Challenges in Pain Management for Children and Adolescents with Solid Tumors

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And our patients who tell their stories via video clips

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Why the Challenge?
• Tumor and/or pathological fractures
  – Osteosarcoma, Ewings sarcoma and other solid tumors
• Complex chemotherapy protocol: 2-3 years
  – Delayed wound healing
  – Nausea → poor oral intake of medicines
• Multiple surgeries
  – Primary tumor: Limb-sparing and amputations
  – Metastatic disease such as thoracotomies
• Intense rehabilitation
• End-of-life

Osteosarcoma Treatment Timeline
Comprehensive Plan

- Pharmacological: multimodal
  - Opioids: various routes
  - Treatment of neuropathic pain
  - NSAIDS (limited use due to side effects)
  - Neuroaxial use of local anesthetics
- Nonpharmacological
  - Identifying psychosocial issues/pre-existing coping styles
- Other challenges
  - Move between inpatient and outpatient care
  - Coordination to home community/local providers

Need Medication Reference

<table>
<thead>
<tr>
<th>Drug</th>
<th>Equianalgesic Dose (in mg)</th>
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<tbody>
<tr>
<td></td>
<td>IV Oral</td>
</tr>
<tr>
<td>Morphine</td>
<td>10 30</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>1.5 7.5</td>
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<tr>
<td>Fentanyl</td>
<td>0.1-0.2 Not available</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>Not available 15-30</td>
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Multidisciplinary Team

- Surgery: MD, APN, Wound Care RN
- Oncology: MD, RN, Pharm, SW, Childlife
- Rehabilitation/Nutrition
- Pain Service: Pain MD, Pain CNS, Pain Clinic RNs, Psychologist
**Peri-Operative Management**

- Gabapentin, started 1-3 days pre-operatively
- Psychologist appointment pre-operatively
- Meet with other amputees pre-operatively
- Initiation of epidural or nerve block catheters pre or intra-operatively
- IV opioids (+/- IV PCA)

**Neuroaxial Pain Management: SJ Experience**

- Epidurals at SJ since 1990
  - 2008 62 patients had epidural catheters for 1 to 33 days
  - 92 total infusions (range of 1 to 83 days)
    - Pt with 83 days of same catheter, out on passes during day
    - 22 pts had at least 1 day outpatient with NBI

**Nerve Block System**

- Block sensory with little motor
- Ropivacaine or bupivacaine +/- clonidine
- Use for 7 to 10 days
Patient Education: Nerve Block Infusions

**Do you know...**

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**Nerve block injections and infusions**

- What is a peripheral nerve block injection or a continuous peripheral nerve block injection?
- How does it work?
- What are some potential benefits and risks?

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**Preparation of the Patient**

- Rehearse coping for anticipated pain
- Procedural support
  - Distraction, relaxation, and deep breathing during pre-operative period and anesthesia induction
- Meet with other patients who have experienced similar surgeries

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**Challenge: Immediate Post-Operative Period**

- Ongoing multidisciplinary communication
  - Can patient follow rehabilitation plan?
  - Is pain preventing activities?
- Reassess pain and opioid requirements
  - Need for neuropathic pain medications
  - Pattern of opioid use
  - Adjustment of neuroaxial medications
- Child life and psychology support
  - Distraction/relaxation/guided imagery
  - Diversionary activities
Challenge: Rehabilitation Phase

• Sustained release/immediate release opioids
• Outpatient continuation of continuous nerve block infusion with bupivacaine
• Escalation of gabapentin
• Use of tri-cyclic anti-depressants: amitriptyline
• Use of oral methadone

• So how do our patients meet those challenges?

Patient Perspectives: Their Stories
Including Their Voices via Video clips

• JR and the need for multiple surgeries/amputation
• HC and AC: osteosarcoma times two for brother and sister
• DH: Need for pre-emptive nerve block infusion for tumor and pathological fracture
• MC: Extensive disease at diagnosis, complicated social support and end-of-life pain management strategies

Challenge: JR and Multiple Surgeries

• 12 year old from Puerto Rico with pain in right ankle
• Bone bx: osteosarcoma of R distal tibia
• Started chemotherapy
• Both he and his mother have limited English
• Outlets: bike riding and other sports
• Thoracotomy with epidural
• Amputation
• Outpatient management
• Return to sports including rock wall climbing
• Episode of viral meningitis and PCA management
### Challenge: Osteosarcoma Times Two

**AC and HC**

- **HC:**
  - Dx at 9 years of age
  - Left proximal tibia
  - Chemo 3 months pre-surgery
  - Fever and neutropenia
  - Mucositis, platelets 17K
  - RBC and platelet transfusions
- **Limb sparing surgery requiring gastronemius muscle reconstruction**
- **Insertion of expandable prosthesis**
- **Epidural analgesia**
- **Inability to swallow whole pills**
- **Weight and wound healing problems**
- **Ongoing neuropathic pain**

### Challenge: Unplanned Amputation and AC

- **AC:** 12 year old brother of HC
- **Past history of Tetrology of Fallot**
- **C/o of pain and swelling of right knee**
- **Bone bx: osteosarcoma of right proximal tibia**
- **No other mets**
- **8 rounds of chemo**
- **Limb sparing surgery**
- **Nerve block infusion**
- **Complications: thrombus in femoral artery with injury to popliteal artery requiring amputation**
- **Adjustment to amputation**
- **Outpatient with nerve block infusion**
- **Resolution of phantom pain**

### DH: Pre and Post-Operative Pain

- 15 year old with 3 mon hx of left thigh pain and swelling: large mass and fracture; diagnosed with localized osteosarcoma of the femur
- **Need for nerve block infusion in outpatient setting**
- **Chemotherapy**
- **Surgery: complex reconstruction with total femoral and hinged knee modular prosthesis**
- **Painful rehabilitation/need for ongoing nerve block infusion; use of CPM machine**
- **Psychologist role and social issues**
MC: Extensive Disease at Diagnosis

- 20 year old with months of pain in left leg
  - “tendonitis” with steroid injections
  - “pulled muscle” following slipping on a river bank
  - X-ray with large mass arising from midshaft femur and pathologic fracture
- Dx: metastatic osteosarcoma of femur extending into pelvis + multiple pulmonary mets
- Epidural and hydromorphone PCA

MC: Extensive Disease at Diagnosis

- Surgery: Hip disarticulation with epidural and fentanyl PCA
- Fentanyl patch and oral methadone for severe phantom pain
- Appendectomy, thoractomies, and craniotomy
- Ketamine infusion
- Identifying “realistic joys”
- End-of-life pain control: epidural and PCA and transition to hospice
- Complex family with history of substance abuse
- Role of girlfriend (later wife) and church

References

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