Dental Management of Patients with Osteoporosis

New Mexico Health Resources Providers’ Retreat

May 20, 2011

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Osteoporosis

- More than 30 million people in the US
- 24% of patients with osteoporotic fractures not treated will die because of these fractures
- At present, bisphosphonates are the best tool to reduce bone loss and significantly reduce the chance of these fractures
- USC study: 96% success rate of people using oral bisphosphonates with osteoporosis
What are Bisphosphonates?

• First approved and released in 1970
• Introduced over 20 years ago as toothpaste additive (pyrophosphates)
• Target areas of high osteoclast activity
• Re-establish balance between osteoclast and osteoblast activity
• First clinical reports of oral necrosis were published after 2003
What is the Mechanism of Action?

- Exact mechanism is unknown

- Results in inhibition of osteoclast activity - suppressing bone turnover
Bisphosphonates

1. Main purpose = to inhibit bone resorption
   - disrupts osteoclastic activity & osteoclast precursors

2. Nitrogenous forms are integrated into hydroxyapatite crystals and blocks resorption
Bisphosphonates

3. Not metabolized
   - either incorporated
   or eliminated (may take
decade)

4. Also disrupts normal bone
turnover and bone healing

5. Decreases serum Ca+
Bisphosphonates

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4. Also disrupts normal bone
turnover and bone healing

5. Decreases serum Ca+
Properties of Bisphosphonates

- Poor intestinal absorption
- Highly selective
- Prolonged storage in bone (half-life may be years)
Types of Bisphosphonate Drugs

Nitrogenous forms
• Zometa/Reclast (Zolendronate) IV
• Aredia (pamidronate) IV
• Fosamax (alendronate) PO
• Boniva (ibandronate) PO
• Actonel (risendronate) PO
• Skelid (tiludronate) PO

Non-nitrogenous
- Didronel (etidronate) IV/ PO
- Bonefos, Loron, Ostac (Clodronate) IV/ PO
Indications for Bisphosphonates

- Osteoporosis
- Chronic steroid therapy
- Paget’s disease of the bone
- Cancer metastasis to the bone
- Multiple myeloma
- Hypercalcemia in cancer patients
Contraindications

• Pregnancy
• Children
• Renal insufficiency/ pre-existing renal disease
• Low serum calcium levels
• Osteomalacia
• Esophageal reflux disease
• Patients at bed rest who cannot stand up for at least an hour
Benefits

• Prevents further bone damage and hypercalcemia
• Reduces bone pain and pathologic fractures
• Improves quality of life, healing time and strengthens bone
Side Effects

- Fever
- Phlebitis
- Malaise
- Kidney dysfunction
- Headache
- Dementia
- Nausea/emesis
- Diarrhea
- Esophageal irritation
- Osteonecrosis
New Class of Drugs Associated with ONJ

- Denosumab (Prolia)- anti-receptor activator of nuclear factor-kB ligand (RANKL)
- FDA approved for postmenopausal women with osteoporosis at high risk for fracture
- Supplied as injection for subcutaneous use
- Works by decreasing bone turnover, resulting in significant increase in bone mineral density
- ONJ noted in doses of 120 mg per month in cancer patients

Osteonecrosis

• What is osteonecrosis?
• How do bisphosphonates cause osteonecrosis?
• What is the incidence of osteonecrosis?
• Who might develop osteonecrosis?
• What are the treatments for osteonecrosis?
• Can you prevent osteonecrosis?
What is Osteonecrosis of the Jaws?

- Exposed bone in the maxilla or mandible
- A disruption of the resorption and remodeling cycle of bone
- Poor blood supply to affected area
- “Non-healing” extraction socket or exposed jawbone with progression to sequestrum formation associated with localized swelling and purulent discharge
Definition of ONJ

• American Society of Bone and Mineral Research (ASBMR) and American Association of Oral and Maxillofacial Surgeons (AAOMS)
  1. Current or previous treatment with a bisphosphonate
  2. Exposed necrotic bone in the maxillofacial region, present for at least 8 weeks
  3. No history of radiation therapy to the jaws
Clinical Picture of Osteonecrosis
Panorex
How do Bisphosphonates cause Osteonecrosis?

• The pathogenesis is consistent with localized vascular insufficiency
• Mechanism of compromising bone vascularity related to osteoclasts
• Pamidronate depresses bone vascularity in laboratory rats
• Antiangiogenic properties shown by Wood et. al
Who might develop Osteonecrosis?

- Patients on pamidronate or zoledronic acid (nitrogen containing bisphosphonates)
- Predisposing factors
  - Age
  - Radiation therapy to the jaw region
  - Medications i.e. steroids
  - Underlying dental problems
  - Tooth removal or local factors i.e. dental implants or fillings
  - Thin, friable mucosa
Risk for ONJ

• Oral bisphosphonate use for osteoporosis:
  0.01-0.04%, with a 0.09-0.034% risk after a dental extraction

• IV bisphosphonate use for malignancy
  0.88%- 1.15%, with a 6.7%-9.1% risk after a dental extraction

Risk of ONJ

• Horizon study (Health Outcomes and Reduced Incidence with Zoledronic Acid Once Yearly)

• N= 5,903 osteoporotic women, mean age= 73 y.
  matched to 5,140 control subjects (placebo)

• Incidence:
  – One case of ONJ across both groups
  – Risk described as negligible

Sources:

Risk of ONJ

- Patients treated for osteoporosis with oral or IV bisphosphonate regimens
- Risk:
  
  Less than 1 per 100,000 person-years of exposure

CONCLUSION: BN use for osteoporosis is not in itself a contraindication to oral surgery or dental implants

Sources:
Management of Dental Patients on Bisphosphonates and the Management of ONJ From Bisphosphonate Therapy
Topics to be Covered

• Management of Patients with BRONJ
  ➢ Staging of the Disease
  ➢ Common management techniques
• Dental Management of patients on BP therapy
  ➢ Patients on oral BP
  ➢ Patients on I.V. BP
• Use of implants while taking BP
• Case Report
• Ethical and Professional Dilemmas
Cross Section of Bone

Normal Bone

Osteoporotic Bone
Definition of BRONJ

• “The presence of exposed bone in the maxillofacial region that does not heal within eight weeks after identification by a healthcare provider.”
At Risk Category: Stage 0

• No apparent exposure/necrotic bone in patients who have been treated with either oral or IV bisphosphonates
• No treatment indicated
• Patient education
• Patients can have odontalgia, bone pain, sinus pain, paraesthesia/dysesthesia, neuropathic pain
Radiographic Findings: Stage 0

- Alveolar bone loss
- Bone resorption
- Changes in trabecular pattern (dense woven bone, persistence of unremodeled bone in extraction sockets)
- Thickening/obscuring of PDL with thickening of lamina dura, decrease PDL space
- Inferior alveolar canal-narrowing
Pts with BRONJ: Stage 1*

- Exposed, Necrotic (sequestrum) Bone that is Asymptomatic
- Txt: Peridex forever, no surgical txt, round/smooth rough edges with bone file/rongeur or bur

*adapted from JADA, Vol. 140, January 2009 and Dr. Eric Tuggle
Pts with BRONJ: Stage 2*

• Exposed Necrotic Bone (sequestrum), Associated with Pain, Clinical Evidence of Infection
• Txt: Peridex forever, Penicillin, Clindamycin, Keflex, or 1st Generation Quinolones
• No surgical therapy unless mobile sequestrum, and extractions if within necrotic bone, and rounding of rough edges
• Refractory cases require long term AB or i.v. AB

*adapted from JADA, Vol. 140, January 2009 and Dr. Eric Tuggle
## Antibiotic Regime for BRONJ

<table>
<thead>
<tr>
<th>Patient Type</th>
<th>Suggested Drug</th>
<th>Oral Regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Allergic to Penicillin</td>
<td>Amoxicillin</td>
<td>500mg 2X per day 14 days</td>
</tr>
<tr>
<td></td>
<td>May be combined with* Metronidazole</td>
<td>250mg 3X per day 14 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allergic to Penicillin</td>
<td>Clindamycin Or Azithromycin</td>
<td>300mg 3X per day 14 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>250mg 1X per day 10 days</td>
</tr>
</tbody>
</table>

*Amoxicillin may be combined with Metronidazole for maximum coverage of periodontal microflora*
Pts with BRONJ: Stage 3*

• Exposed necrotic bone (sequestra), Pain, Clinical Evidence of Infection, and one of the following: Pathologic Fracture, Extra-Oral Fistula, Osteolysis extending to Inferior Border of Mandible or Floor of Sinonasal Cavity

• Surgical Resection/Debridment,

*adapted from JADA, Vol. 140, January 2009 and Dr. Eric Tuggle
Stage 2 and 3

• Recommend Management by OMFS
Strategies Treating Patients on BP’s

• Pts about to start IV Bisph: Extract Non-Restorable/Perio Involved Teeth, Examine Dentures/Partials for Trauma. Incidence .8-12% of developing BRONJ

• Asymptomatic Pts receiving IV Bis: Good OHI, Regular Evaluations, Non Rest Teeth need coronectomy and endo therapy of the roots

• Asymptomatic Pts receiving Oral Bis: Elective Surgical Tx is not Contraindicated! But…. Make sure you get informed consent and the patient is well educated. Incidence is .09-.34% post extraction
Patient Tx Strategies for Oral Bisphosphonates

- Less than 3 years: no change in txt, informed consent
- Less than 3 years and concomitant steroid use: 3 month drug holiday is preferred prior to invasive procedures
- More than 3 years: 3 month drug holiday (if clinical/systemic conditions permit)
Areas of Disagreement in Management

• Quick search of PubMed on ONJ and BP- 1244 articles and of those 261 Reviews

• 2 Main areas of disagreement
  – Use of prophylactic AB prior to minor surgery for patients on BP
  – Discontinuation of BP treatment (if clinical situation allows) for tx of ONJ

• ADA expert panel and British Dental Association do not recommend prophylaxis
Areas of Disagreement in Management

• Interruption of BP for 3-6 months recommended in Canadian Guidelines for nonemergency invasive dental tx

• BDA recommends assessment on case by case basis

• No prospective studies assessing effectiveness of the treatments previously mentioned
Implant Placement Retrospective Case Series: Patients on Oral BP

• Results: 26 implants placed in 21 osteoporotic women
• Time of BP therapy before and after placement, implant location, prosthetic type, & opposing dentition showed no statistical influence on clinical or radiographic parameters
• Conclusion: Being on BP before or after placement does not jeopardize osseointegration

Implant Study

• Small Study
• Some patients (14) began BP after implant placement
• Probably can’t extrapolate the results of this study to the clinical situation
Implants- “Currently not contra-indicated if taking bisphosphonates but prudent to gain informed consent which should be documented (risk assessment)”
Case Report

- Patient missing multiple teeth
- Desires Replacement of teeth
- Multiple carious teeth
- High caries rate
- PMH: AIDS, I.V. Bisphosphonates, Medical Marijuana
Imtec 2.8 x 13 Implant
Guidelines Are Great,

BUT HOW IS THE PATIENT GOING TO PAY FOR IT?
• NM Medicaid will not cover root canals for patients over 21 years old no matter what their medical condition is

• The dentist is either:
  1. Forced to provide treatment at no cost
  2. Not treat the patient and leave them in pain
  3. Treat the patient by extracting teeth, violating best practices and guidelines

• The best practice is for physicians to demand dental clearance for any patient placed on bisphosphonates, particularly I.V.
Physicians might carry legal liability if they can’t demonstrate that a dental consultation was sought.
Should Medicare cover the costs of tx and management of BRONJ?
CONSENT FOR ORAL SURGERY IN PATIENTS WHO HAVE RECEIVED ORAL BISPHOSPHONATE DRUGS

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Patient’s Name

Date

Please initial each paragraph after reading. If you have any questions, please ask your doctor BEFORE initialing.

1. You have been treated with oral Bisphosphonate drugs, and you should know that there is a risk of future severe complications that might happen with dental treatment. There is a small but real risk. Jaw bones usually heal themselves very well and maintain their normal health. In some patients, Bisphosphonate drugs seem to affect the ability of jaw bones to break down or remodel themselves, and this interferes with the jaw’s ability to heal itself. This risk is increased after surgery, especially from extractions, gum surgery, implant placement or other “invasive” procedures that might cause even mild trauma to bone. Necrosis (dying cells) or Osteonecrosis (dying bone cells) may result, and an infection may occur in the soft tissue and/or inside the bone. This is a long-term process that destroys the jawbone that is often very hard or even impossible to get rid of.

2. Your medical/dental history is very important. We must know the medications and drugs that you have received or taken before, and are receiving or taking now. A correct medical history, including names of physicians is important.

3. The decision to stop oral Bisphosphonate drug therapy before dental treatment should be made by you in talking with your medical doctor.

4. If a complication occurs, antibiotic therapy may be used to help control infection. For some patients, such therapy may cause allergic responses or have undesirable side effects such as stomach discomfort, diarrhea, swelling of the colon, etc.

5. If osteonecrosis should occur, treatment may be long and difficult. You might need ongoing intensive therapy that could include hospitalization, taking antibiotics for a long time, and removal of dead bone. Reconstructive surgery may be needed, including bone grafting, metal plates and screws, and/or skin flaps and grafts.

6. Even if there are no immediate complications from the proposed dental treatment, the area is always subject to breakdown by itself at any time and infection due to the unstable condition of the bone. Even the smallest trauma from a toothbrush, chewing hard food, or denture sores may set off a complication.

CONSENT FOR ORAL SURGERY TREATMENT IN PATIENTS WHO HAVE RECEIVED ORAL BISPHOSPHONATE DRUGS

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7. We may need to see you on a long-term basis after your surgery to check your condition. It is very important that you keep all of your scheduled appointments with us. Regular and frequent dental check-ups with your dentist are important to try to prevent breakdown in your oral health.

8. I have read the information above and understand the possible risks of having my planned treatment. I understand and agree to the following treatment plan:

________________________________________

________________________________________

9. I understand the importance of my health history and I have given you all information. I understand that if I don’t give you true health and complete information, it may be harmful to my care and lead to unwanted complications.

10. I realize that even though the doctors will take all precautions to avoid complications, the doctor can’t guarantee the result of the proposed treatment.

CONSENT

I certify that I speak, read and write English and have read and fully understand this consent for surgery and have had my questions answered. All of the blanks were filled in before I initialed or signed the form.

Patient’s (or Legal Guardian’s) Signature

Date

Doctor’s Signature

Date

Witness’ Signature

Date
Practice Recommendations

• Dentistry
  ➢ Follow OMFS Guidelines
  ➢ Don’t be fearful of treating oral BP patients—even with minor surgery if necessary
  ➢ Educate patients of BP concerns
  ➢ Consent specifically for BP
  ➢ Ethical and professional dilemmas for tx are unresolved

• Medicine
  ➢ Dental clearance for all patients you are going to place on any type of bisphosphonate therapy
  ➢ Document that dental clearance was given
  ➢ Educate patient on need of oral hygiene
References


References- Continued


• Novis B. International Myeloma Foundation - Understanding Bisphosphonate Therapy.

References- Continued


References- Continued

• Mortensen, M et al. (2007) Osteonecrosis of the Jaw Associated with Bisphosphonate Use: Presentation of Seven Cases and Literature Review, Laryngoscope, 117:30-34, 2007


References- Continued


Acknowlegements

• Dr. Ken Shay, DDS, MS, *Dental Treatment Considerations for the Older Patient*, Dept. of Veteran Affairs and University of Michigan School of Dentistry, Ann Arbor, MI.

• Dr. Kirk Kiracofe, DDS. Former Dental Director, Albuquerque Health Care for the Homeless

• Dr. Eric Tuggle, DDS. Albuquerque OMFS

• Dr. T. Jay Robinson, DMD. Former UNMAEGD resident