Pain Management in the Emergency Department (ED)

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“Pain is, with very few, if indeed any exceptions, morally and physically a mighty and unqualified evil. And, surely, any means by which its abolition could possibly be accomplished, with security and safety deserves to be joyfully and gratefully welcomed by medical science.”

Sir James Young Simpson, 1871
Contents

• Epidemiology of pain in ED
• Pain assessment
• Pharmacological management of pain in ED
• Regional anaesthesia and analgesia in ED
• Adjuvants
An ordinary ED patient...

72 yr, female, diabetic, known also with:
• COPD
• stable angina
• congestive heart failure NYHA III
• hepatitis B

fell at home 6 hours before presenting in ED.
• her left leg appeared shorter than the right leg and externally rotated.
• Pain score at arrival: 8 on NRS
• RX (has to be attached)

• ECG (has to be attached)
What means the work in ED today?

- increased workload
- a broad range of illnesses presenting with pain
- a growing incidence of visits (20%/10yr)
- **acute pain** is the reason that the majority of patients presents to the ED (7/10)
- failure to adequately treat acute pain in ED has been labelled as a **public health problem**, in USA
- untreated pain  ➔ long term effects
Categories of illnesses presenting with pain in ED

- Trauma (fractures, dislocations, strains)
- Wounds
- Back and neck pain
- Abdominal pain
- Headache
- Chest pain (noncardiac)
- Abscesses, cellulitis
- Toothache
- Urinary tract infection
- Upper respiratory tract infection
- Renal colic

Why there is lack of analgesia in ED?

• reduced educational emphasis on pain management
• inadequate ED quality improvement services
• lack of ED pain research (geriatric, pediatric)
• concerns regarding opioid addiction and abuse
• fear of opioid side effects
• racial and ethnic bias

*Bonica’s Management of Pain*
# Acute versus chronic pain

<table>
<thead>
<tr>
<th></th>
<th>Acute pain</th>
<th>Chronic pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment goal</td>
<td>Pain relief</td>
<td>Pain prevention</td>
</tr>
<tr>
<td>Quick effect</td>
<td>Important</td>
<td>Unnecessary</td>
</tr>
<tr>
<td>Sedation</td>
<td>Often desirable</td>
<td>Undesirable</td>
</tr>
<tr>
<td>Duration</td>
<td>2-4 hours (short)</td>
<td>As long as possible</td>
</tr>
<tr>
<td>Timing</td>
<td>As needed</td>
<td>Regularly</td>
</tr>
<tr>
<td>Dose</td>
<td>Standard</td>
<td>Individual</td>
</tr>
<tr>
<td>Route</td>
<td>Injection/oral</td>
<td>Oral/patch</td>
</tr>
<tr>
<td>Adjuvant use</td>
<td>Uncommon</td>
<td>Common</td>
</tr>
</tbody>
</table>
## Acute versus chronic pain

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Acute pain</th>
<th>Chronic pain</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cause</strong></td>
<td>Generally known</td>
<td>Often unknown</td>
</tr>
<tr>
<td><strong>Duration of pain</strong></td>
<td>Short well-characterized</td>
<td>Persists after healing &gt;3 months</td>
</tr>
<tr>
<td><strong>Treatment approach</strong></td>
<td>Resolution of underlying cause</td>
<td>Underlying cause and pain disorder</td>
</tr>
<tr>
<td></td>
<td>Usually self-limited</td>
<td>Outcome is pain control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not cure</td>
</tr>
</tbody>
</table>
Assessing the patient with pain

- Onset and duration
- Location /distribution
- Quality
- Intensity
- Aggravating/relieving factors
- Associated symptoms
- Treatment response
Pain assessment tools

Numerical rating scale NRS (0,10)
Visual analog scale VAS (0,100 mm)
Faces scale:

Timing:
• At admission (< 20 min)
• After maximum 60 min
• At discharge
Check the efficacy of pain therapy, because there is a GOAL!
TREAT THE PAIN!

- Physical
- Pharmacological
- Regional anesthesia
Acetaminophen

• Inhibition of prostaglandin synthesis in the central nervous system
• Doses: 2-3 g/24 hr (4-6g)?
• Routes: oral, intravenous
• Contraindications: in patients with heavy alcohol use acute/chronic hepatitis
• Part of a multimodal analgesic regimen
• FDA new recommendations: 325 mg/tablet
Antiinflammatory drugs (AINS)

- Most commonly prescribed analgesics
- Not recommended in patients > 75 years
- Work by inhibiting COX-1 and COX-2 enzymes
- Results in a decreased production of prostaglandins from arachidonic acid
- Side effects: gastrointestinal and cardiovascular, renal
  - **Ibuprofen**: max 2400 mg/24 hr
  - **Naproxen**: max 1500 mg/24 hr
Opioids... to fear or not to fear of their side effects?

• For managing moderate/severe acute pain and chronic pain
• Short acting opioids for acute pain
• Specific opioid selection guided by intensity and duration of pain, tolerance and safety
• Recommendation: in association with acetaminophen and AINS
• Administration of meperidine is discouraged
• Parenteral opioids in selected cases
• Search for abuse history
# Short-acting oral opioid formulation

<table>
<thead>
<tr>
<th>Medication</th>
<th>Initial dose/Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codeine /APAP</td>
<td>30-60 mg* PO/ Q4-6h PRN</td>
</tr>
<tr>
<td>Codeine</td>
<td>30-60 mg PO/ Q4-6h PRN</td>
</tr>
<tr>
<td>Hydrocodone /APAP</td>
<td>5-15 mg* PO/ Q4-6h PRN</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>2-4 mg PO/ Q4-6h PRN</td>
</tr>
<tr>
<td>Morphine</td>
<td>15-30 mg PO/ Q4-6h PRN</td>
</tr>
<tr>
<td>Oxycodone /APAP</td>
<td>5-15 mg PO/ Q4-6h PRN</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>5-15 mg PO/ Q4-6h PRN</td>
</tr>
<tr>
<td>Oxymorphone</td>
<td>10-20 mg PO/ Q4-6h PRM</td>
</tr>
</tbody>
</table>

APAP-acetaminophen; h-hour; mg-milligram; PO-by mouth; PRN-as needed; Q-every

Principle for Safe & Effective Opiate Use

Titrated to Effect

Dose of Opiate

Pain Level

Time

analgesia & no problems

analgesia with problems

Adverse Effects

No Adverse Effects
# Adjuvant medication

<table>
<thead>
<tr>
<th>Medication</th>
<th>Drug</th>
<th>Dose</th>
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</thead>
<tbody>
<tr>
<td>Antiepileptic</td>
<td>Gabapentin</td>
<td>300-3600 mg/24h</td>
</tr>
<tr>
<td></td>
<td>Pregabalin</td>
<td>50-300 mg/24h</td>
</tr>
<tr>
<td></td>
<td>Carbamazepine</td>
<td>200-600 /24 h</td>
</tr>
<tr>
<td>Antidepressant</td>
<td>Amitriptyline</td>
<td>10-150 mg/24 h</td>
</tr>
<tr>
<td></td>
<td>Duloxetine</td>
<td>20-60 mg/24 h</td>
</tr>
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</table>
Regional anaesthesia and analgesia in ED

- Cost effective
- Provide long and good quality analgesia
- Few side effects
- Central and peripheral blocks
- Ultrasound guidance ± neurostimulation
US guidance

- Requires a short training period
- Expensive equipment
- Reduces: - procedural duration
  - doses of local anesthetic
  - time to block onset and completion
  - procedural discomfort
- Prolongs the duration of block and analgesia
- Avoids intravascular injection
- Improves block quality
- Decrease need for rescue analgesics
Neurostimulation guidance

- Gold standard for the last two decades
- Accessible equipment
- Few side effects
- Maybe a more difficult technique
- Slightly uncomfortable for the patient
Plexus and peripheral nerve blocks

- AL (lidocaine, bupivacaine, ropivacaine)
- Concentrations (0.125-0.375 %) analgesic
- Safe total doses !!
- Duration 7-12 hours
- Success rate > 90%
- Side effects < 2 % (neuropathies, local anesthetic toxicity)
- Tips
Upper limb nerve blocks

- Indications (dislocations and fractures of the upper limb)
- Brachial ± cervical superficial plexus block
Interscalenic block

- C5-T1
- 95% phrenic nerve block
- analgesia for the shoulder and arm
- avoid anterior vertebral artery
- the block is forbidden in patients with respiratory distress
Cervical superficial block

- C3-C5
- superficial
- posterior border of sternocleidomastoid muscle (SCM)
- neck surgery and auxiliary for the shoulder
- 5-7 ml local anesthetic (LA)
- side effect - none
Infraclavicular and Axillary block

• 20-40 ml AL solution

• elbow, forearm, hand

• > 90% success rate

• permits 1 hour discharge
Mid-humeral block

• Block at the junction between the upper 1/3 and lower 2/3 of the arm

• Use 10-15 ml LA
Femoral nerve block

film
Femoral nerve block

• femoral nerve: sensory innervation of the hip and knee, motor for quadriceps and adductor muscles of the thigh
• Approach: 2 cm under the inguinal crease and 2 cm lateral to the femoral artery
• Use: 20-30 ml LA
Fascia Iliaca Block

- Pediatric use
- 40-50 ml LA
- 2 nerves

- N. femoral +
- Lateral cutaneous nerve of the thigh
Sciatic nerve block

Raj Technique

• Patient remains supine
• Hip and knee both flexed at 90 degrees, with the foot held by an assistant
• The needle is insert perpendicular to the skin at the midpoint of the line that connects the great trochanter and the ischial tuberosity
• Use 15-20 ml LA

Picture to be added
Ankle block

• 5 nerves
• 5 infiltrations of 5 ml of local anesthetic
• Don’t add epinephrine
• No side effects
Back to our old lady

- 20 mg tramadol iv
- Femoral nerve block: 20 ml bupivacaine 0.375%
- Total time procedure: 5 minutes
- Analgesia: 10-12 hours
- Preparing for OR: hip arthroplasty
I hope you will remember that

- Pain is undertreated in ED
- Pain as the fifth vital sign should be monitored
- Pain level must be reassessed after first therapeutic gesture
- Pain is the important cause for reattendance in the ED
- Pain might lead to immediate and long-term side effects
Thank you!