Putting Medicine Where Your Mouth Is

Leesa M. Prunty, Pharm.D., BCPS
Assistant Clinical Professor
Marshall School of Pharmacy
Clinical Pediatric Specialist

Jeremy J. Prunty, Pharm.D.
Assistant Clinical Professor
WVU School of Pharmacy
Clinical Internal Medicine Specialist
Objectives

- List the most commonly prescribed medications in pediatric patients
- Discuss how both local and systemic medications can affect the mouth
- Assess side effects and potential drug interactions involved with medications commonly prescribed by dental professionals
- Propose a strategy for integrating interdisciplinary interaction into day to day practice
Medication Effects on Oral Health
Why is this important?

- Most common chronic disease of childhood:
  - Dental caries

**Top 5 Pediatrics Prescriptions 2011**
1. Amoxicillin
2. Azithromycin
3. Albuterol Sulfate
4. Montelukast
5. Ibuprofen

http://www.practicefusion.com/pages/pr/most-commonly-prescribed-medications.html
Medications Affecting Oral pH

- Chewable tablets
- Sweetened cough drops
- Sugary liquid medications
Oral pH Solutions

- Switch to oral tablets when children can swallow
- Brush teeth after taking medication
- Take medications with meals
Medications Affecting Salivary Flow

- Xerostomia
  - Over 400 medications with these side effects
- Anticholinergic side effects
- Sympathomimetics
Medications causing Xerostomia

- Most common cause of xerostomia
- Anticholinergics most likely to cause dry mouth
- Medications with sympathomimetic/anticholinergic effects
- Antihypertensives may cause in a multitude of mechanisms
Managing Medication Induced Xerostomia

- Take medications in the morning
- Divide doses where applicable
- Avoid anticholinergics
Nonpharmacologic Xerostomia Therapies

- Bedroom Humidifier
- Artificial saliva, moisturizers, lubricants

Artificial saliva typically contain:
- Carboxymethylcellulose
- Hydroxymethylcellulose
- Electrolytes
- Fluoride
- Preservatives and flavoring

Products:
- Mouth Kote
- Biotene Gel
- Biotene Liquid
- Moi-Stir Spray

Prescriptions:
- Caphosol
  - Supersaturated calcium phosphate rinse
Pharmacologic Xerostomia Therapies

- Muscarinic antagonists
  - Pilocarpine
    - 5-10mg TID–QID (max 30mg)
    - Duration – 3-5 hours
  - Cevimeline
    - 30mg tid
    - Duration ~5 hours
- Pilocarpine eye drops
  - Four drops of 2% solution swish and swallow/spit TID

- Side effects are dose dependent
  - Sweating, nausea, rhinitis, flushing, urinary frequency

- Should not be used in:
  - Cardiovascular disease
  - Uncontrolled asthma
  - Narrow-angle glaucoma
  - Acute iritis
Chochran Review: Nonpharmacologic Interventions

- 2013 Meta analysis of 36 trials
- Looked at various Interventions and outcomes

General conclusion:
- No strong evidence to support any one intervention over another

Comparison 1: Saliva stimulants versus placebo
- Insufficient evidence

Comparison 2: Saliva substitutes versus placebo
- Insufficient evidence

Comparison 3: Saliva stimulants versus saliva substitutes
- No strong evidence to support difference of product
- Patient preference – gum over spray
Chochran Review: Topical Therapies

- 2011 Meta analysis of 36 trials
- Looked at various Interventions and outcomes
- General conclusion:
  - no strong evidence that any topical treatment is effective for relieving the sensation of dry mouth.
- Oxygenated glycerol triester spray is more effective than water based spray
- While gum increases saliva production, no evidence more or less effective than saliva substitutes
Medications Affecting Oral Mucosa

- Hypersensitivities
- Lichenoid lesions
  - Clindamycin
  - Barbiturates
  - Captopril
  - Carbamazepine
  - Furosemide
  - Ibuprofen
  - Phenytoin
Treatment of Mucosal Lesions

- Stop the offending drug
- Topical corticosteroids
- Topical anesthetic ointment
Medications Affecting Taste

- hypogeusia (decreased taste)
- dysgeusia (distortion of the correct taste)
- parageusia (bad taste)
- ageusia (no taste)
Medications Affecting Taste

- Tuccori et al. Drug related taste/smell dysfunctions
  - Macrolides
  - Terbinafine
  - Fluoroquinolones
  - Protein Kinase Inhibitors
Medications Affecting Taste

- Metallic Taste
  - Clarithromycin
  - 5-FU
- Disulfuram reaction
  - Metronidazole
- Altered sense of taste
  - Acetazolamide
  - Chemotherapy/Radiation
Medication Taste Alteration Solutions

- Remove offending agent if possible
- Limited data available
- Hoven et al. Zinc sulfate and amifostine prophylaxis for chemotherapy patients
  - Limited benefit
- Najafizade et al. Zinc sulfate prophylaxis for radiotherapy patients
  - Zinc sulfate 50mg TID x 1 month
  - Bitter, salty, sweet, and sour tastes improved
- Mizoguchi et al. Sertraline for depressed patient with altered taste
  - Dysgeusia resolved after about 1 month of treatment
Medications Affecting Tissue Pigmentation

- Tetracycline
- Minocycline
- Doxycycline
Medications Affecting Tissue Pigmentation

- Temporary tooth stains
  - Chlorhexidine
  - Liquid iron solutions
  - Clarithromycin
Medications Causing Gingival Hyperplasia

- Phenytoin
  - 3 to 62% incidence reported

- Calcium channel blockers
  - Nifedipine 6.3% incidence reported

- Cyclosporine
  - 25% incidence in certain populations
Gingival Enlargement

Figure 3. Severe gingival enlargement associated with two years’ use of a calcium channel blocker.

Figure 4. Severe gingival enlargement associated with cyclosporine therapy.
Medications that Anticoagulate

- Warfarin (Coumadin®)
- Enoxaparin (Lovenox®)
- Fondaparinux (Arixtra®)
- Dabigatran (Pradaxa®)
- Rivaroxaban (Xarelto®)
- Apixaban (Eliquis®)
Medications that Anticoagulate

- Aspirin, Clopidogrel, Prasugrel, Ticagrelor
  - Irreversible inhibition of platelets

- NSAIDs
  - Reversible inhibition of platelets

- SNRIs/SSRIs
  - Impaired platelet aggregation
Herbals

- Anticoagulate
  - Ginger
  - Ginkgo biloba
  - Garlic
  - Fish oil
- Drug interactions
  - St. John’s Wort
Medications and Mouth Infections

- Inhalers: for example
  - Fluticasone/salmeterol (Advair®)
  - Fluticasone/vilanterol (Breo Ellipta®)
  - Beclomethasone (Qvar®)

- Rinse mouth out after inhaler use to prevent thrush

- Use a spacer
Medications prescribed by dental professionals
Fluoride

Who needs it?
- 2 years and older: brush twice daily with fluoride toothpaste
- People with inadequate amounts of fluoride in drinking water
- Risk factors:
  - Poor dental hygiene
  - High consumption of sugar
  - Orthodontics
  - Dry mouth
Fluoride

- **Mouth rinses**
  - First line treatment - Available Rx and OTC
  - Not for use in kids under 6 years
  - Sodium fluoride
    - Neutral product
    - Acidic substances can stain
  - Acidulated phosphate fluoride
    - Best for patients with orthodontic devices
  - Stannous fluoride
    - Protects against gingivitis/plaque
    - Can cause some staining
Fluoride

Gels

- Useful for patients needing more than a rinse
- Sodium fluoride and stannous fluoride available
- Lower concentration products can be applied at home
- More concentrated products can be applied by a dental professional
- Children should rinse with water after use
- Not recommended for kids under 6 years old
Fluoride

- **Pastes**
  - Also useful for patients needing more than a rinse
  - Sodium fluoride + stannous fluoride available
  - Should be used at bedtime in place of regular toothpaste
  - Children should rinse with water after use
  - Not recommended for kids under 6 years old
Fluoride

- **Oral supplements**
  - Intended for people who do not drink fluoridated water or water does not have enough fluoride
    - Supplementation is recommended level is <0.7 ppm
    - [http://apps.nccd.cdc.gov/MWF/Index.asp](http://apps.nccd.cdc.gov/MWF/Index.asp)
  - CDC has specific dosing recommendations for fluoride products
    - [http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5014a1.htm#tab1](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5014a1.htm#tab1)
  - Infants – liquid formulation
  - Children – chewable tablets
Pre-dental work antibiotics for Endocarditis Prophylaxis

- Underlying principles in Guidelines
  - Infective Endocarditis (IE) is life-threatening disease and prevention is preferable to treatment infection
  - Certain underlying cardiac conditions predispose to IE
  - Bacteremia with organisms known to cause IE occurs commonly with invasive dental, GI or GU tract procedures
  - Antimicrobial prophylaxis was proven to be effective for prevention of experimental IE in animals
Endocarditis Prophylaxis

- No prospective randomized placebo-controlled studies for the efficacy of antibiotic prophylaxis

- Absolute risk for IE from a dental procedure is extremely difficult to measure

- Those at risk should receive prophylaxis any time the gingival tissue, periapical region of teeth, or perforation of oral mucosa
Cardiac conditions associated with the highest risk of adverse outcome from endocarditis for which prophylaxis with dental procedures is reasonable.

- Prosthetic cardiac valve or prosthetic material used for cardiac valve repair
- Previous infective endocarditis
- Congenital heart disease (CHD)*
  - Unrepaired cyanotic CHD, including palliative shunts and conduits
  - Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by catheter intervention, during the first six months after the procedure†
- Repaired CHD with residual defects at the site or adjacent to the site of a prosthetic patch or prosthetic device (which inhibit endothelialization)
- Cardiac transplantation recipients who develop cardiac valvulopathy

* Except for the conditions listed above, antibiotic prophylaxis is no longer recommended for any other form of CHD.
† Prophylaxis is reasonable because endothelialization of prosthetic material occurs within six months after the procedure.
Regimens for a dental procedure.

<table>
<thead>
<tr>
<th>SITUATION</th>
<th>AGENT</th>
<th>REGIMEN: SINGLE DOSE 30-60 MINUTES BEFORE PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Adults</td>
</tr>
<tr>
<td>Oral</td>
<td>Amoxicillin</td>
<td>2 grams</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Children</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 milligrams per kilogram</td>
</tr>
<tr>
<td>Unable to Take Oral Medication</td>
<td>Ampicillin OR Cefazolin or ceftriaxone</td>
<td>2 g IM* or IV†</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 g IM or IV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 mg/kg IM or IV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 mg/kg IM or IV</td>
</tr>
<tr>
<td>Allergic to Penicillins or Ampicillin Oral</td>
<td>Cephalexin OR Clindamycin OR Azithromycin or clarithromycin</td>
<td>2 g</td>
</tr>
<tr>
<td></td>
<td></td>
<td>600 mg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>500 mg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 mg/kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 mg/kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 mg/kg</td>
</tr>
<tr>
<td>Allergic to Penicillins or Ampicillin and Unable to Take Oral Medication</td>
<td>Cefazolin or ceftriaxone OR Clindamycin</td>
<td>1 g IM or IV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>600 mg IM or IV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 mg/kg IM or IV</td>
</tr>
</tbody>
</table>

\* IM: Intramuscular.
† IV: Intravenous.
‡ Or other first- or second-generation oral cephalosporin in equivalent adult or pediatric dosage.
§ Cephalosporins should not be used in a person with a history of anaphylaxis, angioedema or urticaria with penicillins or ampicillin.
Caveats for Prophylactic Antibiotics

- Assess medication allergies
  - Specific drug and reaction

- Do not give cephalosporins to anaphylaxis to a penicillin/carbapenem

- Clindamycin also carries *C. diff* risk

- Remind girls taking birth control to use a back up method
Pain medication changes

- Hydrocodone/acetaminophen (Lortab ®) 500mg APAP no longer available as of the end of the year

- Combined products will have no more than 325mg of acetaminophen

- Response to patients inadvertently consuming greater than recommended amounts of APAP

FDA Drug Safety Communication: Prescription Acetaminophen products to be limited to 325mg per dosage unit; boxed warning will highlight potential for severe liver failure. January 13, 2011. www.fda.gov/drugs/drugsafety/ucm239821.
The Fractured Health System
The “Silo System”

- Many professions taking care of 1 patient
- Egos get in the way of patient care
- Tradition and prior educational methods
- Lack of communication
Piecing it all Together
Current Initiatives

- Educational collaboration
- Simulations
- Health Care Reform
- Medical Home Models
Competency domains required for interprofessional collaborative practice Source: Core competencies for interprofessional collaborative practice.
Questions?
References

References


- FDA Drug Safety Communication: Prescription Acetaminophen products to be limited to 325mg per dosage unit; boxed warning will highlight potential for severe liver failure. January 13, 2011. www.fda.gov/drugs/drugsafety/ucm239821.


References