded.

Intraoral radiographs and/or pans were used to plan extractive therapy. When multiple extractions were indicated, priority was given to the symptomatic teeth. In asymptomatic patients, the most distal tooth programmed for extraction was selected. Each patient underwent professional oral hygiene one week before the extractive procedure

Blood pressure was recorded for both groups before tooth extraction; International Normal Ratio (INR) was registered for VKA group. Antibiotic prophylaxis was orally administered one hour before the extraction (Amoxicillin 2gr or Clarithromycin 500 mg for allergic patients).

Subsequently, following cutaneous disinfection, blood withdrawal from cubital or cephalic vein of the non-dominant arm was performed using 9ml blood collection tubes. The tube was immediately placed into a centrifuge and operated for 18 min at 2700rpm.

The patient was asked to perform a one-minute mouth rinse with 0.2% chlorhexidine mouthwash before starting the surgical procedure (extraction). The time at which the procedure took place was recorded.

All the surgeries were performed by a single operator and only simple extractions were included, i.e., carried out without elevation of mucoperiosteal flaps and ostectomies, in a maximum of 15 min (from periotomy to complete tooth extraction).

Local anaesthesia (mepivacaine 20mg/ml + adrenaline 1:100,000) was performed, and teeth were luxated and extracted with elevators and forceps. Following an accurate alveolar curettage, L-PRF plug was positioned and compacted inside the alveolus using appropriate tools and finally secured with non-absorbable 3/0 braided silk sutures. After aspirating the excess of saliva, a cotton roll was gently compressed over the surgical site for 20s. The weight in grams of the cotton before and after imbibition was obtained with an analytical balance. All the intra-operative variables were collected.

Within 30 min after surgery, patients began topical ice application keeping a gauze in compression. Patients were prescribed with chlorhexidine 0.2% 3 rinses/day (except for the first day) and paracetamol 1000mg in case of pain, excluding any other NSAID. Once hemostasis was reached, the patient was discharged with a form to be filled with data related to pain-VAS (score 0 to 10), paracetamol intake, any bleeding event and its management.

The seventh day sutures were removed and any biological complication (ecchymosis, hematoma, swelling, infection, nerve injury) was recorded, as well as the presence of

phlebitis, bruising, or hematomas at the sampling site on the arm. A lebeding score of 3 or greater was considered clinically significant and classified as a relevant post-operative bleeding complication. In addition, the onset, course, and severity of complications, as well as the procedures undertaken by the patient or the operator to solve them, were registered.

Results

A total of 112 patients under oral anticoagulation therapy (59 patients for DOAC and 53 for VKA group) needing tooth extraction were enrolled in this study.

Pre-operatively, the two groups were homogeneous for all parameters, and evenly distributed by gender (P = 0.93) and age (P = 0.79), with a mean of 76.6 ± 9.2 years for VKA and 76.8 ±10.4 for DOAC, as well as by pathology for which they were under anticoagulant therapy.

In the DOAC group, 15 patients (25.4%) took dabigatran, 17 (27.1%) rivaroxaban, 17 (28.8%) apixaban, and 11 (18.6%) edoxaban, while in the VKA group 51 (96.2%) took warfarin and the remaining 2 (3.8%) acenocoumarol. The most frequent indication both for DOACs and VKA was atrial fibrillation, with 39 (73.6%) and 39 (66.1%) cases, respectively.

Patients were also equally distributed with regard to the time elapse from the last dental. For patients receiving VKA or DOAC, the bleeding scores were similar with no significant difference. Hematologic parameters (sampled within 30 days before intervention) were found in the normal range in all patient in both groups.

Blood pressure and INR were measured in all subjects just before proceeding with the extractions. Mean systolic and diastolic readings were similar in both groups and the Indication for extraction and type of dental element were equally distributed in the groups. The most frequent indication for tooth extraction was endodontic/conservative [31 (52.5%) and 28 (53%) patients for DOAC and VKA groups, respectively], with no significantly different distribution along with the other indications.

There were no significant differences between the two groups regarding gingival inflammation of the surgical site (P=0.08) and amount of granulation tissue of the post-extraction socket (P=0.90)

Most of the patients achieved complete hemostasis immediately after extraction, with an average cotton roll imbibition rate of 0.03±0.02 g and 0.04±0.04 g for VKA and DOAC, respectively. No significant differences between the two groups were demonstrated for this item (P=0.65).

Post-operative bleeding was recorded in nine patients (17%) for VKA group and nine patients (15.3%) for DOACs group. No significant difference has been registered (P=0.31).

In particular, bleeding was distributed as follows in VKA patients: bleeding was managed with simple compression (once or twice a week) in seven patients (13.2%), while in two patients (3.8%) bleeding was stopped with simple compression (more than twice a week).

In DOAC group, all the nine patients reported bleeding stopped with simple compression (once or twice a week). None of the patients of the two groups needed a medical support for managing of bleeding (score 4 according to the classification used).

Seven days after surgery, no cases of post-extractive complications, such as ecchymoses, hematoma, swelling, neurological lesions, and or surgical site infections requiring antibiotic therapy occurred in both groups.

The sensation of blood taste during the seven post-operative days was significantly more frequent in VKA group (P = 0.018). No differences between the two groups emerged with respect to the intake (yes/no) of paracetamol in the 7-day post-operative period (P = 0.5). No differences in the amount of paracetamol (mg) were observed between groups at each time-point.

Similarly, no differences in pain-VAS values were observed between the two groups on post-operative days (P=0.409). Twenty patients (7 VKA and 13 DOAC) reported ecchymoses in the site of blood sampling (forearm).

Multivariate regression analysis failed to highlight any correlation to the examined variables.

Conclusions

The researchers concluded that the use of L-PRF resulted in limited mild late post-operative bleedings without the need of medical intervention.

Implications for practice: The results of this trial suggest that the use of L-PRF can be adopted for an uneventful post-operative episode in anticoagulated patients without adjusting their therapy for single tooth extraction.

REFERENCE:

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CPD questionnaire on page 372

The Continuing Professional Development (CPD) section provides for twenty general questions and five ethics questions. The section provides members with a valuable source of CPD points whilst also achieving the objective of CPD, to assure continuing education. The importance of continuing professional development should not be underestimated, it is a career-long obligation for practicing professionals.