

PREGNANT WOMEN CARE IN DENTAL OFFICE: A REVIEW ARTICLE

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ABSTRACT

The purpose of this article is to provide basic knowledge for dental students and dental practitioners regarding management of pregnant patients in a dental clinic. A pregnant female require substantial care, medical monitoring and emotional assistance and it is strongly recommended that a thorough oral health assessment is to be carried out for pregnant females. It is also important for a dentist to know and take measures according to patient's condition such as alteration in the medication and deference of certain elective treatments that may coincide with the organogenesis phase of the fetus and it is recommended that the practitioner consults with the patient's obstetrician.

KEYWORDS: Organogenesis, estrogen, hormones, pregnancy.

INTRODUCTION

Human gestation is a period of dynamic physiologic changes designed to support the developing fetus. Systems affected are respiratory, gastrointestinal system, circulatory system, and musculoskeletal. These alterations influence the patient's general health and make her prone to develop complications unique to pregnancy. The alterations that occur during pregnancy are due to an increase in maternal and fetal requirements for the growth of the fetus and the preparation of the mother for delivery. Both systemic, as well as local

physiologic changes occur at the time of pregnancy. A noticeable increase in secretion of estrogen and progesterone is seen by up-to 10 and 30 times respectively. 45% of pregnant females have gestational diabetes because pregnant women are unable to produce sufficient amounts of insulin to overcome the antagonistic action of estrogen and progesterone.^[1,2] These changes in hormonal levels affect most of the organ systems including oral cavity. Bacterial flora of the oral cavity changes with the change in hormone levels and these changes support the occurrence of pyogenic granulomas and disease process in periodontium.^[3]

A Pregnant woman requires various levels of dental support throughout this time and the dentists therefore must understand the requirement of the pregnant patient and improvise the treatment plan and should not perform those procedures which could require multiple dental radiographs and medications which could be harmful to the fetus unless it is an acute infection and cannot be deferred.^[4,5] For the protection of both the mother and unborn child, dental professional may need to incorporate maternal counseling, changes in treatment modalities, or changes to their customary medication repertoire.

Oral cavity Changes during pregnancy

Gingivitis and pregnancy associated hyperplasia are the common mucosal changes reported. Pyogenic granulomas and alterations in the saliva have been reported and are related to the elevated levels of estrogen causing an increase in the permeability of blood capillaries. This increased permeability results in accumulation of inflammatory factors.^[6] Pregnancy actually exaggerates pre-existing diseases rather than causing it. A typical lesion of periodontium that appears is pregnancy is epulis, it is a type of pyogenic granuloma which is characterized by a dark red, swollen and smooth gingival tissue which bleeds easily.^[7,8] The increased level of salivary estrogen, the proliferation and desquamation of the oral mucosal cells provide a suitable environment for bacterial growth which also predisposes the pregnant woman to dental caries.^[9]

It has been theorized that the endotoxins from periodontal inflammation are risk factors and cause a stimulation of the production of cytokines and prostaglandins.^[10] Such pro-inflammatory mediators could cross the placenta barrier and may induce fetal toxicity that can result in preterm delivery and low-birth-weight.^[11] Chemical mediators involved in maternal periodontitis have also been reported as a strong risk factor of preterm low birth weight and improving periodontal health before or during pregnancy may prevent or reduce

the occurrences of adverse pregnancy outcomes and leads to reduction of the maternal and perinatal morbidity and mortality but such cause to effect is yet to be proven as no such relationship has been established between periodontal disease and preterm low birth weight.^[12]

Radiography and chair positioning

It is advisable that during the first trimester, oral health status is assessed and the patient is informed about the changes which they might encounter during the pregnancy. Knowledge about the regulation of these changes should also be outlined, if they occur. Patients also must be educated and the dental treatment should be done if possible, should be restricted to prophylaxis and emergency treatment where possible. Dental radiography for pregnant females is considered safe during pregnancy if protective measures have been provided which include thyroid collar, Lead apron and use of high speed E films. No fetal abnormalities have been reported to x-ray radiation values of 5-10 cGy and a complete set of full mouth radiographs results in radiation exposure of value 8×10^{-4} cGy.^[13,14] The highest risk to the fetus from teratogenicities is during the first 10 days after the conception. Spontaneous abortions have been reported in various studies during first trimester when dental treatment were received by the patient.^[15,16] Organogenesis phase is completed by the end of first trimester and the second trimester is reported to be the safest time to carry out minor elective dental treatment, but some unavoidable dental emergencies such as acute pain and infections should be addressed at any stage of pregnancy to avoid patient discomfort. Treatments that take longer time to complete the procedure and require any elective surgical intervention must be postponed until delivery has taken place.^[17]

Dental chair position should be controlled and monitored while working because when uterus expands it lies right over dorsal aorta and vena cava. These may get compressed when patient is in supine position resulting in reduction of cardiac output, venous return and uteroplacental blood flow. An Aortrocaval compression leads to supine hypotensive syndrome and this syndrome is characterized by weakness, restlessness, sweating, pallor and tinnitus. This situation is managed turning the patient on her left side and placing a pillow to elevate her right hip and buttock by about 15°. Strict precautions should be taken during the second month of the third trimester, procedures should be avoided where possible. The rest of the period of the third trimester is safe for elective dental procedures that do not require surgical

intervention. Protocols followed for dental radiography are the same as for the first trimester and peri-apical and bitewing radiographs can be taken with protection protocols.^[15,18]

Medications to be prescribed to pregnant patients

During pregnancy the serum plasma concentration is reduced, lipid solubility increased and low plasma half-life, therefore the prescribed drugs are easily absorbed, distributed and cleared from the system as compared to a non-pregnant female. All these factors leads to increased transfer of drugs from mother to fetus via placenta which can culminate and cause potential miscarriage, low birth weight, neonatal toxicity and teratogenicity which raises the chances of morbidity and mortality of the unborn child.^[19-22] Food and Drug Administration (FDA) has classified drugs on basis of their risk to mother and developing fetus during pregnancy into various categories (Table 1).

Table 1. Drug Classification for Pregnant patients as given by U.S Food and Drug administration.

Category	Evidence
A	Human studies carried out in a control environment have failed to show risk to the fetus and fetal harm appears remote.
B	Animals have shown adverse reaction when subjected to these drugs but well-controlled studies in pregnant women have failed to show a risk to the fetus.
C	Animals have shown adverse reaction when subjected to these drugs but there are no adequate and controlled studies in pregnant women
D	Positive evidence exist which reflects risk to the human fetus but the need of the therapy outweighs potential danger.
X	Positive relationship exists between such drugs and human fetal abnormalities and their use is contraindicated for patients that are or may become pregnant.

Antibiotics

When prescribing antibiotics to a pregnant woman, amoxicillin and penicillin V are the safest drugs and the most common drugs and these are classified as class B. Tetracycline and Doxycycline are categorized in class D because these affect teeth and bone development. Arthropathy and congenital cartilage defects are reported in animals with use of Ciprofloxacin

but there are not sufficient evidence among human studies thus categorized in class C²³ (Table 2).

Table 2: Drugs Categorized as pregnancy risk category by FDA.

Antibiotics	Analgesics	Anxiolytics	Local Anesthetics
Amoxicillin (B)	Acetaminophen (B)	Barbiturates (D)	Lidocaine (B)
Cephalexin (B)	Ibuprofen (B)(D)	Benzodiazepines (D)	Prilocaine (B)
Chlorhexidine (B)	Acetaminophen hydrocodone (C)	Nitrous oxide (not rated; avoid in first trimester)	Epinephrine (C)
Penicillin (B)	Acetaminophen Oxycodone (C)		Articaine (C)
Clindamycin (B)	Acetaminophen Codeine (C)		Bupivacaine (C)
Erythromycin (B)	Aspirin (C)		Mepivacaine (C)
Metronidazole (B)	Naproxen (B)		
Ciprofloxacin (C)	Mefenamic acid (C)		
Tetracycline (D)	Propoxyphene (C)		
Doxycycline (D)			

Analgesics

Paracetamol (Acetaminophen) is a relative safer drug for pain management of a pregnant patient as compared to Aspirin and has no negative effects reported so far but prolong use of acetaminophen with narcotics have shown neonatal respiratory depression.^[24] Use of acetaminophen in adults may cause livers toxicity and dosage should not exceed more than 4gm/day. Most of the analgesics which are prescribed to normal adults are categorized as class C for pregnant patients however there use is not absolutely contraindicated as there are no studies reflecting that they affect fetus but use of Class C drugs should be of short duration. Use of Ibuprofen has been associated with fetal ductus arteriosus and inhibition of labor in third trimester thus categorized as class D but for first and second trimester it is categorized as class B^[25] (Table 2).

Local Anesthetics and Vasoconstrictors

Local anesthetic agents can be used during pregnancy. Lidocane 2%, Prilocane and Etidocane are classified by FDA as safe anesthetic agents but there use should be monitored and should not exceed maximum recommended dose. Mepivacane 3%, Procaine and Articane can also be used but with caution and consent of obstetrician and should be avoided if any their alternate

is available.^[26-28] Epinephrine is a class C drug, theoretically if injected intravenously it might obstruct uteroplacental blood flow, which can be prevented by slowly injecting local anesthesia using aspirating needle and limiting to a minimum dose required (Table 2).

Restorative considerations

American Dental Association (ADA), FDA and WHO have classified amalgam restorations to be safe for pregnant patients requiring cavity restorations even though the dental community is uncertain about the use of dental amalgam. It has mercury metal alloy, consisting of 50% of organic mercury. Dental amalgam restorations release mercury vapors (a form of inorganic mercury) in the oral cavity especially during chewing. This released mercury could cross the placental barrier through blood circulation. Although no such evidence has been found or is yet to be reported that it is harmful during the pregnancy and many concerns can be effectively managed with the application of dental rubber dam during restorative procedures.^[29] Composite resins and glass ionomer cements can also be used for restorations however, it was observed that bisphenol-A, a component present in composite resins, results in endocrine disruptions in animals.^[30,31]

Procedures which require gingivectomy should be done with caution and could raise a concern for a dentist while treating the patient as it may lead to bacteremia. Literature does not provide sufficient evidence to support the concern but pregnant patients may be given prophylactic antibiotic coverage if there is risk of developing infective endocarditis.^[32] In a controlled clinical trial, 1806 women were randomized to get scaling and root planning. Patients who were assigned to get delayed periodontal treatment until after birth showed a worsening of their periodontal status over the course of pregnancy. No significant correlation could be found between groups who had birth complications in relation to periodontal infection and the treatment provided for the disease. Nevertheless periodontal therapy should be provided either antenatal or during a safe pregnancy period and should be restricted to supra gingival scaling and polishing where possible.^[33]

Pregnant patient management guidelines

First trimester (conception to 14th week): The most critical period of rapid cell division and active organogenesis occur between the second and the eighth week of post conception. Therefore, the higher risk of susceptibility to stress and teratogens occurs during this time and 50% to 75% of all spontaneous abortions occur during this period.^[32]

The recommendations are

1. Educate the patient about maternal oral changes during pregnancy.
2. Emphasize strict oral hygiene instructions and thereby plaque control.
3. Limit dental treatment to periodontal prophylaxis and emergency treatments only.
4. Avoid routine radiographs. Use selectively and when needed.

Second trimester (14th to 28th week)

Organogenesis is completed and therefore the risk to the fetus is low. Some elective and emergency dental procedures are more safely accomplished during the second trimester.

The recommendations are

1. Oral hygiene instruction and plaque control.
2. Scaling, polishing, and curettage may be performed if necessary.
3. Control of active oral diseases, if any.
4. Elective dental care is safe.
5. Avoid routine radiographs. Use selectively and when needed.

Third trimester (29th week until childbirth)

Although there is no risk to the fetus during this trimester, but pregnant female may experience higher level of discomfort. Short dental appointments for treatment should be scheduled with appropriate positioning while in the chair to prevent supine hypotension. The safe time to perform routine dental treatment is the early part of the third trimester, but from the middle of the third trimester routine dental procedures should be avoided.

The recommendations are

1. Oral hygiene instruction and plaque control.
2. Scaling, polishing, and curettage may be performed if necessary.
3. Avoid elective dental care during the second half of the third trimester.
4. Avoid routine radiographs. Use selectively and when needed.

CONCLUSIONS

It is important that a Dentist-Obstetrician-Patient interface is well established while formulating a treatment plan for pregnant patients so that the chances of complications to occur can be significantly reduced for a better results. It is necessary that health professionals collaborate to ensure that such patients receive thorough oral health assessment, intervention

as well as oral health education. The dentist must gain basic understanding of the physiological changes and influences that may occur during pregnancy with the use of certain medications and dental procedures and with use of dental radiography. Oral and maxillofacial surgeons should be consulted if there is an emergency involving trauma and severe dental infections. Active treatment in pregnant females should be focused towards improving the maternal oral and general health with minimum fetal risk.

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