What's new for the clinician – summaries of recently published papers (February 2024)

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1. IS THERE ANY ASSOCIATION BETWEEN MATERNAL DEPRESSION IN THE FIRST 1,000 DAYS OF LIFE AND EARLY CHILDHOOD CARIES PREVALENCE?

The first thousand days of life refer to the period between conception and 24 months of life and it is a critical period in which foundations for the healthy development of the child are laid, having a huge impact on the health of unborn babies, infants and young children. Pregnancy and the postpartum period are considered a phase where women have an increased vulnerability to mental disorders. Studies have shown that around 12% of pregnant women experience depression in the antenatal period and the prevalence of postpartum depression ranges from 10%-15%.1 These psychiatric disorders are not only associated with poor maternal health but also with negative effects on children, affecting the cognitive development and behaviour.1 Studies have also shown that there is a strong correlation between the oral health knowledge, practice and behaviour of the mother and the oral health status of the young child. Mothers who have poor oral health often have children who have higher levels of early childhood caries (ECC). Mothers with mental disorders have also been shown to be unable to take care of their own health optimally thereby also placing the health (and oral health) of their children at risk. Due to a lack of longitudinal studies investigating the influence of maternal depressive disorders on the occurrence of child's dental caries, da Fonseca Cumerlato and colleagues from Brazil (2023)[1] reported on a study that sought to investigate the effect of the trajectory of maternal depressive disorders in the first thousand days of the child's life on the prevalence of early childhood dental caries at 48 months of age in a birth cohort.

MATERIALS AND METHODS

This was a longitudinal prospective study developed from data collected in a population-based birth cohort in the city of Pelotas, Brazil. In 2015, a population-based birth cohort study was started with the recruitment of pregnant women during antenatal care, thus allowing for the prospective collection of pregnancy-related variables. To identify pregnant women expected to give birth during 2015, 123 health facilities and private clinics providing antenatal care in the city were visited by the research team between May 2014 and December 2015. These women were visited at home or invited to the research clinic between 16 and 24 weeks of gestation to answer a health questionnaire. This antenatal study obtained a response rate of 79.8% (n = 3,199) from all mothers who had their children included in the 2015 birth cohort.

During 2015, all infants born in the five hospitals of Pelotas were identified, and the mothers of live-born infants were invited to join the cohort. Until the present study, this cohort has been followed up five times. The follow-up visits included home visits at 3, 12 and 24 months. The 4-year follow up occurred between January to September 2019. A total of 4,010 children were followed up.

The 48-month assessment fieldwork was conducted at a clinic. Oral health clinical examination was conducted by dentists, previously trained and calibrated, to investigate dental caries and other clinical conditions. The outcome of this study was early childhood dental caries assessed using the International Caries Detection and Assessment System (ICDAS). It was considered the merged ICDAS classification which classifies the tooth surface for the presence of dental caries into four categories as follows: 0, no evidence of caries; A, initial caries; B, moderate caries; C, extensive caries. The ICDAS also separately classified tooth surface for the presence of dental restoration. The other three codes were included in both assessments (dental caries and restorations): 97, missing surface due to tooth decay; 98, missing surface due to other reasons; 99, unerupted tooth surface. The merged ICDAS classification is in accordance with a protocol for early childhood caries diagnosis developed by researchers from the World Health Organization (ECC-0 sound; ECC-1 smooth white spot lesion; ECC-2 enamel breakdown; ECC-3 cavity into dentin).

For analysis purposes, the dmfs index variable was created from the ICDAS as follows: Decayed surface (d) included moderate caries and extensive caries categories (ECC-2 and ECC-3), once initial lesion involves only enamel and it is not considered in dmfs index; missing surface (m) included missing surface due to tooth decay category; and filled surface (f). The dmfs index variable was considered in analysis models in two ways including presence of ECC (no [dmfs = 0] and yes [dmfs ≥ 1]) and severity of the ECC (count variable considering number of tooth surfaces decayed, missed and filled).

As exposure variables, two maternal depressive symptom trajectories were created (screening and diagnosis of depression) from the scores obtained in the Portuguese version of the Edinburgh Postnatal Depression Scale (EPDS) applied in four moments of the cohort study (antenatal, 3-, 12- and 24-month follow-ups). The EPDS assesses the presence and intensity of depressive symptoms in the previous week. A score greater than or equal to 10 was used as a cut-off point for screening of depression, and a score greater than or equal to 13 was used as a

cut-off point to define clinically relevant symptoms of depression (diagnosis). Other variables collected included maternal education which was considered as completed schooling years of mothers and categorised into 0-4, 5-8, 9-11 and 12 + (years). Maternal age was collected in years and classified into four categories: < 19, 19-24, 25-34 and 35 + (years). Familiar income was collected in continuous way in Brazilian real (BRL) and categorised in quintiles (1st-lowest quintile and 5th-highest quintile).

RESULTS

A total of 3,645 children were included in this study, representing a response rate of 90.9% considering the eligible population at 48-month follow-up (n = 4,010 children; 217 were losses, 139 refusals and 9 missing data related to the outcome). There were no differences between the samples for the tested variables. For depression variables, considering screening cut-off, almost 30% (29.2%; n = 1,063) of mothers presented a high trajectory of depression symptoms, and almost one-fifth (18.84%; n = 686) of mothers presented a high trajectory of depression diagnosis. ECC was observed in 26.7% (n = 973) of children at 48 months.

It was possible to observe that the prevalence of ECC was greater in children from younger mothers, with less completed schooling years and with lower familiar income ($p < 0.001$). In addition, the mean number of surfaces affected by ECC increased as the mother's age, completed schooling years and familiar income decreased. Among the maternal depressive symptoms' trajectories, children from mothers with high depressive symptoms trajectories (screening and diagnosis) presented both a higher prevalence and higher number of surfaces affected by ECC ($p < 0.001$).

Multivariate analysis showed that both ECC prevalence and severity of dental caries at 48 months of age were associated with maternal depressive symptom.

Trajectory for positive screening of depression and for depression diagnosis was associated to presence of ECC. Children whose mothers presented high trajectory for screening and for diagnosis of depression presented 1.14 (RR = 1.14; 95% CI 1.02-1.28) and 1.19 (RR = 1.19; 95% CI 1.05-1.35) higher risk of having at least one surface affected by dental caries at 48 months, respectively, when compared to children whose mothers presented low depression trajectory for both screening and diagnosis of depression.

Children whose mothers presented high trajectory for diagnosis of depression had mean number of surfaces affected by caries 26% higher (RR = 1.26; 95% CI 1.02-1.54) compared to children whose mothers presented low trajectory for diagnosis of depression.

CONCLUSIONS

Maternal depression trajectories from pregnancy to 24 months increased the risk for early childhood dental caries at 48 months of age. It was observed that children from mothers with high depression trajectory had higher risk of having early childhood caries compared to children from mothers with low depression trajectory.

IMPLICATIONS FOR PRACTICE

Early detection and treatment of maternal mental disorders should be considered of high priority in health services. The children of these mothers are at higher risk for developing ECC and should be targeted for preventative approaches.

REFERENCE

1. da Fonseca Cumerlato CB, Cademartori MG, Barros FC et al. Maternal depression in first 1000 days of life and early childhood caries prevalence at 48 months of age. Clin Oral Invest 27, 7625-7634 (2023)

2. ASSESSMENT OF CARDIOVASCULAR ALTERATIONS AND CATECHOLAMINES SERUM CONCENTRATION AFTER ORAL SURGERY IN PATIENTS RECEIVING LOCAL ANAESTHETICS WITH EPINEPHRINE

Vasoconstrictors (VCs) are widely used in conjunction with local anaesthetic (LA) solutions in dentistry. An important issue related to potential toxicity is the systemic effects of vasoconstrictors after intraoral injection. A related question faced by the dentist is whether to administer a vasoconstrictor-containing local anaesthetic solution to a patient with cardiovascular disease. Local anaesthetic with vasoconstrictors (LAVCs) increase the duration of anaesthesia, promote local haemostasis and reduce the absorption speed of LA, thereby decreasing the risk of systemic intoxication.[1] However, the safety of LAVCs has been debated for decades, especially in patients with cardiovascular problems. Factors such as pain caused by anaesthetic infiltration, psychological stress, intravenous vasoconstrictor application and drug interaction, in addition to the systemic absorption of vasoactive agents, may contribute to these cardiovascular alterations.[1]

Most vasoconstrictors used in dentistry are classified as sympathomimetic amines or catecholamines. Ideally, vasoconstrictors should act on alpha-adrenergic receptors, which are responsible for increasing peripheral circulatory resistance (vasoconstrictor effect). Nevertheless, all the vasoconstrictors currently used exhibit some beta-adrenergic effect, including increased heart rate (HR) and heart muscle contractility, decreasing peripheral resistance in the skeletal muscle arterioles and bronchial muscle relaxation.[1] The most widely used vasoconstrictor in dentistry is epinephrine, which exhibits both alpha and beta-adrenergic effects. Given that the substance is applied in the oral mucosa, where the alpha-adrenergic receptors predominate, its beta-adrenergic effects are minimised. Despite that, there is tissue absorption of the vasoconstrictor with consequent action in beta-adrenergic receptors, causing undesired cardiovascular effects. Older patients with heart disease may therefore display a more marked systemic response to vasoconstrictors, precipitating complications such as angina, infarction and arrhythmias, among others.[1]

An electrocardiogram (ECG) can be used to detect arrhythmias and myocardial ischemia in patients submitted to oral surgery with LAVCs. Another tool that can be used to assess the effects of LAVCs is to measure the serum catecholamine concentration (epinephrine, norepinephrine and dopamine).

Da Silveira and colleagues (2023)1 reported on a trial that sought to assess the effects of LAVCs on the

cardiovascular system and their relationship with serum catecholamine concentration in hypertensive and healthy patients who had oral surgery.

MATERIALS AND METHODS

This was a randomised clinical trial that consisted of 20 healthy and hypertensive patients requiring tooth extraction with LAVCs. The aim was to compare cardiovascular parameters with serum catecholamine concentration in healthy and hypertensive patients. The cardiovascular parameters analysed were HR, oxygen saturation (SO2) and systolic (SBP) and diastolic blood pressure (DBP), in addition to the number of ventricular and supraventricular extrasystoles (VES and SVES respectively) and ST segment depressions, which were measured in the perioperative and 24hr postoperative periods using a Holter monitor. Data on infiltration anaesthesia volume, transoperative pain level and total surgery time were collected from both groups.

The inclusion criteria were healthy patients and those with high blood pressure diagnosed by a cardiologist and who needed tooth removal surgery with LAVCs. The exclusion criteria were patients who declined to participate in the study, were allergic to LAVCs or the drugs used in the research, and those with health problems that prevented them from undergoing outpatient surgery.

A total of 23 patients were screened for the study. Two were excluded for refusing to participate and one for incorrect recording on the Holter monitor. The 20 remaining patients were divided into two groups: control group (CG) composed of healthy patients and experimental group (EG) consisting of hypertensive patients. All the patients underwent oral surgery with 2% lidocaine and 1:100,000 epinephrine.

The patients were submitted to a clinical examination and a thorough review of the patient's medical history to identify health problems and prepare a treatment plan. For hypertensive patients, a medical report was provided by the cardiologist with a diagnosis, and all the drugs used were recorded on their medical chart. Before surgery, the patients received a drug protocol consisting of 500mg of dipyrone, 8mg of dexamethasone and 1000mg of amoxicillin. None of the patients reported being allergic to the medication used.

All the surgeries were performed in the morning, and the treatment protocol was the same for all the patients. After the patient arrived at the clinic, vital signs were measured to identify any possible systemic alteration that could contraindicate surgery. Next, the patient took the pre-emptive medication, the Holter monitor was installed and venous access to the arm was obtained. The patient then rested for 30 min. This rest period before the first blood collection was necessary to avoid changes in catecholamine levels caused by venous puncture pain. In addition to the perioperative period, the patient wore the Holter monitor for 24hr after surgery, which was removed the following day.

Analyses were conducted at three different times (initial, trans and final). After the rest period, the first measurement (initial) was made, followed by onset of the surgery. The trans period was assessed after the anaesthetic solution was already infiltrated and the exodontia was being performed. The last measurement (final) occurred at the end of suturing. HR, SBP and DBP were recorded with an automatic device and SO2 with a pulse oximeter. The occurrence of VES, SVES and ST segment depressions was recorded on a Holter monitor for each time interval as well as in the 24hr after surgery and were evaluated by a cardiologist who was blinded to the heart comorbidity of the patients.

Blood samples were collected to measure serum catecholamine concentration during each period of evaluation.

RESULTS

Of the 23 patients screened for the study, 20 were assessed, six of whom were allocated to the Control Group[CG] (1 M and 5 F) and 14 to the Experimental Group[EG] (6 M and 8 F). Two patients refused to participate, and one could not be included because the Holter test was not correctly recorded. The average age of EG patients was almost twice that of their CG counterparts.

Variables related to the surgical procedures such as transoperative pain, number of anaesthetic tubes used and surgery time obtained similar results in both groups, with no statistically significant differences. SO2 exhibited a statistically significant difference between the experimental and control groups in the initial period ($p = 0.001$), with EG patients obtaining lower values than those of their CG counterparts. No differences were found in the trans and final periods. A statistically significant difference in SBP was also observed at the three measurements, with EG patients exhibiting higher values than those of the CG. DBP was similar between the two groups at the three assessments.

Arrhythmias were measured via the occurrence of ventricular and supraventricular extrasystoles. VES showed a statistically significant difference only in the 24hr postoperative period ($p = 0.041$), with the group of hypertensive patients (EG) obtaining a higher number of events. Assessment of SVES demonstrated no difference for the two groups in any of the assessments. Serum catecholamines exhibited no intergroup differences for the three measurements.

Intragroup comparison revealed that the hypertensive patients (EG) obtained a statistically significant difference for HR ($p = 0.001$) with the transoperative HR demonstrating a higher value than that seen in the initial and final periods. The CG showed no difference in the three measurements for this variable ($p = 0.070$). SO2 also remained stable for both groups, with no statistically significant difference for the three assessments.

SBP was significantly different for the EG in the three measurements ($p = 0.041$), with the transoperative period obtaining higher values than in the initial and final periods. The CG results were not different between the three assessments ($p = 0.513$) and, unlike the EG, the highest SBP values were observed in the initial period. DBP remained stable over the three periods for the CG ($p = 0.483$) and EG ($p = 0.066$). In both groups, the highest DBP values occurred in the initial period.

Intragroup analysis for the variables VES and SVES was conducted with and without excluding extrasystole measurement in the 24hr postoperative period. Normotensive CG patients had no VES events during the perioperative period. However, EG hypertensive patients demonstrated VES episodes during the three assessments, albeit not significantly different ($p = 0.305$) (Table 16). SVES also showed no statistically significant difference in the three periods assessed for the CG ($p = 0.135$) or the EG ($p = 0.549$), as shown in Table 17. Analysis of VES and SVES, including the 24hr assessment period, showed that only the CG exhibited no significant difference for the variable VES ($p = 0.112$) (Tables 18 and 19). The VES events for the EG ($p = 0.000$) showed a significant difference when the 24hr period was compared to the initial and trans periods. Assessment of SVES events for the EG ($p = 0.000$) demonstrated a difference between the initial and 24hr periods, while for the CG ($p = 0.013$) this difference was observed between the 24hr period and its initial and trans counterparts.

Intragroup serum catecholamine concentration demonstrated no significant difference between assessment periods for both groups. This shows that the variation in these substances remained stable during the surgery with LACV infiltration (trans period) for both normotensive and hypertensive patients.

CONCLUSIONS

Teeth extraction with LAVC can be safely executed in hypertensive patients. Blood pressure should be monitored in these patients since the sysBP presented significant differences during the surgical procedures. Cardiac arrhythmia and the serum catecholamines concentration levels seem not to be altered by the surgical procedure. Also, serum catecholamines do not influence cardiovascular changes in this type of surgery.

IMPLICATIONS FOR PRACTICE

LAVC can be safely used in hypertensive patients and does not increase the risk of arrhythmias or cardiac ischemia.

REFERENCE

1. da Silveira MLM, da Conceição Coêlho OD and Germano AR. Assessment of cardiovascular alterations and catecholamines serum concentration after oral surgery in patients receiving local anesthetics with epinephrine: a randomized, blind, controlled clinical trial. Clin Oral Invest 27, 7651-7662 (2023)

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