

Treatment and Drugs for Pregnant Dental Patients

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Abstract: *Maintaining oral health and treating dental diseases are fundamental components of overall health. Evidence-Based Guidelines for Health Professionals, states: "Prevention, diagnosis, and treatment of oral diseases, including needed dental radiographs and use of local anesthesia, are highly beneficial and can be undertaken during pregnancy with no additional fetal or maternal risk when compared to the risk of not providing care. Good oral health and control of oral disease protects a woman's health and quality of life; and has the potential to reduce the transmission of pathogenic bacteria from mothers to their children."*¹. For an healthy adult dental patient, the selection of dental therapeutic agents for local anesthesia, sedation, postoperative pain control, and treatment of infections is usually straightforward. A dental practitioner might routinely select lidocaine with epinephrine, triazolam, ibuprofen, or acetaminophen with hydrocodone and penicillin V.^{2,3} In case of a pregnant patient, the dental practitioner must consider the additional risks drug therapy may have for the mother and fetus. Adverse drug effects specific to the health of the fetus may include congenital defects, miscarriage, complications during delivery, low birth weight, as well as postnatal drug dependence depending upon the trimester periods of pregnancy. Dental treatment generally involves use of drugs with short elimination half-lives, which are administered for limited periods of time and are, therefore, less likely to cause complications during pregnancy.

Keywords: pregnancy, dental treatment, drug therapy

1. Introduction

Maintaining oral health and treating dental diseases are fundamental components of overall health. Evidence-Based Guidelines for Health Professionals, states: "Prevention, diagnosis, and treatment of oral diseases, including needed dental radiographs and use of local anesthesia, are highly beneficial and can be undertaken during pregnancy with no additional fetal or maternal risk when compared to the risk of not providing care. Good oral health and control of oral disease protects a woman's health and quality of life; and has the potential to reduce the transmission of pathogenic bacteria from mothers to their children."¹ For an healthy adult dental patient, the selection of dental therapeutic agents for local anesthesia, sedation, postoperative pain control, and treatment of infections is usually straightforward. A dental practitioner might routinely select lidocaine with epinephrine, triazolam, ibuprofen, or acetaminophen with hydrocodone and penicillin V.^{2,3} In case of a pregnant patient, the dental practitioner must consider the additional risks drug therapy may have for the mother and fetus. Adverse drug effects specific to the health of the fetus may include congenital defects, miscarriage, complications during delivery, low birth weight, as well as postnatal drug dependence depending upon the trimester periods of pregnancy. Dental treatment generally involves use of drugs with short elimination half-lives, which are administered for limited periods of time and are, therefore, less likely to cause complications during pregnancy.

2. Physiologic Changes during Pregnancy

Weight gain, positional hypotension when placed in a supine position, frequent need to urinate, restricted respiratory function, and a potential for hypoglycemia, morning sickness. Care should be taken to avoid prolonged supine positioning, to provide oral hygiene, and judicious use of radiographs.^{1,4,5} *Supine hypotensive syndrome:* A decrease in blood pressure and cardiac output may occur while the pregnant patient is in a supine position, particularly during the second and third trimesters.⁵ This has been attributed to

decreased venous return to the heart as a result of compression of the inferior vena cava by the gravid uterus, resulting in a reduction of cardiac output.^{6,7} Characterized by *lightheadedness, hypotension, tachycardia, and syncope.* Treatment is to place the patient in a *5-to-15-degree left lateral position* to reduce the uterine pressure on the vena cava and *administer 100% oxygen.* *Pregnancy gingivitis:* the most common oral manifestation in pregnant women, is caused by *elevated estrogen* and progesterone levels, leading to increased capillary permeability during pregnancy.⁹ Pregnant patients experience *irritation of the gums, weakening of tooth enamel, and dental caries* due to the *increased acidic exposure* from morning sickness and gastroesophageal reflux disease (GERD). Preventative care through periodontal treatment and proper oral hygiene can help prevent such occurrences.

3. Selection of Dental Therapeutic Agents:

3.1 Local Anesthetics

Most local anesthetics have not been shown to be teratogenic in humans and are considered relatively safe for use in dentistry. In animal studies, fetal bradycardia can result from high concentrations of *lidocaine, bupivacaine, or mepivacaine* injected in the vicinity of the umbilical artery.¹⁷ Because all local anesthetics can cross the placenta and cause fetal depression, limiting the anesthetic dose to the minimum required for effective pain control is advisable. A limited dose of *bupivacaine* may be a valuable alternative to postoperative *nonsteroidal anti-inflammatory drugs (NSAIDs)* and *opioid analgesics* for postoperative pain management in pregnant patients. *Prilocaine* and *benzocaine* are recognized as inducers of *methemoglobinemia*.

3.2 Epinephrine and Vasoconstrictors:

An inadvertent intravascular injection of a *1.8-ml cartridge of local anesthetic* formulation containing 1:100,000 *epinephrine* can deliver *18 µg of epinephrine*. Clinically significant intravascular doses of α -adrenergic agents are to

be avoided in order to maintain appropriate placental perfusion and fetal viability.^{20,21} There are no significant contraindications for the use of epinephrine in the recommended dosages, provided intravascular injection does not occur.^{1,5}

Epinephrine improves local anesthesia. In general, there does not appear to be any significant contraindication for the careful use of *lidocaine with epinephrine* in pregnant patients.¹

Levonordefrin, another vasoconstrictor used in local anesthetic solutions, has pharmacologic activity similar to epinephrine. In equal concentrations, levonordefrin is less potent than epinephrine in raising blood pressure or as a vasoconstrictor. However, in dental cartridges, the concentration of levonordefrin (1:20,000) is five times the normally employed concentration of epinephrine (1:100,000). This higher concentration of levonordefrin is a more potent vasoconstrictor, and, therefore, carries a higher risk to the fetus. Thus, levonordefrin is a poor choice for the pregnant patient.⁵

3.3 Peripheral analgesics

Aspirin and *NSAIDs* have the common mechanism of inhibiting prostaglandin synthesis. NSAIDs may prolong labor. prostaglandin inhibitors raise concerns about premature fetal ductus arteriosus constricture, resulting in pulmonary hypertension in the fetus. There may be a slightly increased risk of congenital anomalies, including cardiac defects, when NSAIDs—such as *ibuprofen*, *naproxen*, or *celecoxib*—are taken early in pregnancy as well.²³ Newborns of mothers who have ingested 5 g to 10 g of aspirin 5 days before delivery are associated with bleeding tendencies, specifically intracranial hemorrhage. Aspirin and other NSAIDs should be avoided, especially during the third trimester of pregnancy. The alternative to aspirin and other NSAIDs is *Acetaminophen*, which causes less gastric irritation and does not cause bleeding tendencies.

3.4 Centrally acting Analgesics:

Codeine is associated with multiple congenital defects, including heart defects and cleft lip/palate.^{26 27} Neonatal respiratory depression as well as *opioid* withdrawal has also been reported with opioid use.²⁸ The prolonged or high-dose use of opioids significantly increases these risks when used late in pregnancy.

3.5 Antibiotics

The *penicillin* and *cephalosporin* antibiotics most commonly used in dentistry (*penicillin V*, *amoxicillin*, and *cephalexin*) are generally considered safe for use during pregnancy. *Clindamycin*, *Metronidazole*, and *Erythromycin* are also believed to have minimal risk. *Aminoglycosides*, such as *Gentamicin*, may induce *ototoxicity* when administered late in pregnancy. *Tetracyclines*, including *Doxycycline*, have been implicated in causing *tooth discoloration* and *impaired bone metabolism*.

Sedative agents:

Sedative agents are inhibitors of neuronal function and generally cross placental barriers. The anti-anxiety drugs commonly prescribed, the *benzodiazepine diazepam* have noted association with it's exposure during pregnancy and oral clefts. Overall, the evidence cautions against the prolonged use of benzodiazapines, particularly during pregnancy.

3.6 Nitrous Oxide and Anesthesia

Prolonged high-dose exposure to *nitrous oxide* in rats has demonstrated skeletal and behavioral *teratogenic effects*.^{32,33} Prolonged exposure to nitrous oxide has been demonstrated to inhibit cell replication, minimizing long appointments using N2O—particularly during the first trimester—would seem indicated.

4. Conclusion

Maintaining an optimal oral health, is essential for women who are pregnant. Dental practitioners should provide all necessary care for pregnant patients, particularly when managing an acute infection. Drug and chemical exposure during pregnancy is believed to account for about 1% of congenital malformations.⁴² When dental treatment is necessary to maintain oral health, selecting the safest agents, limiting the duration of the drug regimens, and minimizing dosages are the fundamental principles for safe therapy.

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