ORAL SURGERY

LECTURE 4 **ا.م.د.احمد فاضل ابراهيم القيسي**

Pregnancy

A pregnant patient poses a unique set of management considerations for the dentist. Dental care must be rendered to the mother without adversely affecting the developing fetus, and although routine dental care of pregnant patients is generally safe, the delivery of dental care involves some potentially harmful elements, including the use of ionizing radiation and drug administration. Thus, prudent practitioners must balance the beneficial aspects of dentistry while minimizing or avoiding exposure of the patient (and the developing fetus) to potentially harmful procedures.

Medical Considerations:

1- Fatigue is a common physiologic finding during the first trimester with a tendency toward syncope and postural hypotension. During the second trimester, patients typically have a sense of well-being and relatively few symptoms. During the third trimester, increasing fatigue and discomfort and mild depression may be reported. Several cardiovascular changes occur as well.

2- Blood volume increases by 40%- 50%, and cardiac output increases by 30%-50%, but red blood cell (RBC) volume increases by only about 15%-20%, resulting in a fall in the maternal haematocrit (Anemia). The majority of pregnant women have insufficient iron stores, a problem that is exaggerated by significant blood loss.

3- Despite the increase in cardiac output, blood pressure falls (usually to _100/ 70 mm Hg) during the second trimester, and a modest increase is noted in the last month of pregnancy. This increase in blood volume is associated with high-flow, low-resistance circulation; tachycardia; and heart murmurs

4- During late pregnancy, a phenomenon known as supine hypotensive syndrome may occur that manifests as an abrupt fall in blood pressure, bradycardia, sweating, nausea, weakness, and dyspnea when the patient is in

a supine position. Symptoms are caused by impaired venous return to the heart that results from compression of the inferior vena cava by the gravid uterus. This leads to decreased blood pressure, reduced cardiac output, and impairment or loss of consciousness. The remedy for the problem is to roll the patient over onto her left side, which lifts the uterus off the vena cava. Blood pressure should rapidly return to normal.

5- decrease in platelets during pregnancy. While several blood clotting factors, especially fibrinogen and factors VII, VIII, IX, and X, are increased. this combined with venous stasis, pregnancy is associated with a hypercoagulable state. The overall risk of thromboembolism in pregnancy is estimated to be 1 in 1500 and accounts for 25% of maternal deaths in the United States.

6- The WBC count increases progressively throughout pregnancy primarily because of an increase in neutrophils and is nearly doubled by term. Also, during pregnancy, the immune system shifts from helper T-cell 1 (Th1) dominance to Th2 dominance. This can lead to immune suppression.Clinically, the decrease in cellular immunity leads to increased susceptibility to infections with pathogens. During the postpartum period, rebound and heightened inflammatory activity occurs.

7- Changes in respiratory function during pregnancy include elevation of the diaphragm, which decreases the volume of the lungs in the resting state, thereby reducing total lung capacity by 5% and the functional residual capacity, the volume of air in the lungs at the end of quiet exhalation, by 20%. These ventilatory changes produce an increased rate of respiration (tachypnea) and dyspnea that is worsened by the supine position. Thus, it is not surprising that sleep during pregnancy is impaired, especially during the third trimester.

8- An increased appetite and often a craving for unusual foods. As a result, the diet may be unbalanced, high in sugars, or non-nutritious. This can adversely affect the mother’s dentition and contribute to significant weight gain. Taste alterations and an increased gag response are also common.

9- Nausea and vomiting, or “morning sickness,” complicate up to 70% of pregnancies. Typical onset is between 4- and 8-weeks’ gestation, with improvement before 16 weeks.

10- Normal pregnancy lasts approximately 40 weeks. During the first trimester, organs and systems are formed (organogenesis). Thus, fetuses are most susceptible to malformation during this period. After the first trimester, the majority of formation is complete, and the remainder of fetal development is devoted primarily to growth and maturation. Thus, the chances of malformation are markedly diminished after the first trimester.

A notable exception to this is the fetal dentition, which is susceptible to malformation from toxins or radiation and to tooth discoloration caused by administration of certain tetracyclines.

11- Insulin resistance is a contributing factor to the development of gestational diabetes mellitus (GDM), which occurs in 2%-6% of pregnant women. GDM increases the risks for infection and large birth weight babies.

12- Hypertension can lead to end-organ damage or preeclampsia, a clinical condition of pregnancy that manifests as hypertension, proteinuria, edema, and blurred vision. During preeclampsia, which is a pregnancy complication characterized by high blood pressure and signs of damage to another organ system, most often the liver and kidneys usually begins after 20 weeks of pregnancy in women whose blood pressure had been previously normal. Symptoms include unusual weight gain, edema, and hypertension. Risk factors include kidney disease and vitamin D deficiency.

13- Preeclampsia may progress to eclampsia, a very serious, life-threatening condition with increasing blood pressure, and seizures or coma may develop. Symptoms that signal an increasing risk of eclampsia include upper right abdominal pain, severe headache, and vision and mental status changes. The cause of eclampsia is unknown but appears to involve sympathetic overactivity associated with insulin resistance, the renine-angiotensin system, lipid peroxidation, and inflammatory mediators.

14- During the postpartum period, the mother may suffer from lack of sleep and postpartum depression. Also, during the postpartum period, risks are increased for the development of autoimmune disease, particularly rheumatoid arthritis, multiple sclerosis, thyroiditis, and oral vesiculobullous conditions.

Dental management:

1- PREOPERATIVE RISK ASSESSMENT

a- Determine patient's stage of pregnancy, prenatal medical care, previous outcomes,

b- Determine comorbid conditions (e.g., hypertension, diabetes)

c- Ask about medications taken; use of tobacco, alcohol, or illicit drugs; history of GDM; miscarriage; hypertension; and morning sickness. If the need arises, the patient's obstetrician should be consulted, particularly with the use of certain medications

2- Breathing: Patient may have difficulty breathing in the supine position. Blood pressure Watch for supine hypotension if patient is in the supine position, most likely in late third trimester. Roll patient on left side if hypotension occurs.

3- Chair position Patient may not be able to tolerate a supine chair position in the third trimester.

4- Cardiovascular Elevated BP could be a sign of preeclampsia; refer to physician for follow-up care.

5- Drugs Avoid all drugs, if possible. If drugs are needed, use FDA category A or B if possible.

6- Equipment Take only necessary radiographs; use a lead apron and thyroid collar.

7- Emergencies Anticipate the possibility of supine hypotension if in the third trimester.

Dental Treatment Timing

TABLE 17.1 Treatment Timing During Pregnancy

First Trimester	Second Trimester	Third Trimester
Plaque control	Plaque control	Plaque control
Oral hygiene instruction	Oral hygiene instruction	Oral hygiene instruction
Scaling, polishing, curettage	Scaling, polishing, curettage	Scaling, polishing, curettage
Avoid elective treatment; urgent care only	Routine dental care	Routine dental care

Dental Radiographs

1- Ionizing radiation should be avoided, if possible, during pregnancy, especially during the first trimester, because developing fetuses are particularly susceptible to radiation damage.
2- Teratogenicity also is dependent on the dose of radiation and gestational age of the fetus at the time of exposure.
3- The safety of dental radiography has been well established, provided these features are used
   a- fast exposure techniques (e.g., high-speed film or digital imaging),
   b- filtration
   c- collimation
   d- lead aprons
   e- thyroid collars

4- When risks of dental radiography are assessed during pregnancy, the following evidence should be kept in mind and can be used to explain the risk to a patient.
a- The maximum risk attributable to 1 cGy (which is more than 1000 full-mouth series with E-speed film and rectangular collimation or 10%e20% of the threshold dose)

b- fetal dose of two periapical dental films (when a lead apron is used) is 700 times less than 1 day of average exposure to natural background radiation.
c- The risk of a first-generation fetal defect from a dental radiographic examination is estimated to be 9 in 1 billion.
d- The gonadal dose to women after full-mouth radiography using a lead apron is less than 0.01 mSv, which is at least 1000-fold below the threshold shown to cause congenital damage to newborns.

5- maternal thyroid exposure to diagnostic radiation in excess of 0.4 mGy has been associated with a slight decrease in birth weight
6- Teratogenicity is also dependent on the gestational age of the fetus at the time of exposure.
- During the organogenesis fetuses are extremely sensitive to ionizing radiation, particularly CNS between the 8th and 15th weeks of pregnancy.
- From the 16th to the 25th week, there is a reduction in the radiosensitivity of the CNS
- After the 25th week, the CNS becomes relatively radioresistant, and major fetal malformations and functional anomalies are highly improbable.

7- with use of a lead apron, rectangular collimation, and E-speed film or faster techniques, one or two intraoral films of minute significance in terms of radiation effects on a developing fetus (fetal dose of two periapical dental films (when a lead apron is used) is 700 times less than 1 day of average exposure to natural background radiation in the United States.30,31

8- Radiographs should be used only when necessary
9- Bitewing, panoramic, periapical film recommended for minimizing dose.
10- measures to further reduce the radiation dose
    a- rectangular collimation
    b- E-speed or F-speed film or faster techniques (digital imaging reduces radiographic exposure by at least 50% compared with E-speed exposures)
    c- lead shielding (abdominal and thyroid collar)
    d- high kilovoltage (kV) or constant beams
11- Production of congenital defects is negligible from fetal exposures of 50 mSv.

Oral Complications and Manifestations

1) pregnancy gingivitis;
   a- results from an exaggerated inflammatory response to local irritants and less than meticulous oral hygiene during periods of increased secretion of estrogen and progesterone and altered fibrinolysis.
   b- begins at the marginal and interdental gingiva,
   c- usually in the second month of pregnancy.
   d- Progression leads to fiery red and edematous interproximal papillae that are tender to palpation.
2) In 1% of these ladies; hyperplastic response (seen in pregnancy gingivitis) may exacerbate in a localized area, resulting in a pyogenic granuloma or "pregnancy tumor"
   A- common location is the labial aspect of the interdental papilla.
   B- generally asymptomatic
   C- tooth brushing may traumatize the lesion and cause bleeding.

- Gingival changes become apparent around the second month and continue until after parturition, then these changes regress to normal, provided if good oral hygiene is maintained
- Surgical or laser excision is occasionally required if symptoms, bleeding, or interference with mastication dictates.

3) Pregnancy does not cause periodontal disease but may modify and worsen what is already present.
4) Caries incidence increases; attributed to
   - the presence of cariogenic bacteria
   - diet containing fermentable carbohydrates
   - poor oral hygiene.

   Control of the carious process through fluoride and chlorhexidine is important because maternal saliva is the primary vehicle for transfer of cariogenic streptococci to the infant.

5) Many women are convinced that pregnancy causes tooth loss (i.e., "a tooth for every pregnancy") or that calcium is withdrawn from the maternal dentition to supply fetal requirements (i.e., "soft teeth").

- Calcium is present in the teeth in a stable crystalline form and hence is not available to the systemic circulation to supply a calcium demand.
- Calcium is readily mobilized from bone to supply these demands.
- Calcium supplementation needed for general nutritional requirements of the mother and infant.

6) Hypersensitive gag reflex and/or morning sickness, may contribute to regurgitation and lead to halitosis and enamel erosion. Advise the patient to rinse after regurgitation with a solution that neutralizes the acid (e.g., baking soda, water).

Drug Administration

Drugs prescribed during pregnancy should not be

1) Toxic
2) Teratogenic
3) respiratory depressant, causing maternal hypoxia, resulting in fetal hypoxia, injury, or death.

General rules

I- drug administration should be avoided during pregnancy, especially during the first trimester.

II- most of the commonly used drugs in dental practice can be given during pregnancy with relative safety

PREGNANCY LABELING CATEGORIES FOR DRUGS POTENTIAL RISK OF FETAL INJURY

A drug shown by controlled studies in humans have no risk to the fetus, and the possibility of fetal harm appears remote.

B drugs shown by animal studies have not indicated fetal risk, and human studies have not been conducted

C drugs shown by animal studies have a risk, but controlled human studies have not been conducted, or studies are not available in humans or animals.

D drugs shown to have human fetal risk, but in certain situations, the drug may be used despite its risk.

X drugs shown to inflict fetal abnormalities and fetal risk exists based on human experience

- Drugs in categories A or B are preferable for prescribing during pregnancy.
- Drugs used in dentistry fall into category C (safety uncertain, e.g., narcotic analgesic for a pregnant patient who is in severe pain.)
- Local Anesthetics (lidocaine, prilocaine) with epinephrine generally safe.
- Articaine, bupivacaine, and mepivacaine used with caution.
- local anesthetic and the vasoconstrictor cross the placenta, subtoxic threshold doses have not been shown to cause fetal abnormalities.
- topical anesthetics, (e.g., benzocaine, dyclonine, and tetracaine) used with caution.
- topical lidocaine is safe

Analgesics

- The analgesic of choice is acetaminophen.
- Aspirin and nonsteroidal antiinflammatory drugs convey risks for constriction of the ductus arteriosus, as well as for postpartum hemorrhage and delayed labor (risk increases during the third trimester). Therefore, it is best to avoid these analgesics (especially in the third trimester)
- Same risk is shown with potent antiinflammatory drugs (e.g., glucocorticoids and indomethacin).
- opioids, including codeine, Demerol, and propoxyphene, are associated with multiple congenital defects
- hydrocodone and oxycodone safety are unclear (best avoided)

Antibiotics

- Penicillins (including amoxicillin), erythromycin (except in estolate form), cephalosporins, metronidazole, and clindamycin, are safe
- tetracycline, including doxycycline, is contraindicated during pregnancy. Tetracyclines bind to hydroxyapatite, causing
  a- brown discoloration of teeth
  b- hypoplastic enamel
  c- inhibition of bone growth, and other skeletal abnormalities
- Clarithromycin should be avoided

Antibiotics and Oral Contraceptives

- Select antibiotics (e.g., rifampin, an antituberculosis drug) reduces plasma levels of circulating oral contraceptives.
- American Dental Association Council on Scientific Affairs issued the following recommendations when prescribing antibiotics to a female patient who takes oral contraceptives:
  "The dentist should
  1) advise the patient of the potential risk of the antibiotic's reducing the effectiveness of the oral contraceptive
  2) recommend that the patient discuss with her physician the use of an additional nonhormonal means of contraception
  3) advise the patient to maintain compliance with oral contraceptives when concurrently using antibiotics."

*In general, dentists should provide treatment for acute infection irrespective of the stage of pregnancy.

Anxiolytics:

- Few anxiolytics are considered safe to use during pregnancy.
- Benzodiazepines, zaleplon, and zolpidem should be avoided.
- single, short-term exposure to nitrous oxide–oxygen (N2 O–O2) for less than 35 minutes is not thought to be associated with any human fetal anomalies
- chronic occupational exposure to N2 O–O 2 has been associated with spontaneous abortion and reduced fertility in humans.
- following guidelines are recommended if N2 O–O 2 is used during pregnancy
  1) Use of N2 O–O 2 inhalation should be minimized to 30 minutes.
  2) At least 50% oxygen should be delivered to ensure adequate oxygenation at all times.
  3) Appropriate oxygenation should be provided to avoid diffusion hypoxia at the termination of administration.
  4) Repeated and prolonged exposures to nitrous oxide are to be prevented.
  5) The second and third trimester are safer periods for treatment because organogenesis occurs during the first trimester.
- Female dental health care workers who are chronically exposed to nitrous oxide for more than 3 hours per week, when scavenging equipment is not used, have decreased fertility and increased rates of spontaneous abortion.

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