Dental Considerations in a Patient with Pregnancy: A Concise Review

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ABSTRACT: The purpose of this article is to provide basic knowledge for dental students and dental practitioners regarding dental management of pregnant patients in clinical practice. A pregnant female requires extensive care, medical monitoring, and emotional assistance, and it is strongly recommended that a thorough oral health assessment is carried out for pregnant females. It is also important for a dentist to understand 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: Clinical considerations, Drug safety, Oral health care, Pregnancy.


Received: 21 April 2016, Accepted: 15 June 2016

INTRODUCTION

The changes that occur in a pregnant female are due to an increase in maternal and fetal requirements for the growth of the fetus and the preparation of the mother for deliver. Several systemic, as well as local physiologic changes in a pregnant woman occur at the time of pregnancy. A substantial rise in secretion of estrogen and progesterone is seen by up-to 10 and 30 folds respectively. Also about 45% of females have gestational diabetes because pregnant women are unable to produce sufficient amounts of insulin to overcome the antagonistic action of estrogen and progesterone.

These hormonal changes affect most of the organ systems and oral cavity is not exempted from it. Within the oral cavity, bacterial flora changes with the change in hormone levels and these changes support the occurrence of pyogenic granulomas and disease process in periodontium. 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.

CHANGES TO THE ORAL CAVITY DURING PREGNANCY

Gingivitis and pregnancy associated hyperplasia are the common mucosal changes observed. Pyogenic granulomas and changes in the saliva have been reported and are related to the elevated levels of estrogen causing an increase in the formation and permeability of blood capillaries. This increase leads to accumulation of inflammatory factors. Pregnancy actually aggravates pre-existing diseases rather than causing it. A characteristic lesion of periodontium that appears is pregnancy epulis, a type of pyogenic granuloma which is characterized by a dark red, swollen and smooth gingival which bleeds easily.

Due to an increase in salivary estrogen levels, 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. It has been theorized that the endotoxins from periodontal inflammation are risk factors and cause a stimulation of the production of cytokines and prostaglandins (IL-1β, IL-6, and TNF-α). Such
pro-inflammatory mediators could cross the placenta barrier and may induce fetal toxicity that can result in preterm delivery and low-birth-weight\textsuperscript{11}. Chemical mediators of 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 therefore, reduce 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\textsuperscript{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. Guidance about the management of these changes should also be outlines, if they take place. Patients must be educated and the dental treatment if possible, should be restricted to prophylaxis and emergency treatment where possible. Dental radiography is considered safe during pregnancy if protective measures have been provided such as thyroid collar, Lead apron and use of high speed E films. No fetal abnormalities have been reported to x-ray radiation values 5-10\textsuperscript{cGy} and a complete set of full mouth radiographs results in only \(8 \times 10^{-4}\text{cGy}\)\textsuperscript{13,14}. The greatest risk to the fetus of teratogenicity and death, is during the first 10 days after the conception. Spontaneous abortions have been reported in the literature during first trimester when dental treatment were received by the patient\textsuperscript{15,16}. Organogenesis 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 dental emergencies such as acute pain and infections should be addressed at any stage of pregnancy to avoid patient discomfort. Treatment that are time consuming and require any elective surgical intervention must be postponed until delivery has taken place\textsuperscript{17}.

Dental chair position should be controlled and monitored while working because when uterus expands it lies right over dorsal aorta and vena cava. There is a chance that these may get compressed when patient is in supine position leading to decreases in cardiac output, venous return and uteroplacental blood flow. An Aortocaval compression leads to supine hypotensive syndrome which is clinically characterized by weakness, lightheadedness, restlessness, sweating, pallor and tinnitus. Such condition is managed by having the patient turn on her left side and placing a pillow to elevate her right hip and buttock by about 15\textdegree. During the second month of the third trimester, strict pre-cautions should be taken procedures should be deferred where possible.

The rest of the period of the third trimester is safe for elective dental procedures that do not require surgical intervention. Protocols for dental radiography are the same as for first trimester and peri-apical and bitewing radiographs can be taken with protection protocols\textsuperscript{15,18}.

**PRESCRIBING MEDICATIONS TO PREGNANT PATIENTS**

During pregnancy the serum plasma concentration is reduced, there is higher lipid solubility and low plasma half-life thus, the prescribed drugs are easily absorbed, distributed and cleared from the system as compared to a non-pregnant individual. These factors increases the transfer of drugs from mother to fetus via placenta which can culminate and cause potential miscarriage, low birth weight, neonatal toxicity and teratogenicity which intensifies the chances of morbidity and mortality of the unborn child\textsuperscript{19-22}.

FDA has classified drugs on basis of risk to mother-fetus during pregnancy into various categories (Table 1).

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

**Antibiotics**

When prescribing antibiotics to a gestational woman, amoxicillin and penicillin V are the safest and the most common drugs and are classified as class B. Tetracycline and Doxycycline are categorized class D because of their side effects on teeth and bone development. Arthropathy and congenital cartilage defects are found in animals with use of Ciprofloxacin but there are not sufficient evidence among human studies thus categorized as class C\textsuperscript{23} (Table 2).
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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 has shown neonatal respiratory depression. There is a risk with the use of acetaminophen of liver’s toxicity in adults 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 effect fetus but use of Class C drugs should be of short duration. 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 its categorized as class B (Table 2).

Local Anesthetics and Vasoconstrictor

Local anesthetic agents can be used and Lidocaine 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. Mepivicane 3%, Procaine and Articane can be used with caution with the consent of obstetrician and should be avoided if any alternate is available. Epinephrine is a class C drug, theoretically if injected intravenously it might impede uteroplacental blood flow, which can be avoided by slowly injecting local anesthesia using aspirating needle and limiting to a minimum dose required (Table 2).

RESTORATIVE CONSIDERATIONS

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 which is a metal alloy, consisting of 50% of organic mercury. Dental amalgam fillings release mercury vapors (a form of inorganic mercury) in the oral cavity especially during chewing. As a result, mercury could cross the placental barrier through blood circulation. However; 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. Composite resins and glass ionomer cements can also be used for treatment however; bisphenol-A, a component found in composite resins, has reportedly caused endocrine disruptions in animals.

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. Studies do 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. In a controlled clinical trial, 1806 women were randomized to receive scaling and root planning. Those patients who were assigned to get delayed periodontal treatment until after birth showed a worsening of their periodontal status over the course of pregnancy. However; no significant correlation could be established between groups who had birth complications in

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

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>Analgesics</th>
<th>Anxiolytics</th>
<th>Local Anesthetics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin (B)</td>
<td>Acetaminophen (B)</td>
<td>Barbiturates (D)</td>
<td>Lidocaine (B)</td>
</tr>
<tr>
<td>Cephalixin (B)</td>
<td>Ibuprofen (B)(D)</td>
<td>Benzodiazepines (D)</td>
<td>Prilocaine (B)</td>
</tr>
<tr>
<td>Chlorhexidine (B)</td>
<td>Acetaminophen hydrocodone (C)</td>
<td>Nitrous oxide (not rated; avoid in first trimester)</td>
<td>Epinephrine (C)</td>
</tr>
<tr>
<td>Penicillin (B)</td>
<td>Acetaminophen Oxycodone (C)</td>
<td></td>
<td>Articaine (C)</td>
</tr>
<tr>
<td>Clindamycin (B)</td>
<td>Acetaminophen Codeine (C)</td>
<td></td>
<td>Bupivacaine (C)</td>
</tr>
<tr>
<td>Erythromycin (B)</td>
<td>Aspirin (C)</td>
<td></td>
<td>Mepivicaine (C)</td>
</tr>
<tr>
<td>Metroniamazole (B)</td>
<td>Naproxen (B)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ciprofloxacin (C)</td>
<td>Mefanamic acid (C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetracycline (D)</td>
<td>Propoxyphene (C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doxycycline (D)</td>
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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.

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 can be significantly reduced for a better outcome. 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 radiography. Oral and maxillofacial surgeons may be consulted in case there is an emergency involving trauma and severe dental infections. Active treatment should be focused toward improving the maternal oral and general health while minimizing the fetal risk.

DISCLOSURE

None declared.

REFERENCES


