MANAGEMENT OF DENTAL PATIENTS WITH MEDICAL PROBLEMS

Asthma

A chronic inflammatory respiratory disease consisting of recurrent episodes of dyspnea, coughing, and wheezing resulting from hyperresponsiveness of the tracheobronchial tree.

The bronchiole lung tissue of these patients is particularly sensitive to a variety of stimuli:

1) Allergens
2) Upper respiratory tract infections
3) Exercise
4) Cold air
5) Certain medications
   a) Salicylates
   b) NSAID’s
   c) B-adrenergic blocking drugs
6) Chemicals
7) Smoke
* 8) Highly emotional states such as anxiety, stress and nervousness.
Five Types of Asthma

I. Extrinsic (allergic or atopic)
II. Intrinsic (idiosyncratic, nonallergic, or nonatopic)
III. Drug Induced
IV. Exercise Induced
V. Infectious

IV. Exercise Induced Asthma

A. Stimulated by exertional activity (Running to appointment)
B. Pathogenesis unknown.
C. Thermal changes during inhalation of cold air provoke mucosal irritation and airway hyperactivity.
D. Children and young adults more severely affected because of high physical activity.

Pathophysiology

The obstruction of airflow in asthma is the result of:

A. Bronchial smooth muscle spasm.
B. Inflammation of bronchial mucosa.
C. Mucous hypersecretion.
D. Thick, tenacious mucous plugs.

→ Difficulty in Expiration
Typical Symptoms

A. Reversible dyspnea episodes.
B. Chest tightness.
C. Expiratory wheezing.
D. Cough worse at night.
E. Flushing.

II. Avoidance Of Known Precipitating Factors.

A) Operatory odorants such as methyl methacrylate should be reduced before the patient is treated.

IV. Patients To Bring Medication/Inhaler to Every Appointment

A. Bronchodilator – available
B. Prophylactic inhalation
   • Beginning of appointment
   • Valuable method
C. Inform dentist of earliest sign or symptom
D. Pulse oximeter
   • Oxygen saturation
Oral Complications and Manifestations

I. Beta, Agonist Inhalers

A.) Salivary flow by 20% to 35%
B.) Plaque ph
C.) Prevalence of gingivitis
D.) In caries

EPILEPSY

A group of disorders characterized by chronic, recurrent, paroxysmal changes in neurologic function (seizures) caused by abnormal and spontaneous electrical activity in the brain.

Grand Mal Seizures

Generalized Tonic - Clonic

I) AURA
   - Warning
   - Momentary Sensory Alteration
   - Irritability
Grand Mal Seizures
Generalized Tonic - Clonic

II) SEIZURE
• Epileptic cry
• Tonic Phase
  1) Generalized muscle rigidity
  2) Pupil dilation
  3) Eyes rolling upward or to side
  4) Loss of consciousness
• Clonic Activity
  1) Uncoordinated beating movement of limbs and head
  2) Forcible jaw closing
  3) Head rocking
• Incontinence of urine or feces

III) MENTAL STUPOR (POSTICTAL)
• Movement ceases
• Muscles relax
• Deep sleep then gradual return to consciousness
• Confused, disoriented, embarrassed, headaches

Medical Management
A) Long-term drug therapy
B) First-Line
  • (Dilantin®) phenytoin
  • (Tegretol®) carbamazepine
  • (Depakote®) valproic acid
C) Second-Line
  • (Klonopin®) clonazepam
  • (Neurotin®) gabapentin
  • (Luminal®) phenobarbital
  • (Trileptal®) oxcarbazepine
**Dental Considerations**

- **Adverse Effects**

  (Normal Daily Adult Dosages)

**Dilantin®**
- Gingival Hyperplasia (average 42%)
  - Youngsters > Adults
  - Meticulous Oral Hygiene
- Bone Marrow Suppression (Leukopenia/Thrombocytopenia)
  - Incidence of Microbial Infections
  - Delayed Healing
  - Gingival and Post Operative Bleeding

**Tegretol®**
- Xerostomia
- Ataxia
- Bone Marrow Suppression
  - Incidence of Microbial Infections
  - Delayed Healing
  - Gingival and Post Operative Bleeding

**Depakote®**
- Drowsiness
- Platelet Aggregation
- Bone Marrow Suppression
  - Incidence of Microbial Infections
  - Delayed Healing
  - Gingival and Post Operative Bleeding
IV. Be Alert To Adverse Effects of Anticonvulsants

- Drowsiness
- Slow Mentation
- Dizziness
- Ataxia
- GI Upset

VI. Management of Seizure

- Clear area
- No attempt to move patient to the floor
- Clear instrument tray from area
- No attempt to restrain or hold patient down
- Passive restraint (prevent injury)
- Do not attempt to use mouth prop/padded tongue blade at this time
- Turn patient to right side (to avoid aspiration)

STROKE

A generic term used to refer to a CVA, a serious and often fatal neurologic event caused by sudden interruption of oxygenated blood to the brain. This results in focal necrosis of brain tissue and possibly death. Even if not fatal, often some degree of debilitation in motor function, speech, or mentation noted.
**Thrombus:**
Stationary blood clot along wall of blood vessel

**Embolism:**
Blockage of artery by a clot which has been brought to its current site of lodgment by blood

**Of Those Surviving the Event:**
- 10% - No Impairment
- 50% - Mild Residual Disability
- 15-30% - Disabled, Require Special Services
- 10-20% - Require Institutionalization

*Approximately 50% of those surviving acute period (1st 6 months) are alive 7 years later*

**Signs and Symptoms**

**Right-Side Brain Damage**
- Paralyzed left side
- Spatial – perceptual deficits
- Thought impaired
- Memory deficits
- Patient can’t use mirrors (OHI)
- Difficulty performing tasks (Tooth Brushing)
Signs and Symptoms

Left-Side Brain Damage
- Paralyzed right side
- Language and speech problems
- Anxious
- Slow, cautious disorganized behavior
- Can’t remember long instructions

Dental Management

III. Hx of Stroke or TIA
   a) Use caution – previous stroke places patient at ↑ risk for another.
   b) Deferral of treatment for 6 months. Patients at ↑ risk of recurrent stroke during this period.
      1) Urgent dental care only.
   c) Patient’s with TIA’s or Reversible Ischemic Neurologic deficit are unstable.
      1) No elective care.
      2) M.D. consult / referral mandatory.

<table>
<thead>
<tr>
<th>Disease Entity</th>
<th>Vessel</th>
<th>Process</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.V.T. A.F.</td>
<td>Vein</td>
<td>Formed Blood Clot (Stasis)</td>
<td>Coumadin®</td>
</tr>
<tr>
<td>Coronary M.I. (Clot) Stroke</td>
<td>Artery</td>
<td>Intima of Vessel Reptures and Platelets Form (Later a Clot Forms)</td>
<td>ASA Plavix®</td>
</tr>
</tbody>
</table>
Dental Management

IV. Antiplatelet Drugs & Bleeding Problems
A) **Aggrenox®** (25mg. ASA / 200 mg Extended Release dipyridamole)
   - A combination antiplatelet agent intended for oral usage.
B) **Plavix®** (clopidogrel bisulfate)
   - An inhibitor of ADP – induced platelet aggregation.
C) **ReoPro®** (abciximab)
   - Inhibits platelet aggregation by preventing the binding of adhesive molecules to specific receptor sites on activated platelets.
D) **Ticlid®** (ticlopidine HCL)
   - Inhibits both platelet aggregation and release of platelet granule constituents.

Drug Effects on Platelet Aggregation

- Monitored by bleeding time (BT)
- A BT>10 minutes – potential for slight ↑ risk of bleeding
- Risk usually doesn’t become significant until BT>20 minutes
- Manage p.o. pain with acetaminophen – containing products

V. Anticoagulant Drugs & Bleeding Problems
A) **Coumadin®** (warfarin sodium)
   - Coumarin anticoagulant class, which acts by inhibiting vitamin K-dependent coagulation factors.
   - Lab Values for Invasive Treatment:
     1) A **PT** (Prothrombin Time) level 2.5 times normal or less (normal being 11 to 14 seconds)
     OR
     2) An **INR** (International Normalized Ratio) level of 3 or less.
Dental Management

V. Anticoagulant Drugs & Bleeding Problems

A) Coumadin® (warfarin sodium)
   3) If PT > 2.5 times normal or INR > 3.5 and O.S. planned:
      - Significant bleeding can occur.
      - Consult M.D.
      - Reduce dosage of anticoagulant
      - ↓ recommended over interruption to minimize the risk for adverse outcomes.

B) Heparin sodium (IV)
   - Palliative emergency dental care only
   - OR
   - Discontinue 6 to 12 hours before surgery with MD’s approval.
   - Restart heparin after clot forms (6 hours later)

C) Lovenox ® (enoxaparin sodium)
   - Low molecular weight heparin
   - Given s.q.
   - No changes required

In the past 3 years, 3 new blood thinners, also called anticoagulants, have been FDA-approved for atrial fibrillation, the type not caused by a heart valve problem, or an artificial (prosthetic) heart valve.

(one of the 3 → FDA approval → additional conditions)
Atrial Fibrillation

- **Most common** type of irregular heartbeat, affecting over 2 million people in the U.S. alone.
- Although AFib is a heart condition, the greatest risk is to the brain.
- It disrupts the flow of blood through the heart.
- As blood pools, it is more likely to form blood clots that can travel to the brain — Ischemic Stroke
- For many years Coumadin® (warfarin) was the only drug to help lower the stroke risk.

Pradaxa® (dabigatran)

- It was approved by the FDA in October 2010 for prevention of blood clots/stroke from atrial fibrillation.
- Usual dosage ➞ 150 mg tablets, 2x per day, with or without food.

Xarelto® (rivaroxaban)

- It was approved by the FDA in November 2011 to prevent blood clots/strokes from AFib.
- It had been approved earlier to lower the risk of clots after hip/knee replacements.
- In November 2012, the FDA approved it to treat DVT, (blood clots usually in lower legs and thigh), and PE. (condition that results when a blood clot from a vein breaks off and travels to an artery in the lung and blocks blood flow.)
- Stroke risk reduction dosage ➞ 20 mg 1x per day taken with evening meal. (Dosages can be different for other conditions.)
Eliquis® (apixaban)

- It was approved in December 2012 to lower the risk of dangerous blood clots and strokes secondary to AFib.
- Usual dosage is 5 milligrams, taken 2x per day, with or without food.

New Drugs

- If blood levels rise too much with new drugs, there is no “antidote” as there is with warfarin. If blood levels of warfarin rise too much, “antidote” ➔ Vitamin K. With new drugs, time is the “antidote” as the 3 drugs clear the body…should overdosing occur, for example.
- Higher blood level of new drugs can become an issue if the patient needs emergency surgery.

Dental Management

X. Minimize amount of anesthesia with vasoconstrictor (4 ml or less)

a) No epinephrine in retraction cord
• O2
• Activate EMS
• Transport
• After dx—sif indicated, thrombolytic agents should be administered within 3 hours of onset to be most effective in reestablishing arterial blood flow.

Signs or Symptoms Develop In The Office:


Pregnancy

While not considered a medically compromised condition, it poses a unique set of management considerations. Care must be rendered to the mother without adversely affecting the developing fetus. Providing routine care to pregnant patients is generally safe, but some potentially harmful elements can be involved in dental care.

I. Ionizing Radiation
II. Drug Administration
III. N2O Exposure

Normal Processes of Pregnancy

Cardiovascular Changes
a) Blood volume ↑ 40%
   1) Tachycardia
   2) Heart murmur
      1) Benign systolic
      2) 90% of women
      3) Disappears shortly after delivery
      4) Physiologic/Functional
      5) If preceded pregnancy/persisted s/p delivery needs evaluation
b) C.O. ↑ 30% to 40%
c) R.B.C. volume ↑ only 15% to 20%
IV. Blood Changes
A) Anemia
1) Occurs because blood volume \( \uparrow \) more than RBC mass does.
2) \( \downarrow \) in Hg
3) Marked need for additional folate and iron occurs
   • Approximately 20% have iron deficiency.
   • Can be exaggerated with significant blood loss.
B) \( \downarrow \) HCT valve

VI. Oral Cavity
A) Alteration in taste
B) \( \uparrow \) gag response
   • common
   • may make up to 90% vulnerable to nausea/vomiting
   • Worse during first trimester

VIII. First Trimester
A) Formation of organs and systems.
B) Fetus most susceptible to malformation.
C) Once finished, majority of formation complete.
   • Remainder of development devoted primarily to growth and maturation.
   • Chances of malformation markedly diminished.
   • Exception – Fetal Dentition
   • Later pregnancy
   • Tetracycline - staining
IX. Second Trimester
   A) Sense of well being
   B) Relatively few symptoms.

X. Third Trimester
   A) Fatigue
   B) Discomfort
   C) Mild Depression
   D) Supine Hypotensive Syndrome

Treatment Timing
I. First Trimester
   A) Plaque Control Program
      • To minimize the exaggerated inflammatory
        response of gingival tissues to local
        irritants commonly accompanying
        hormonal changes.
   B) OHI
   C) Scale, polish, curettage
   D) Avoid Elective Tx; only urgent care
   E) Ideally, stay away from drug administration
      • Sometimes impossible

Normal Processes of Pregnancy
II. Second Trimester
   A) Plaque Control Program
   B) OHI
   C) Scale, polish, curettage
   D) Routine dental care
      • Safest period
      • Control active disease, eliminate problems
        that could occur later in pregnancy
   E) Fluoride tablet supplementation from 3rd → 9th
      month safe & effective
      • 2.2 mg. tablet of Sodium Fluoride daily
      • In combination with fluoridated water
      • 97% offspring remained virtually free of caries for
        up to 10 years
      • Fluorosis absent

III. Third Trimester
   A) Plaque control program
   B) OHI
   C) Scale, polish, curettage
   D) Routine dental care (early part)
      • After middle of third trimester (late pregnancy)
        1) Postpone elective care
           • Discomfort
           • Supine hypotension

Supine Hypotensive Syndrome

Manifestation
   A) Abrupt ↓ in b.p.
   B) Tachycardia
   C) Sweating
   D) Nausea
   E) Weakness
   F) Air hunger
   G) Pallor
   H) ↓ in placental perfusion
Supine Hypotensive Syndrome

**Cause**
A) Impaired venous return  
B) Results from compression of IVC by gravid uterus  
C) This causes ↓ b. p., ↓ c.o. and impairment or LOC

Supine Hypotensive Syndrome

**Remedy**
A) Roll patient over onto her LEFT side  
B) Lifts uterus off vena cava  
C) BP should return rapidly to normal

Controversial Areas

2. Gonadal dose to woman, after full mouth x-rays is at least 1000 fold below the threshold shown to cause congenital damage to newborns.  
   - Use of one or two intraoral films are truly of minute significance in terms of radiation to developing fetus.

For the Patient...  
"The gonadal/fetal dose of 2 periapical dental films (when a lead apron is used) is less than 1 day of average exposure to natural background radiation in the U.S."

D. Don’t be cavalier  
   - Used selectively  
   - Only when necessary
Controversial Areas

II. Drug Administration

Concern: Drug may cross placenta and be toxic or teratogenic to fetus

A. Acceptable Antibiotics
   1) Penicillins
   2) Erythromycin (except in Estolate form)
   3) Cephalosporins (1st & 2nd generation)
   4) Metronidazole
   5) Clindamycin

FDA Categorization (Category B):
Animal studies have not indicated fetal risk, and human studies have not been conducted; or animal studies have shown a risk, but controlled human studies have not.

B. Analgesics
   1. Acetaminophen
      • analgesic of choice
      • category B
   2. Ibuprofen
      • avoid in 2nd half of pregnancy
      • category B
   3. ASA/Some NSAID’s
      • risk for constriction of ductus arteriosus
      • ↑ postpartum hemorrhage
      • delayed labor

Local Anesthetics

A. Administered with epinephrine considered relatively safe
B. Both local and vasoconstrictor cross placenta
C. Subtoxic threshold doses have not been shown to cause fetal abnormalities
D. Category B
   • Lidocaine
   • Prilocaine
   • Etidocaine
E. Category C
   • Mepivacaine
   • Bupivacaine
   • Fetal bradycardia
   • FDA categorization: Animal studies have shown a risk, but controlled human studies have not been conducted or studies are not available in humans/animals
Oral Complications / Manifestations

C. Tooth loss
- "A tooth for every pregnancy"
- Calcium withdraw from maternal dentition to supply fetal requirements ("soft teeth")
- Calcium is present in the teeth in stable crystalline form
- Not available to systemic circulation
- Calcium is readily mobilized from bone to supply any demands
- Calcium supplementation for "soft teeth" or tooth loss is unwarranted
- MD may still prescribe calcium for general nutritional requirements of mother and infant

Breast-feeding / Drug Administration

I. Concern is that administered drug can enter breast milk, be transferred to infant, and result in adverse effects.

II. Most drugs are only minimally transmitted to breast milk-infant exposure usually not significant
   - Amount of drug excreted in milk usually not more than 1% to 2% of maternal dose.

III. Data on which to draw definitive conclusions are limited, however, retrospective clinical studies and empiric observations, coupled with known pharmacologic pathways, allow for recommendations

IV. Antibiotics that are acceptable
   a) Penicillins
   b) Erythromycin
   c) Cephalosporins
   d) Metronidazole
   e) Clindamycin

V. Acceptable Local Anesthetics
   a) Lidocaine
   b) Prilocaine
   c) Eterodaine
   d) Mepivacaine
   e) Bupivacaine

VI. Analgesics
   a) ASA AVOID
   b) Ibuprofen → Acceptable
   c) Acetaminophen → Acceptable
   d) Naproxen → Acceptable
   e) Codeine → Acceptable

VII. Anxiolytic Agents
   a) N₂O → Acceptable

VIII. Contraindicated Medications
   a) Lithium
   b) Anticancer drugs
   c) Radioactive pharmaceuticals
   d) Tetracycline
Hypertension

An abnormal elevation of arterial pressure that can be fatal if sustained and untreated. Patients may not display its symptoms for a long time but could experience damage with resultant symptoms in several target organs:

Kidneys
Heart
Brain
Eyes

<table>
<thead>
<tr>
<th>Category</th>
<th>Systolic (mm Hg)</th>
<th>Diastolic (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal</td>
<td>&lt;120</td>
<td>&lt;80</td>
</tr>
<tr>
<td>Normal</td>
<td>&lt;130</td>
<td>&lt;85</td>
</tr>
<tr>
<td>High Normal</td>
<td>130-139</td>
<td>85-89</td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAGE 1</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>STAGE 2</td>
<td>160-179</td>
<td>100-109</td>
</tr>
<tr>
<td>STAGE 3</td>
<td>&gt;180</td>
<td>&gt;110</td>
</tr>
</tbody>
</table>

α₁  
Constriction of arteries in skin and mucosa (Cephalic and classic blood dilatation)

β₁  
β₂  
Diathesis of arteries in skull and brain (C Cephalic and classic pressure)
I. **Diuretics**
   - Reduce plasma volume and extracellular fluid by ↑ excretion of Na+

II. **Beta-Adrenergic Blockers**
   - Block beta-adrenergic receptor sites and probably have direct effects on myocardium

III. **Direct Vasodilators**
   - Cause direct dilation of arteries (mechanism unclear)

IV. **Angiotensin – Converting Enzyme (ACE) Inhibitors**
   - Block conversion of angiotensin I to angiotensin II

V. **Calcium Channel Blockers**
   - Inhibit Ca^{2+} ion influx into cardiac and vascular smooth muscle cells.

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**Definition**

I. This approach suggested by the Joint National Committee on Detection, Evaluation, and Treatment of HBP.

II. Therapy is initiated with small dose of drug, ↑ the dosage of that drug, then adding or substituting one drug after another in gradually ↑ doses as needed until:
   - b.p. goal reached
   - side effects become intolerable
   - maximum dose of each drug reached

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**Stepped - Care**

Step I: Initial therapy is begun with:
   - Diuretic
   - β Blocker

Also effective and acceptable if the above prove unacceptable or ineffective:
   - ACE inhibitors
   - CA^{2+} antagonists
   - α-receptor blocker
**Step II:** If control not achieved after 1 to 3 months, then either:
- ↑ dosage of first drug
- Add an agent from different class
- Substitute a drug from another class.

**Step III:** If control has not been achieved, a 2nd or 3rd drug or diuretic is added if not already prescribed. Supplemental drugs include:
- Vasodilators
- Adrenergic neuron antagonists

**Dental Management**
I. Many patients may be receiving medical treatment for complications of HBP
   - CHF
   - Cerebrovascular disease
   - MI
   - Renal disease
   - Diabetes

II. At least 2 to 3 b.p. recording separated by several minutes should be taken on all patients with an ↑ b.p. during the first dental appointment → results averaged
   - Let patient become accustomed to surroundings first
   - BASELINE
     - Emergency management
     - Compliance
III. D.D.S. should develop an approach to management

- Anxiety-free situation in relationship established among D.D.S., office staff, and patient
- Encourage patients to discuss fears and concerns
- ↓ stress and anxiety of treatment
  Premedication with short-acting benzodiazepine:
  » triazolam (Halcion®)
  » oxazepam (Serax®)
  » diazepam (Valium®) (Prescribe dose at h.s., night before, and another dose 1 hour before appointment), stomach emptying

- N₂O inhalation sedation is an excellent anxiolytic
  » Care to ensure adequate O₂ at all times
  » Termination hypoxia
    - To be avoided → resultant ↑ in b.p. that can occur
- Long appointment best avoided

IV. Orthostatic hypotension

- Tend to be produced by many antihypertensive agents
- Sudden changes in chair position to be avoided
  » Concluded treatment:
    - Return dental chair to upright position slowly
    - Physically support patient while getting up until good balance obtained

Vasoconstrictors & Local Anesthetic

I. Vasoconstrictors

A. ↓ systemic absorption
  1) ↑ duration
  2) ↑ depth of anesthesia
  3) ↓ chances of toxicity
  4) Provide local hemostasis
B. Reverse the mild vasodilatory properties of anesthetics.
C. Potential danger with HBP or CV disease
  1) ↑ in b.p.
  2) Arrhythmia development
D. Sympathomimetic drugs
  1) Stimulate Adrenergic Receptors (α and β)
    » Epinephrine
    » Norepinephrine
    » Levonordefrin
Conclusion of Many Studies

I. 1 to 2 carpules of 2% lidocaine with 1:100,000 epinephrine (0.018 to 0.036 mg. epi) are of little significance
   A. Benefits far outweigh any potential disadvantages/risks
   B. ↑ this amount is associated with ↑ risk of adverse hemodynamic changes
      » Approach cautiously

II. Norepinephrine and levonordefrin should not be used
   A. Excessive alpha₁ stimulation

Relative Contraindication to Use of Vasoconstrictors

I. Severe uncontrolled hypertension
II. Refractory arrhythmias
III. Recent MI (less than 6 months)
IV. Recent CVA (less than 6 months)
V. Unstable angina
VI. Recent coronary artery bypass graft (fewer than 3 months)
VII. Uncontrolled CHF
VIII. Uncontrolled hyperthyroidism

Final Considerations

I. Topical vasopressors generally should not be used
   A. Control local bleeding
II. Avoid using gingival retraction cord with epinephrine
   A. One study can soak cord → minimal systemic effects
      1. Afrin®
      2. Neosynephrine®
      3. Visine®
III. Activity of most antihypertensive drugs can be ↓ by prolonged use of NSAID’s → P.O. analgesia
   A. Few days, little practical concern