

Analgesia in Pregnant Patients: A Literature Review

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Abstract: Pregnant patients physiologically undergo various changes in their bodies due to hormonal actions. The oral cavity is not exempt from these alterations, and repercussions on oral health are also identified. It is essential to provide safe and appropriate dental care during pregnancy, taking into account the gestational trimester and the patient's overall health. Analgesia in pregnant patients remains a taboo for many professionals, especially for newly graduated dental surgeons. The use of local anesthetics in the office as a pain control method makes the procedure safer and more efficient. Regarding orally administered analgesics, acetaminophen is considered the first choice, with dipyrrone as the second option. Aspirin, ibuprofen, and corticosteroids may be an option, but their use should be rationalized and when the benefits outweigh the risks to the maintenance of pregnancy and maternal health. The use of analgesia or reduction of the pain protocol in a pregnant patient in the office can be performed with 2% lidocaine with epinephrine, as it is considered safe. However, certain anesthetics, such as benzocaine and procaine, should be avoided due to risks of methemoglobinemia. Nonetheless, the professional must always weigh the risks and benefits of using analgesic medications for the pregnant patient and the fetus when choosing the medication.

Keywords: Pregnancy; Dental care; Analgesic.

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1. Introduction

Pregnancy represents a unique time in a woman's life, requiring meticulous attention, especially concerning pain control and medication use. It is crucial to have knowledge about the safety and efficacy of treatments, particularly when considering the administration of analgesics, anesthetics, and other drugs. This challenge is compounded by the complexity involved in clinical decision-making, where it is necessary to weigh which factor predominates: the potential risks or the benefits to the pregnant woman and the fetus [1, 2].

Pregnant women undergo various physical and hormonal changes, and these physiological alterations facilitate the process of pain due to some associated factors [3, 4]. It is up to the dentist to present the correct pain management for these patients for analgesia [5]. Regarding non-steroidal anti-inflammatory drugs (NSAIDs), more caution is required when prescribing to pregnant women, as they pose a higher risk compared to analgesics, according to the Food and Drug Administration (FDA), especially in the third trimester due to greater risks to fetal health [6]. Concerning opioids, typically used for acute pain, their use must be cautious, in the correct and allowed doses, to avoid possible adverse effects. Opioids like Codeine and Oxycodone are commonly prescribed in combination with acetaminophen or acetylsalicylic acid [6, 7].

The use of local anesthetics in dental procedures during pregnancy, aiming for analgesia during dental care, is directly related to the complexity of clinical decision-making [8]. Another point addressed in this study is the use of analgesics, considering they are the first line of choice for pain control. However, it is important to emphasize that, initially, the cause of the pain should be identified and then treated [6].

Dental care for pregnant patients is still considered complex. However, with the evolution of dentistry, pain management, and increasingly in-depth studies, it is only a matter of time before this type of care becomes normalized.

It is evident that there is a need for clear and updated guidelines on dental care for pregnant women, especially considering the uncertainties surrounding this topic. This often generates doubts, particularly among newly graduated dentists. Understanding the importance of proper care during pregnancy and recognizing the lack of consolidated information in this area, it is proposed to continue and deepen studies on analgesia in pregnant women. Thus, this work aims to fill this knowledge gap, offering based and updated guidance.

The main goal is to contribute to building a more informed and high-quality clinical practice in the context of dental care for pregnant women. It is believed to be crucial to provide clear guidelines on the selection and prescription of safe medications, including anesthetics, opioids, and anti-inflammatories, to ensure maternal-fetal health during dental treatment. Furthermore, it intends to comprehensively address possible drug interactions that may occur during pregnancy. The proposal involves debating best practices, considering the constant evolution of dentistry and the most recent discoveries regarding dental care during pregnancy. By adopting a collaborative and multidisciplinary approach, it seeks to establish a solid and updated consensus that benefits not only dentists but also pregnant women, ensuring safe, effective, and scientifically supported care. Ultimately, the proposal aims to improve the quality of dental care for pregnant women.

2. Methodology

This narrative literature review aimed to gather information about analgesia and pain control in pregnant patients. The research was conducted through virtual libraries on the PubMed and ScienceDirect databases, using the following keywords: "pregnancy", "dental care", "analgesic", followed by the Boolean operator AND. For article selection, the following inclusion and exclusion criteria were applied:

Inclusion criteria: full articles, published in the last 10 years, written in English and Portuguese, addressing the topic.

Exclusion criteria: extended abstracts, letters to the editor, abstracts not related to the topic, animal studies, and duplicated articles in the mentioned databases.

After applying the inclusion and exclusion criteria, 7 articles were selected from the PubMed platform and 13 articles from the ScienceDirect platform.

3. Results

3.1 Systemic Changes in Pregnant Women

During pregnancy, a woman undergoes changes throughout her body, both physiological and hormonal. Among these changes, the main ones are related to the endocrine, respiratory, cardiovascular, gastrointestinal, and renal systems. These can cause systemic disorders, leading to possible oral alterations in pregnant women [4, 9], where these changes will define the correct process of prescription and patient management [10]. When treating pregnant patients, it is crucial to consider adaptations in the administration and prescription of medications, with an emphasis on minimizing potential adverse teratogenic effects. During pregnancy, the decision to prescribe medications should be guided by the goal of providing maximum benefit to the mother while simultaneously minimizing risks to the developing fetus. To assess the risks associated with the use of medications in this context, the United States Food and Drug Administration (FDA) has categorized drugs based on the levels of risk they pose to the fetus. Table 1 summarizes the FDA's definitions of pregnancy risk factors [6].

3.2 Local Anesthetics

The administration of local anesthetics in pregnant women must be carefully analyzed, as pregnancy can affect nerve sensitivity to these anesthetics. It is speculated that increased hormonal levels, such as progesterone, contribute to heightened neural sensitivity to these anesthetics. Additionally, there are other risks, such as the ability of local anesthetics to cross the placental barrier, which could represent another risk factor for anesthetic toxicity [11]. For pain management in dentistry, anesthetics are widely used. According to the FDA classification, the safest anesthetics for pregnant patients are prilocaine and lidocaine, which belong to category B, taking into consideration the complete situation of the patient [12].

Table 1: FDA Definitions of Risk Factors for Pregnancy.

Category	Definition
A	Controlled studies in pregnant women have failed to demonstrate a risk to the fetus in the first trimester, with no evidence of risk in later trimesters. The possibility of fetal harm is unlikely.
B	Either animal reproduction studies have not demonstrated a fetal risk and no controlled studies in pregnant women have been conducted, or animal studies have shown an adverse effect (other than decreased fertility) that was not confirmed in controlled studies in women in the first trimester and found no evidence of risk in later trimesters.
C	Animal studies have revealed adverse effects on the fetus (teratogenic, embryonal, or other) and no controlled studies in women have been conducted, or no studies are available in both women and animals. Drugs should only be administered if the potential benefits justify the potential risk to the fetus.
D	Positive evidence of human fetal risk has not been observed, but the benefits of use in pregnant women may be acceptable despite the risks (e.g., if the drug is needed in a life-threatening situation or for a serious disease for which safer drugs cannot be used or are ineffective).
X	Studies in animals or humans have demonstrated fetal abnormalities, or there is evidence of fetal risk based on human experience, or both, and the risk of the drug's use in pregnant women clearly outweighs any possible benefit. The drug is contraindicated in women who are or may become pregnant.

Source: Adapted from [6].

Category C includes drugs that should be used with caution, such as bupivacaine, mepivacaine, and articaine. Studies conducted on animals with high concentrations of these category C anesthetics report fetal bradycardia. Moreover, it was observed that subcutaneous administrations of bupivacaine in considerable doses can cause developmental defects [6]. Lidocaine, an amide class anesthetic, is one of the most used anesthetics in dental offices. The most commonly used anesthetics in pregnant women are lidocaine and prilocaine, according to the FDA's risk classification table for pregnant women. Both are classified as B, being the only ones in this category. When using an anesthetic in a pregnant woman, her physiological changes must be considered to choose the most appropriate anesthetic for the situation. It is reported that 2% lidocaine with a concentration of epinephrine of 1:100,000 is considered safe for pregnant women [13, 14].

Prilocaine, even though it falls into group B by the FDA risk classification and is considered safe for use during pregnancy [6], presents complications when administered to pregnant women. Many develop hypoxic conditions, resulting in methemoglobinemia [15]. When metabolized in the liver, prilocaine, which includes toluene in its composition, converts to orthotoluidine. This substance has the capability to oxidize ferrous iron to the ferric state, which impedes the efficient transport of oxygen to tissues [11]. As for topical anesthetics, the eutectic mixture of local anesthetic (lidocaine 2.5% and prilocaine 2.5%) for oral mucosa is recommended, being a better alternative than benzocaine, which belongs to category C and presents a risk of methemoglobinemia [11].

3.3 Analgesics

The use of analgesics is the primary form of management against odontogenic pain [16]. The dentist must control pain in the best possible way, visualizing their options and following the World Health Organization (WHO) analgesic ladder. Depending on the patient's pain intensity, at the first step, in cases of mild pain, the use of a simple analgesic (e.g., paracetamol) is recommended, adding anti-inflammatories if the pain persists. At the second step, in cases of moderate pain, the use of weak opioids (e.g., codeine) is recommended, adding analgesics or anti-inflammatories, as in the first step, if the pain persists. At the third step, in cases of intense pain, the use of strong opioids (e.g., oxycodone) is recommended, following the same scheme as the second step, just switching the weak opioid for a strong one [17]. Always prescribing safely will preserve the patient to the maximum [10].

Paracetamol is the most used analgesic by pregnant women for pain control, being considered the first-choice analgesic for pregnant women. It is classified as category B in the FDA table and acts by inhibiting the cyclooxygenase enzyme, with its action occurring in the central nervous system [18]. Frequently considered the safest analgesic during pregnancy due to the absence of association with teratogenicity, paracetamol has been the subject of recent studies suggesting a possible link to an increased risk of attention deficit hyperactivity disorder (ADHD) in newborns. Although definitive conclusions have not yet been reached, and other factors may have influenced the results of these investigations, it is important to note that prolonged use of paracetamol may be associated with a relatively small risk [6]. Therefore, the safe use of paracetamol for pregnant women is observed by following the recommendations, which consist of administering 500–1000mg every four hours, with a maximum dose of four grams per day [6].

3.4 Opioids

Opioids, when connected to the correct receptors, produce a sensation of relaxation, causing the effect of analgesia, and are used in the treatment of acute pain [19]. If pregnant women are exposed to opioids for a prolonged period, this may result in problems during pregnancy. Research data in adults show that there are no superior outcomes with the use of opioids [11]. Oxycodone is considered the safest option due

to its classification as category B, while codeine, classified as category C, is associated with an increased risk of congenital malformations such as cleft lip, cleft palate, and other cardiac and circulatory anomalies. Although it is preferable to prescribe codeine during the second or third trimesters, if necessary, and for a short period, it is important to highlight that chronic use of opioids is related to fetal dependence, premature birth, neonatal respiratory depression, and growth delay [6].

3.5 NSAIDs

Pregnant women should avoid NSAIDs, as they can cause ineffective contractions during labor and premature closure of the ductus arteriosus, due to the reduction in prostaglandin production. If necessary, an analgesic can be used for post-operative pain, and paracetamol is considered safe within the recommended doses (up to 4,000 mg per day) throughout pregnancy. However, due to the risk of renal damage or hepatic toxicity from overdose, it is preferable to avoid it, if possible [20]. Ibuprofen, initially categorized as Category B in the first two trimesters of pregnancy, is reclassified as Category D in the third trimester, being discouraged during this period. This is due to evidence that the use of NSAIDs at the end of pregnancy can prolong the duration of labor due to ineffective contractions. Moreover, there are concerns related to increased bleeding during labor and premature closure of the ductus arteriosus [6].

3.6 Corticosteroids

An anti-inflammatory agent widely used in endodontic practice are corticosteroids, frequently employed in the treatment of pain or post-operative crises. However, the use of these steroids during pregnancy has generated controversy due to conflicting reports about the association between prenatal use and adverse pregnancy outcomes. Research has indicated that prenatal use of steroids was related to oral fissures, low birth weight, premature birth, and fetal growth restriction [11]. The co-administration of nonsteroidal anti-inflammatory drugs (NSAIDs) and corticosteroids can increase the risk of gastrointestinal bleeding due to the interaction of their effects on the gastrointestinal tract.

The inhibition of cyclooxygenase enzymes by NSAIDs reduces the production of protective prostaglandins, making the gastrointestinal mucosa more susceptible to injury. Concurrently, corticosteroids, with their anti-inflammatory and immunosuppressive properties, can affect the integrity of the mucosa, creating an environment conducive to the development of ulcers or lesions, increasing the risk of bleeding. Therefore, careful evaluation of the risk-benefit relationship and the implementation of preventive measures are crucial when prescribing these medications, especially in the long term, requiring close monitoring of patients [20].

4. Conclusion

Caring for oral health during pregnancy is an important task that requires a careful approach in the choice and administration of medications, especially analgesics and anesthetics. The complexity of the decisions to be made highlights the importance of studies on the safety of medications. The mentioned drugs were placed in the FDA risk classification. The continuous education of health professionals and the cautious use of NSAIDs in certain situations are emphasized. Ultimately, dental care during pregnancy should be respectful and thoughtful, taking into account not only the local efficacy of the medications but also the potential systemic impacts on maternal-fetal health. The constant search for evidence and professional updating are essential to ensure the best care for pain control during pregnancy.

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