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Management of Pregnant patient in a Dental Clinical Setting

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Abstract

Physiological, anatomic and physical changes that occur during the course of pregnancy have an implication on the way dental practitioner goes ahead with the management of dental diseases in an expectant mother. So, various things need to be considered when a dentist treat a pregnant women or even taking her radiograph. Review of the precautions, recommendations, and the most suitable way in which the answers for an encountered dental problem in this dynamic state is sought.Instructions specific for the expectant mother prior to and during her visit to the dentist and a trimester wise approach to management throughout the course of pregnancy has been discussed in this article.

Keywords – Pregnancy, dental problems, management, radiography

Introduction

Necessary provision of dental treatment should not be withheld or be chosen to delay as it might result in progression of the existing dental diseases and further worsening of the oral healthcare status which can affect the overall and general well-being of the expectant mother.Therefore, the Dental practitioner should be skillfully prepared and fundamentally possess clarity of the plan of action that needs to be taken so that the outcome of dental services provided has a positive outcome.It is vital for any dentist attending a pregnant patient as a part of treatment protocol to comprehend and associate the adaptations of the maternal body systemsphysically,anatomically and physiologically and how the alterations in hormone fluctuations affect oral cavity and bear a dental significance[1].

Also, the dentist must be well-versed about the pharmacological mechanisms and medicinal prescriptions, the safety and efficacy of advanced radiographic technologies required for the confirmation of diagnosis, asprevention strategies and diet counselling vary considerably from onepregnant patient to another[2]. The most common problem in pregnant patient is gagging and the dentist should be prepared to handle patients with it. Elective treatment such as teeth whitening should be postponed as preterm labor can occur[3]. This happens because whitening of

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teeth requires use of higher concentrations of peroxide urea which can enter the blood after small amounts of it are deposited on the enamel surfaces in spite of proper isolation techniques. For severe cellulitis, patient should be hospitalized and I.V. clindamycin and cephalosporin should be given. Abscesses should be drained and the diseased pulp removed and tooth extracted to control odontogenic infection [3].

General protocol to be followed for pregnant patient

1. First trimester

Active organogenesis occurs during 1st trimester,increased sensitivity to external factors (prescribed or OTC drugs,maternal stress or irradiation)can result in spontaneous abortions due to greater risk of susceptibility to teratogenic agents.Routine radiographs should be avoided until necessary.

Further, the dentist should inform his assistant to be flexible in terms of placing dental appointments for the pregnant patient. Only brief dental visits should be given with avoidance of lengthy appointments. Evening appointmentsshould be given as incidence of morning sickness is less in the evenings.Also, the dental surgeon can prepare by having oro-pharyngeal suction readily available in case any foreign object gets lodged in the airway after vomiting,chest compressions need to be performed during late stages of pregnancy to remove it so that the airway does not get blocked.

A teaspoon of baking soda in a cup of water for rinsing can be used. This results in neutralization of acid.In order to prevent dehydration due to vomiting, sipping of small amounts of salty liquid can be done. For the protection of eroded or sensitive teeth fluoridated mouthwash can be used.Oral lavage of acid may be performed in case of acid reflux. Using of saltwater nasal sprays to treat nasal congestion is advised. Clinical examination should include evaluation of periodontal condition,erosion status as a part of assessment of oralhealthcare status during the 1st trimester[4].

2. Second Trimester

Fetus becomes less sensitive in second trimester, so this trimester is considered to be ideal for seeking dental care.History update, preventive counselling,observation of hormone-related tissue changes and checking of patient's compliance towards Oral Hygiene instructions along with reinforcement of maintenance of good dental health,inquiring about the recent changes in dietary habits are some of the things that the dentist can inquire about in the dental appointments during this time[4].Urgent /emergency treatments like minor oral surgeries following pericoronitis can be performed in future visits.

Typically, after 20 weeks of gestation the pregnant patient may enter a pathophysiologic state called supine hypotension syndrome while undergoing dental treatment and if so happens, then the dentist must immediately stop the treatment after recognition of symptoms and signs such as lightheadedness,weakness,sweating,restlessness,tinnitus,pallor,↓BP and syncope. In severe cases,unconsciousness and convulsions can occur.If this is suspected to be the cause of hypotension immediate maneuver of rolling the patient on the left side should be done. a pillow or rolled towels should be placed in order to elevate right buttock by about 15degrees

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accompanied by 100% oxygen administration.A full lateral position may be needed.If relief from hypotension doesn't occurreestablishment is attempted in the left lateral decubitus position[5].

The dentist should recognize any initiations that indicate towards dental pathology as after the end of 2nd trimester women who have never encountered any dental conditions may complain of the same.If the dentist reaches the decision to place amalgam restorations, then proper handling of mercury,rubber dam application andinfection control methods has to be done. Also, execution of effective and quick cavity preparation steps and placement of amalgam should be done[6].

3. Third trimester

During the early phase of the 3rd trimester, preventive oral care is scheduled usually from the middle to last stages of pregnancy[4]. Routine dental treatment should be avoided.For maximum safety, frequent change in position should be done along with patient positioning in such a way that head lies at a higher level than the feet propping the patient on her left side[5].The length of the dental appointments should be short(20-25 minutes)[7].

Radiography precautions to be followed for pregnant patient

Obtainment of an X-ray may be useful for yielding a diagnosis as it aids in identification of deep carious lesions and failed restorations including both of which entirely dependon the reported chief complaint[8]. X-rays can be also be acquired to monitor, keep track of progress of treatment performed,come up for an explanation for a relevant clinical question and for determination of prognosis. Therefore, the fundamental issue of radiation protection,safety and use must be addressed.

Reasonable precautions should be taken in all females of childbearing age as very few are aware of their pregnancies within the first 8 weeks[9].An informed decision should be made by the dentist on the type of imaging to be used after evaluation of clinical and patient factors [10].Counselling of the patient is needed to make them understand the nature of the planned X-rays on a factual basis,its potential benefits,and that it is being conducted for necessary care for the patient as the option of using non-radiographic technique(ultrasonography)has been exhausted.Provision of a documentation of consent that is to be filled be which is in true accordance with the indications as given in the applicable published guidelines by key organizations to protect the dentist from litigations and medicolegal liability.

The dentist can also make use of factsheets that issue warning signs in waiting rooms.A referral for a radiation physicist may be needed if the cumulative dose exceeds 5 rad[11].Recent literature states that the order of magnitude of radiation exposure from a single dental examination is less than 1%[9].The developing fetus must be in the direct pathway of radiation less than 10(muSv), as indirect exposure from scattered radiation and maternal tissues can take place. Since, both of these factors are unlikely to happen together and therefore it can be established that pregnancy is not a contradiction for dental X-rays.

Modifications or adjustments in Radiology rooms for pregnant patients

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Scattered radiation is reduced and images of improved contrast are retrieved via restriction of primary beam when rectangular collimation is used,alongside fivefold decrease of the radiation dose when compared with circular collimation[9].

A KV setting should be adjusted between 60-70Kvp in order to reduce patient's dose.Further dose reduction can be done by 40-60% by using digital imaging. The fastest speed films can reduce exposure to 20-50% in contrast to slow E speed films without compromising the diagnostic quality[12].

In order to avoid retakes, follow quality assurance programs and protocols.In addition to this, replacedamaged abdominal shielding and collars if there is indication of voids after visual inspection for creases and folds on a monthly basis. Positionthin Bismuth shielding (protective latex or leaded garments) after AEC has adjusted the tube current to avoid radiation dose cut by 50%[12].

Trimesterwise approach for Dental Radiography practice during pregnancy

1st trimester

If most recent radiographs in the patient's dental chart/documents are available then they can be referred to instead of repeating radiograph.The rate of fetal development is characterized by intensive cell proliferation,differentiation and migration[13].During early pregnancy radiation injury has an all or nothing effect as 50-100mGy may either cause the failure of blastocyst implantation resulting in spontaneous abortion or cause no stochastic or deterministic effects because the cells of blastocyst are omnipotent and can replace damaged cells.

2nd trimester

The rapid growth of fetus slows down and major organ systems begins to differentiate.Exposure to radiation greater than 100mGy is dose -related and has a threshold value significance in determining the incidence of result in intrauterine growth retardation and CNS effects such as gross congenital malformations and mental retardation[14.]

3rd trimester

Radiation exposure greater than 500mGy can deplete the cell population. But, this will not result in gross organ malformation. However, this contradicts that the teratogenic risk of fetal damage can occur at the same dose[14.]

Panoramic Radiography

The use of Panoramic radiography with rare-earth intensifying screens combined with highspeed film of 400 are recommended for pregnant patients[15].

CBCT

Certain things should be kept in mind while using CBCT in pregnant patients- small FOV,lower exposure settings of KV-ma,AEC(automatic exposure Control), provisions of short scanning

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time and avoidance of unnecessary immobilization by offering special support for the head and neck region.

Drug Management for pregnant dental patient

Prescription of many drugs for therapeutic purposes in the first 3 months of pregnancy,if necessary,should be administered in least effective doses for shortest time[16].Drug exposure to the fetus can occur as easy transfer of unbound drug across the placenta can be facilitated[17].The easy absorption of the drug in pregnancy occurs because the serum concentration for drug binding declines with a consequent higher volume of drug distribution,lower plasma life,lower maximum plasma concentration,higher lipid solubility and higher clearance of drugs[18].

	Acceptable drugs for use during pregnancy	**Food and Drug Administration Category**	**Unacceptable drugs for use during pregnancy**	**Food and Drug Administration Category**
Antibiotics	Penicillin Amoxicillin Cephalosporins Clindamycin Erythromycin (except for estolate form)	B B B B B	Tetracyclines Erythromycin (estolate form) Quinolones clarithromycin	D D C C
Analgesics	Acetaminophen Acetaminophen with codeine Codeine Oxycodone Hydrocodone Meperidine Morphine	B C C B C B B	Aspirin	C
Local anesthetics	Lidocaine Mepivacaine Bupivacaine	C C C		
Adrenergic agent	Epinephrine	C		
Inhalational agent	Nitrous oxide	Controversial teratogenicity in first two trimesters		
Sedatives/hypnotics	Diazepam Midazolam Methohexital Lorazepam	D D B D		
Antimicrobials	Chlorhexidine	B		

Anxiolytics and inhalational Drugs

Avoid NO2 during 1sttrimester as it carries the potential for causing hypoxia. However, to minimize stress after 1st trimester of pregnancy short-term NO2 administration with a concentration of 50%O2 can be done[19].Also, if a dentist can afford the installation of modern

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anesthetic machines, then certainly it can prove to be useful. However,the use of NO2 is unrated and its use is still considered to be controversial. Anxiolytics reduce anxiety before the beginning of and during the treatment and they can be mainly sedatives,barbiturates or minor tranquilizers. The implications of prescribing barbiturates and benzodiazepines have led to the development of cleft lip and palate in the past.

Analgesics

Analgesics which are available in various strengths and preparations should be given for a short-term course for 2-3 days[20].Normally,the indication for prescribing analgesics by a dentist is acute dental pain.Category B analgesics are drug of choice for pain management in pregnant patient. Acetaminophen (category B) can be used for pain management ofbut a check should be done on dose to prevent toxicity to liver[20]. Also, acetaminophen causes less gastric irritation hence there are negligible chances of gastric bleeding giving their use an upper hand over NSAIDs.

NSAIDs also causes increase risk of development of cardiac anomalies in fetus. Celecoxib's, Ibuprofen can be given during early pregnancy[21]. If the pain cannot be managed with these drugs, OTC opioids can be given. But all opioids have high chances of causing neonatal abstinence syndrome. Also, opioid analgesics have high risk of causing physical dependence, dose consultation and a strict check on dose should be done to prevent such dependence to develop[22].

Antibiotic

Antibiotics have high lipid solubility and comparatively low molecular weight. This helps in maintaining higher concentration of antibiotics in blood and hence antibiotics can easily cross placental barrier. The bioavailability of oral antibiotics is less due to decreased absorption[23]. Hence oral antibiotics are safer than the antibiotics administered through systemic routes. Category B antibiotics like all penicillin types amoxicillin, ampicillin and cephalosporin are relatively safe during pregnancy[24]. Clindamycin which is also a Category B antibiotic can be given in pregnant patients with penicillin allergy. Erythromycin can be given as it is also Category B antibiotic but the estolate form of erythromycin lies in Category D hence should not be prescribed in pregnancy. Tetracycline(Category D) results in discoloration of teeth and disturbs bone metabolism. Aminoglycosides (gentamycin) can result in ototoxicity.Hence, should not be administered in later stages of pregnancy[25].

Local anesthetics (LAs)

Pregnancy affects nerve sensitivity to LAs and this has been concluded to be true for humans as slowing of nerve conduction occurs[26].Theoretically,it has been shown that an intravascular injection with epinephrinecauses insufficient uteroplacental blood flow. Moreover, LA s whose use is considered to be safe in a pregnant woman do not cross placental barriers by diffusion. BP and sugar levels should be checked and recorded prior to administration of LA at minimal level dose with proper aspiration technique.It is imperative that dental anesthetics containing epinephrine whilst being administered,should be injected slowly.

The toxicity of LAs is reduced as there is decreased absorption in the case of vasoconstrictors. In general,there does not appear to be any significant contradiction for the careful use of lidocaine

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with epinephrine in pregnant patients as it improves local anesthesia,reduces its peak levels and therebyprolonged neural blockade [27].Levonordefrin is less potent than epinephrine in raising BP or as a vasoconstrictor but is a poor choice for pregnant patients as its high concentration is a potent vasoconstrictor and therefore carries a high risk to the fetus.

Propofol is a reasonable alternative to Ketamine and Remifentanil(Category C).Ketamine,due to its drug interaction with certain drugs can lead to an↑sed BP and because of which there can be bleeding tendencies[19]. Pregnant women have a predisposition for High BP so Ketamine should be avoided.Also,Slight Vasodilatation and acute apnea may occur.Pre-eclampsia can spawn from physiologic anemia of pregnancy and is characterized by heightened h2O retention and elevated BP.High BP can affect and be worsened by LA or in contrast insufficient anesthesia.High concentrations of lidocaine,mepivacaine and bupivacaine injected close to umbilical artery can cause development of fetal bradycardia.Both Prilocaineand Lidocaine can cross placental barrier and can reach fetus hence minimum dose should be applied whenever needed[26].

Diet and Lifestyle changes to be followed in pregnant dental patient

Pregnant patients should be advised to avoid fizzy, spicy, citrus and acidic beverages and foods respectively.Aversion to certain foods can occur during pregnancy and therefore patient should be cautioned that nutritional deficiencies can cause hypoplastic enamel in the primary incisors and henceforth a balanced diet should be eaten along with adequate water drinking preferably with optimal and safest fluoride concentrations[28]. They should be advised to avoid heavy meals.Smoking,tobacco use and illicit social drugs use should be discouraged and counselling should be provided for the same[28].Limit the intake of Flour and sugary and sticky products. Therapeutic delivery of Vitamin C and folic acid supplementation is generally advised.

Reduce oral acid exposure through dietary and lifestyle changes.Avoid bleeding areas while brushing and bleeding can be stopped if affected site is cleaned properly[29].Systemic Fluoride to be administered after 6^{th} month of gestation and daily use of both 0.05% NaF and 0.12% chlorhexidine mouthrinse(Category B).Chlorhexidine varnish along with xylitol consumption postdelivery decreases salivary MS levels. Topical fluoride gel application can cause gagging and nausea.Nevertheless, flexible mouthguards can be fabricated for the application of Na and NaF gels or else Fluoride varnishes can be used as they are better tolerated[30].Fluoride when used appropriately can control and prevent dental caries and is considered a safe and effective agent even though it can cross the placental barrier and is absorbed into fetal circulation. Scaling, polishing and root planing to be performed as a preventive measure for plaque control[31]. Only dentist recommended toothpastes to be used,toothbrush with soft bristles, avoid brushing of teeth immediately after vomiting,frequency of brushing 3 times apart from cleanings after sugary snacks are consumed and dental flossing[31].

Conclusion

Oral hygiene instructions, plaque control and periodontal prophylaxis can be carried out at any time during pregnancy. Certain precautions and preventive measures should be taken by the pregnant patient during dental procedures. They should be instructed to drink sufficient water and consume a meal of protein or carbohydrates in order to protect the pregnant patient from dehydrated states and hypoglycemic episodes respectively. Proper sterilization protocol has to be followed. With respect to taking dental radiographs the use of heat sterilizable and disposable

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unused receptor holding devices is recommended for optimal infection control. Assessment and review of the medical history and the acceptability criteria of the FDA should determine the medications that are prescribed or after consultation with the patient's physician if required.

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