When Your Patient Can’t Say “Ouch”: Strategies in Neonatal Pain Management

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Pain

- No precise definition
- Whatever the person experiencing pain says it is and exists whenever that person says it does
- International Association for Study of Pain (1979): Unpleasant sensory / emotional experience associated with actual / potential tissue damage
Historically

- Minimalist approach
- Limiting/Avoidance - Only safe and practical way for surgery
- Minimal analgesics and muscle relaxants were the norm

Neonatal Anesthesia

- Physiologic & philosophic rationale for safety in narcotic analgesia for infants [Robinson & Gregory, 1981]
- AAP Position Statement (1987): Infants age alone should not be a factor in decision to use anesthesia
Myths About Pain & Infants

- Infants do not feel pain
- Infants feel but can’t react to pain
- Infants have no memory of pain


Physiological Effects of Pain


Adverse physiological consequences related to stress response

- Cardiovascular and respiratory system
- Endocrine and metabolic processes
- Immune system
- Coagulation & hemostasis
Biochemical Changes Associated With Pain

- Hormonal Response:
  - Increased catecholamine
  - Increased glucagon
  - Increased cortisol
  - Increased aldosterone
  - Increased corticosteroids

- Metabolic Response:
  - Hyperglycemia
  - Utilization of fat stores / ketones
  - Protein Breakdown

Factors Affect Recognition

- Myths lead to attitude formation
- Research - peeling away at layers of myths
- Education - medicine and nursing; keeping current
- Complexity of assessments - key factor
Physiologic Signs Associated With Pain

- Increased HR
- Increased BP
- Increased RR
- Shallow Respirations
- Pallor/Flushing
- Diaphoresis
- Palmar Sweating
- Decreased Oxygen Saturation

Facial Expression of Pain

- Brows lowered, drawn together
- Bulge, vertical furrows in forehead between brows
- Nasal root broadened, bulged
- Eyed fissure scouraged, tightly closed
- Angular, squarish mouth
**Pain Cry**

*Johnston, CC & Strada, ME (1996) Pain*

- High Pitched
- Followed by relatively long period of no breathing
- Followed by a period of dysphonia
- Gradual return to rhythmic rising-falling ‘basic’ cry
- Varied more in pitch of initial cries than subsequent cries
- Greater initial response differences

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**Behavioral Signs Associated With Pain**

- Vocalizations
- Bodily Movements: limb withdrawal, swiping, thrashing, rigidity, flaccidity, clenching of fists
- State System: changes in sleep/wake cycles, changes in activity level, agitation, listlessness
- Facial expressions
Infant Pain Measures: Multidimensional Measures

- Neonatal Infant Pain Scale (Lawrence et al, 1993)
- CRIES (Krechel & Bilner, 1995)
- Premature Infant Pain Profile (Stevens et al, 1996)
- COMFORT Scale (Ambuel et al, 1992)
- Modified Infant Pain Scale (Buchholz et al, 1998)

CRIES

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crying</td>
<td>No</td>
<td>High Pitch Consolable</td>
<td>Inconsolable</td>
</tr>
<tr>
<td>Required FiO2</td>
<td>No</td>
<td>&lt; 30%</td>
<td>&gt; 30%</td>
</tr>
<tr>
<td>Increased HR &amp; BP</td>
<td>No</td>
<td>11-20 % Higher</td>
<td>&gt; 20% Higher</td>
</tr>
<tr>
<td>Expression</td>
<td>None</td>
<td>Grimace</td>
<td>Grimace/ Grunt</td>
</tr>
<tr>
<td>Sleepless</td>
<td>No</td>
<td>Wakes Frequent Intervals</td>
<td>Constantly Awake</td>
</tr>
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</table>
Premature Infant Pain Profile

<table>
<thead>
<tr>
<th>GA</th>
<th>0 = &gt; / = 36 Wks</th>
<th>1</th>
<th>2</th>
<th>3 = / &lt; 28 Wks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral State</td>
<td>Active/Awake</td>
<td>Quiet/Awake</td>
<td>Active/Sleep</td>
<td>Quiet/Sleep</td>
</tr>
<tr>
<td>HR</td>
<td>0-4 Beats/Minute Inc</td>
<td>5-14 Beats/Minute Inc</td>
<td>15-24 Beats/Minute</td>
<td>25 Beats or &gt; Inc</td>
</tr>
<tr>
<td>O2 Sats</td>
<td>0-2.4% Decrease</td>
<td>2.5-4.9% Decrease</td>
<td>5-7.4% Decrease</td>
<td>7.5% or &gt; Decrease</td>
</tr>
<tr>
<td>Brow Bulge</td>
<td>None</td>
<td>Minimum</td>
<td>Moderate</td>
<td>Maximum</td>
</tr>
<tr>
<td>Eye Squeeze</td>
<td>None</td>
<td>Minimum</td>
<td>Moderate</td>
<td>Maximum</td>
</tr>
<tr>
<td>Nasolabial Furrow</td>
<td>None</td>
<td>Minimum</td>
<td>Moderate</td>
<td>Maximum</td>
</tr>
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</table>

Pharmacologic Management: Severe Pain

- Continuous opioid infusion (MSO4 / fentanyl) + sedation + acetaminophen
- PRN administration is NOT acceptable pain management
- Around the clock acetaminophen is opioid sparing
Graphic conceptualization of effect of PRN opioid administration:
[Hester & Foster (1993)]

SIDES EFFECTS

THERAPEUTIC ANALGESIA

CONSTANT PAIN

Environmental & Behavioral Strategies to Prevent /Modify Pain
[ Franck, L. & Lawhon, G. (1998)]

Environmental modification
Reduce noxious stimuli
• ↓ Lighting
• ↓ Noise from equipment & personnel
• ↓ Handling
• Limit painful procedures to those that provide crucial diagnostic information
Behavioral strategies:
- Containment / positioning - nesting, swaddling, boundaries
- Non-painful sensory stimulation - touch, rocking, music / talking, massage
- Non-nutritive sucking
- Sucrose

Procedural analgesia for circumcision
- EMLA decreases pain (Taddio, 1998)
- Dorsal penile nerve block (DPNB) better than EMLA; EMLA better pain reduction compared to no analgesia (Butler-O’Hara, 1998)
- Ring block effective in all stages of circumcision (Lander et al, 1997)
- DPNB and Mogen clamp less painful than DPNB and Gomco clamp (Kurtis et al, 1999)
<table>
<thead>
<tr>
<th>Pediatric Pain Management Protocol @ Albany Medical Ctr</th>
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<tbody>
<tr>
<td><strong>ASSESSMENTS:</strong></td>
</tr>
<tr>
<td>Use of CRIES or VAS (Visual Analog Scale)</td>
</tr>
<tr>
<td>Time intervals specified</td>
</tr>
<tr>
<td><strong>PROCEDURAL GUIDELINES:</strong></td>
</tr>
<tr>
<td>LP, Circumcision, Chest Tubes, PICC</td>
</tr>
<tr>
<td><strong>MANAGEMENT GUIDELINES:</strong></td>
</tr>
<tr>
<td>No PRN orders first 24h postop</td>
</tr>
<tr>
<td>Major operative procedure: continuous infusion -</td>
</tr>
<tr>
<td>standardized</td>
</tr>
<tr>
<td>Minor operative: around the clock analgesia</td>
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<table>
<thead>
<tr>
<th>Protocol</th>
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<tbody>
<tr>
<td>Use continuous infusions of opioids for major operative procedures</td>
</tr>
<tr>
<td>Use around the clock analgesics for minor operative procedures</td>
</tr>
<tr>
<td>NO prn analgesics in first days postop for preverbal children</td>
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<tr>
<td>Use topical anesthetics for procedures</td>
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AHCPR National Guidelines

- Adoption of standard for pain relief
- Clear documentation of assessment at regular intervals
- Education of children and families
- Families preferences respected when determining methods to be used
- QA improvement program: a review of effectiveness of pain relief strategies

Recommendations: Meeting AHCPR Guidelines

- Education: Dispel the Myths
- Multidisciplinary involvement
- Develop a written protocol/policy/standard
- Incorporate protocol into plan of care - use it, discuss it!
- Review effectiveness of pain relief strategies
Circumcision Policy Statement
[AAP 1999]
Existing scientific evidence demonstrates potential medical benefits of newborn male circumcision, however, these data are not sufficient to recommend routine neonatal circumcision … Parents should be given accurate and unbiased information… *If a decision for circumcision is made, procedural analgesia should be provided.*

Neonatal Circumcision & Pain Relief: Current Training Practices
• Pediatric and family practice programs more likely than OB programs to teach analgesia techniques
• Over 26% of programs which taught circumcisions failed to provide instruction on analgesia for procedure (Howard et al, 1998)
**JCAHO recommendations 1999**

- Hospital includes commitment to pain management in its mission statement, bill of rights or service standards
- Organization supports/coordinates activities & resources to assure pain management is recognized and addressed in all age groups: ALL PATIENTS HAVE RIGHT TO PAIN RELIEF

**Initial Assessment**

- Pain intensity, location, quality, onset, duration
- Factors that alleviate / aggravate
- Present pain regimen / effectiveness
- History: how is pain expressed, past interventions & response
- Pain goal: intensity; related to function
- Physical Exam - observe the site
Staff Education

• Pain assessment & treatment
• Barriers to reporting pain
• Use of analgesics

Provide Individualized CARE

• Monitor & determine outcomes for care
• Modify care
• Coordinate follow-up

• SUPPORT PATIENT PARTICIPATION
Define standards, protocols, policies

- Individualize
- Standardize
  - Order Sheets
  - Documentation Tools

Components to Standards

- Assessment
- Patient Rights
- Staff Knowledge
- Patient Education
- Policies
- QI
- Documentation
SUCCESS?

- Leadership support for Pain Committee
- Interdisciplinary committees already in place
- Good mechanism of communication
- Strong education department that interfaces with all disciplines
- Quality monitoring across disciplines
- Patient education interdisciplinary

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