Management of Endodontic Emergencies

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Lecture Outline

1. Emergency classifications
2. Emergency endodontic management. (3D approach for treating acute pain)
3. Analgesics and antibiotics
4. Definitive dental treatment

11/19/2018
Endodontic Emergency

- Pain and/or swelling, caused by various stages of inflammation or infection of the pulpal and/or periapical tissues.

- Emergency vs. Urgency.
Emergency Classifications

1. Pretreatment Emergency
2. Inter-appointment Emergency
3. Post-obturation Emergency

Flare-ups
Emergency Endodontic Management

Drugs

Diagnosis

Definitive dental treatment
Emergency Endodontic Management

### Table 1. Differential Diagnosis of Dental Pain

<table>
<thead>
<tr>
<th>Category</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odontalgia</td>
<td>e.g., reversible pulpitis, symptomatic irreversible pulpitis, symptomatic apical</td>
</tr>
<tr>
<td>Musculoskeletal</td>
<td>e.g., TMD</td>
</tr>
<tr>
<td>Neuropathic</td>
<td>e.g., trigeminal neuralgia, herpes infection</td>
</tr>
<tr>
<td>Neurovascular</td>
<td>e.g., migraine, cluster headache</td>
</tr>
<tr>
<td>Inflammatory Conditions</td>
<td>e.g., sinusitis</td>
</tr>
<tr>
<td>Systemic Disorders</td>
<td>e.g., cardiac pain</td>
</tr>
<tr>
<td>Psychogenic</td>
<td>e.g., persistent somatoform pain disorder</td>
</tr>
</tbody>
</table>
Emergency Endodontic Management

1. Non surgical root canal treatment
2. Occlusal reduction
3. Pulpatomy
4. Incision and drainage
Emergency Endodontic Management

1. Local Anesthesia
2. Analgesics
3. Antibiotics
## Analgesics

### Table 2. Commonly Prescribed Analgesics for Treating Dental Pain

<table>
<thead>
<tr>
<th>Drug</th>
<th>Brand Name</th>
<th>Dosage</th>
<th>Maximum Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ibuprofen</td>
<td>Advil, Motrin, Nuprin</td>
<td>400-600 mg every 4-6 hours</td>
<td>3200 mg/day</td>
</tr>
<tr>
<td>Naproxen</td>
<td>Aleve, Naprosyn</td>
<td>440-500 mg every 12 hours</td>
<td>1000-1100 mg/day</td>
</tr>
<tr>
<td>Acetaminophen with Codeine #3</td>
<td>Tylenol with Codeine #3 (30 mg codeine/300 mg acetaminophen)</td>
<td>1-2 tablets every 4-6 hours</td>
<td>3000 mg acetaminophen/day and 360 mg codeine/day</td>
</tr>
<tr>
<td>Acetaminophen with Hydrocodone</td>
<td>Vicodin-5 (5 mg hydrocodone/300 mg acetaminophen)</td>
<td>1-2 tablets every 4-6 hours</td>
<td>3000 mg acetaminophen/day and 60 mg hydrocodone/day</td>
</tr>
<tr>
<td>Acetaminophen with Oxycodeone</td>
<td>Percocet-5 (5 mg oxycodone/325 mg acetaminophen)</td>
<td>1-2 tablets every 4-6 hours</td>
<td>3000 mg acetaminophen/day and 60 mg oxycodone/day</td>
</tr>
<tr>
<td>Tramadol</td>
<td>Ultram (50 mg tramadol)</td>
<td>1-2 tablets every 4-6 hours</td>
<td>400 mg/day</td>
</tr>
<tr>
<td>Acetaminophen with Tramadol</td>
<td>Ultracet (37.5 mg tramadol/325 mg acetaminophen)</td>
<td>1-2 tablets every 4-6 hours</td>
<td>3000 mg acetaminophen/day and 400 mg tramadol/day</td>
</tr>
</tbody>
</table>
Analgesics

Flexible Analgesic Strategy

Aspirin-like drugs indicated

Mild Pain
Ibuprofen 400-600 mg

Moderate Pain
Ibuprofen 400-600 mg + Acetaminophen 325 mg

Severe Pain
Ibuprofen 400-600 mg + Hydrocodone 7.5 mg & Acetaminophen 300 mg

Aspirin-like drugs contraindicate

Acetaminophen 325 mg

Acetaminophen 650 mg

Acetaminophen 325 mg & Oxycodone 10 mg

11/19/2018
A combination of ibuprofen 600 mg and acetaminophen 1000 mg is more effective than placebo but not significantly different than ibuprofen 600 mg at 6 hours postoperatively. Ibuprofen 600 mg is more effective than placebo at 6 hours postoperatively.

However, there are insufficient data to recommend the most effective NSAID, dose amount, or dose interval for the relief of postoperative endodontic pain of longer duration in patients with preoperative pain.

Indications for Adjunctive Antibiotics

1. Fever > 100° F
2. Malaise
3. Lymphadenopathy
4. Trismus
5. Increased Swelling
6. Cellulitis
7. Osteomyelitis
8. Persistent Infection
Antibiotics

Conditions Not Requiring Adjunctive Antibiotics

1. Pain without signs and symptoms of infection
   a. Symptomatic irreversible pulpitis
   b. Acute periradicular periodontitis

2. Teeth with necrotic pulps and a radiolucency

3. Teeth with a sinus tract (chronic periradicular abscess)

4. Localized fluctuant swellings
Antibiotics

Types of Antibiotics and Recommended Dosages

- **Efficacy of Antibiotics**
- **Percentage**
  - Penicillin VK: 85%
  - Amoxicillin: 91%
  - Amoxicillin-clavulanate: 100%
  - Clindamycin: 96%
  - Clarithromycin: 89%
  - Metronidazole: 45%
# Types of Antibiotics and Recommended Dosages

## Table 4

<table>
<thead>
<tr>
<th>Drug of choice</th>
<th>Loading dose</th>
<th>Maintenance dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin VK$^a$</td>
<td>1000 mg</td>
<td>500 mg q4–6 h</td>
</tr>
<tr>
<td>Amoxicillin with or w/o clavulanic acid</td>
<td>1000 mg</td>
<td>500 mg q8 h or 875 mg q12 h</td>
</tr>
<tr>
<td>Clindamycin$^b$</td>
<td>600 mg</td>
<td>300 mg q6 h</td>
</tr>
<tr>
<td>Clarithromycin$^b$</td>
<td>500 mg</td>
<td>250 mg q12 h</td>
</tr>
<tr>
<td>Azithromycin$^b$</td>
<td>500 mg</td>
<td>250 mg q24 h</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>1000 mg</td>
<td>500 mg q6 h</td>
</tr>
</tbody>
</table>

$^a$If Penicillin VK alone is not effective in 48–72 h, metronidazole (loading dose 1000 mg followed by 500 mg q6 h) can be used in combination with penicillin VK or penicillin VK is switched to amoxicillin/clavulanic acid or clindamycin.

$^b$If the patient is allergic to penicillin.

### Types of Antibiotics and Recommended Dosages

**Table 5** Antibiotic prophylaxis for medically compromised patients (references in the text)

<table>
<thead>
<tr>
<th>Patient group</th>
<th>Antibiotic</th>
<th>Route</th>
<th>Dose Adults</th>
<th>Dose Children</th>
<th>Timing before procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard general prophylaxis</td>
<td>Amoxicillin</td>
<td>PO</td>
<td>2 g</td>
<td>50 mg kg⁻¹</td>
<td>1 h</td>
</tr>
<tr>
<td>Unable to take oral medication</td>
<td>Ampicillin</td>
<td>IV o IM</td>
<td>2 g</td>
<td>50 mg kg⁻¹</td>
<td>Within 30 min</td>
</tr>
<tr>
<td>Allergic to penicillin</td>
<td>Clindamycin</td>
<td>PO</td>
<td>600 mg</td>
<td>20 mg kg⁻¹</td>
<td>1 h</td>
</tr>
<tr>
<td></td>
<td>Cephalexin or cefadroxil</td>
<td>PO</td>
<td>2 g</td>
<td>50 mg kg⁻¹</td>
<td>1 h</td>
</tr>
<tr>
<td></td>
<td>Azithromycin or clarithromycin</td>
<td>PO</td>
<td>500 mg</td>
<td>15 mg kg⁻¹</td>
<td>1 h</td>
</tr>
<tr>
<td>Allergic to penicillin / amoxicillin /</td>
<td>Clindamycin</td>
<td>IV</td>
<td>600 mg</td>
<td>20 mg kg⁻¹</td>
<td>Within 30 min</td>
</tr>
<tr>
<td>ampicillin and unable to take oral</td>
<td>Cefazolin</td>
<td>IV</td>
<td>1 g</td>
<td>25 mg kg⁻¹</td>
<td>Within 30 min</td>
</tr>
<tr>
<td>medications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>

1. Pretreatment Emergencies

A. Management of Painful Irreversible Pulpitis

- Without Symptomatic Apical Periodontitis
- With Symptomatic Apical Periodontitis
I. Pretreatment Emergencies

B. Management of Pulp Necrosis with Apical Pathosis

- Pulp Necrosis without Swelling
1. Pretreatment Emergencies

B. Management of Pulp Necrosis with Apical Pathosis

- **Pulp Necrosis with Localized Swelling**
  1. relief of pressure and pain
  2. removal of a very potent irritant.
I. Pretreatment Emergencies

B. Management of Pulp Necrosis with Apical Pathosis

- Pulp Necrosis with Diffuse Swelling “Cellulitis”
2. Interappointment Emergency

- **Flare-ups:** Sever pain and/or swelling after initiation or continuation of endodontic treatment.
- **Overall incidence:** 1.5% to 20%.
- **Causative Factors:**

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<tr>
<th>Patient Factors</th>
<th>Treatment Factors</th>
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<tr>
<td>Genetic</td>
<td>Incomplete pulpectomy</td>
</tr>
<tr>
<td>Gender</td>
<td>Mechanical irritation</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Chemical irritation</td>
</tr>
<tr>
<td>Preoperative diagnosis</td>
<td>Number of treatment visits</td>
</tr>
</tbody>
</table>
2. Interappointment Emergency

- Causative Factors:

  **Patient Factors**
  - Genetic
  - Gender and Age
    - Women, 40-60 age group
    - Anxiety
  - Preoperative diagnosis

  **Treatment Factors**
  - Incomplete pulpectomy
  - Mechanical irritation
  - Chemical irritation
  - Number of treatment visits

Asymptomatic irreversible pulpitis (10%) followed by necrosed pulp with periapical lesion (2.7) and without periapical lesion (2.1%)

2. Interappointment Emergency

- **Causative Factors:**

  **Patient Factors**

  - Genetic
  - Gender and Age
  - Anxiety
  - Preoperative diagnosis

  **Treatment Factors**

  - Incomplete pulpectomy
  - Mechanical irritation
  - Chemical irritation
  - Number of treatment visits

There was a statistically significant difference between the vital group compared to the non-vital and retreatment groups (P < 0.001). Teeth in the vital group exhibited no flare-up (0 %) compared to 15 flare-ups in the non-vital group (5.3 %) and 8 in the retreatment group (4.4 %).

2. Interappointment Emergency

- **Causative Factors:**

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☐ Maintenance of apical patency during chemomechanical preparation had no significant influence on post-operative pain in posterior teeth with necrotic pulps and apical periodontitis.

2. Interappointment Emergency

- **Causative Factors:**

  - **Patient Factors**
    - Genetic
    - Gender
    - Anxiety
    - Preoperative diagnosis

  - **Treatment Factors**
    - Incomplete pulpectomy
    - Mechanical irritation
    - Chemical irritation
    - Number of treatment visits

- Postoperative pain was higher in the Foraminal Enlargement group compared with conventional endodontic therapy in the first days after treatment in teeth with necrosis and apical periodontitis.

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Necrosis and Single-visit Endodontics

✓ A retrospective study compared one-visit versus two-visit endodontic treatment in pulpally necrotic molars. Treatment records of 402 consecutive patients with pulpally necrotic first and second molars were compared. Sixteen flare-ups (8%) occurred in the two-visit group versus six flare-ups (3%) for the one-visit group. This showed an advantage for one-visit treatment at a 95% confidence level.

Eleazer and Eleazer, J Endod 1998

✓ A randomized controlled trial study compared the outcome of single- versus 2-visit root canal treatment of teeth with apical periodontitis. The result showed that there was no statistically significant difference between the 2 treatment modalities.

Paredes-Vieyra and Enriquez, J Endod 2012
2. Interappointment Emergency Treatment

✓ Psychological management

✓ Adjusting the working length

✓ Relieving the occlusion and systemic administration of nonsteroidal analgesics

✓ Passing a small file through the apical foramen in order to get drainage

✓ Incision and drainage procedure

✓ Antibiotic
3. Postobturation Emergency

- Causative Factors
- Treatment
EMERGENCY ENDODONTIC MANAGEMENT

- Diagnosis
- Drugs
- Definitive dental treatment
This is a reading guide for the assigned reference

*Endodontics: Principles & Practice 5th ed. Chapter 10*