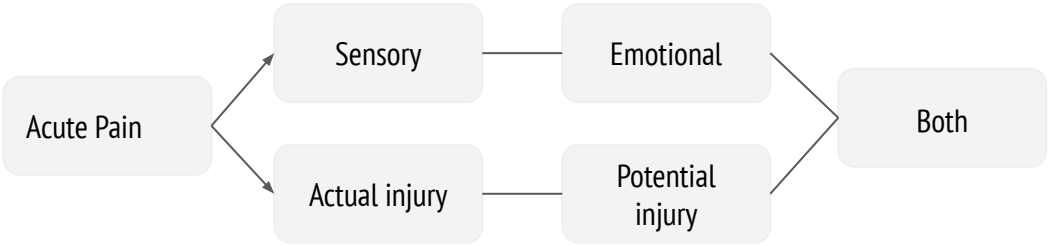
Acute Pain Management

Objectives were not given

Important - Golden Note- Notes-436 Notes

What is the definition of Pain?

"An unpleasant sensory and/or emotional experience associated with actual or potential tissue damage or expressed in such terms"



In any case of acute pain these 4 factors should be assessed:
1-Sensory: involvement of sensory nerves by injury or trauma.
2-Emotional: psychological factor of pain, may lead to stress analgesia but usually leads to an exaggerated pain response (due to anxiety).
3-Actual Injury: evidence of tissue injury, trauma, cut, fracture, burn or labor pain.
4-Potential Injury: no evidence of injury (could be in the early stages eg, ischemia). Nothing is abnormal but the patient is still experiencing pain eg. migraine, biliary or renal colic.

Classification of Pain

➔ A) According to the "Duration"

Acute pain imp.

- Recent onset,
- Limited duration,
- Identifiable cause.

Subacute pain

Pain that persists after subsiding the of acute stage eg. tenderness or redness at site of incision 1-2 weeks post minor procedure

Chronic pain

Recurrent / persistent pain after complete tissue healing >6 months

➔ B) According to the "Pathophysiology"

Nociceptive pain

Identifiable stimuli
Most common (physiological pain)
Subtypes:

- Somatic (superficial, sharp, well localized) often in skin, subcutaneous tissue and muscle
- Bony (sharp, deep with superficial tenderness)
- Visceral e.g.

Dull, diffuse, poorly localized, Colicky, Referred, + N/V

It's important to differentiate between somatic and visceral pain. For example id chest pain was:
1- Superficial, well localized and sharp then it's probably somatic and can be treated by Paracetamol + NSAIDs
2- Deep, diffuse, referred to shoulders and associated with hemodynamic instability and N/V then its most likely acute coronary syndrome and in this case the treatment is completely different

Neuropathic pain

Abnormality:
PNS / CNS
Subtypes:

- Peripheral
- Central

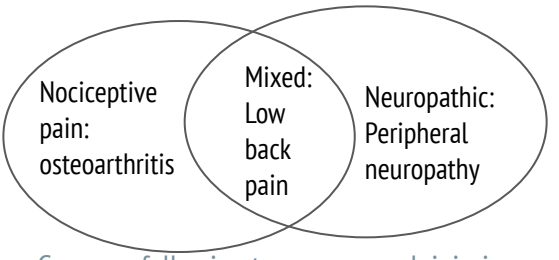
Neuropathic pain may involve sensory, motor or mixed nerves, so the affected nerve may exhibit sensory or motor symptoms
- its associated with changes in pain sensation (hyperalgesia) eg. severe pain could be elicited by touching or massaging

➔ B) According to the "Pathophysiology" Cont.

Idiopathic

- Pain without: Organic inj.
- Disproportionate with injury.
- No definitive cause
- No organic pathology
- psychological pain until proven otherwise

Mixed



Common following trauma or crush injuries

➔ C) According to the "Cause"

1. Postoperative pain, most common
2. Labor pain,
3. Trauma,
4. Sickle cell crisis,
5. Cancer,
6. LBP,
7. Musculoskeletal pain,
8. Others.

➔ D) According to the "Source":

- **Incision:** Skin & SC. tissue (most common)
- **Deep:** Cutting, Coagulation, Trauma (Mainly visceral)
- **Laparoscopic:** CO2 Insufflations (CO2 accumulates below the diaphragm causing severe visceral pain)
- Positional Nerve compression,: traction & bed sore.
- IV site: Needles, extravasation, venous irritation
- Tubes: Drains, NGT, catheters,...
- Respiratory: ETT, coughing, deep breathing
- Rehabs : Physiotherapy, movement
- Surgical: Complication of surgery
- Others : Cast, dressing too tight, urinary retention

- What are the "IMPACTS" of uncontrolled Acute Pain?

Traditional

➔ Clinical Perspective:

- Delayed wound healing
- Increase risk of pulmonary / CVS morbidity
- Increase risk of thrombosis
- Increase morbidity / mortality risk
- Sustained neuro-endocrinal stress response

Non Traditional

➔ Patient Perspective:

- Increase Pt's suffering
- Fear and Anxiety
- Poor quality of life
- Increase length of hospital stay
- Increase Costs
- Increase Risk of CPOP

Assessment of Acute Pain

➔ Pain assessments:

Subjective		Objective
Uni-Dimensional	Multidimensional	◆ Behavioral ◆ Physiological ◆ Neuro-endocrinol ◆ Algometry.
◆ VRS, VAS & NRS. ◆ Facial expression.	◆ McGill P Q, ◆ Pain Inventory	
Acute Pain	Chronic Pain	Both

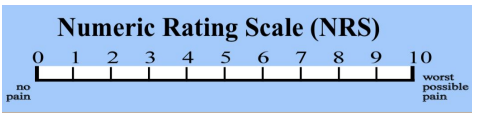
➔ Pain Measurements:

1. Rules:

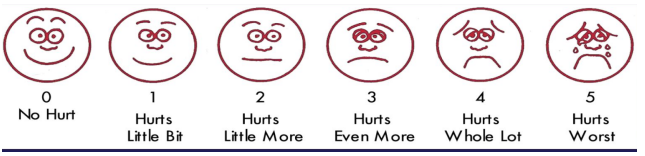
➔ Timing:
- ◆ Before & after analgesia
- ◆ Before & after any procedure
- ◆ On regular basis

➔ Same score (use the same scale type for the same patient)

➔ Recorded (document pain score regularly)



2. Pediatric Scores "Facial expression" (difficult to communicate, very sensitive, also used in case of language barriers)



Adult; numeric, verbal, visual
Pediatrics; visual

Managements of Acute Pain

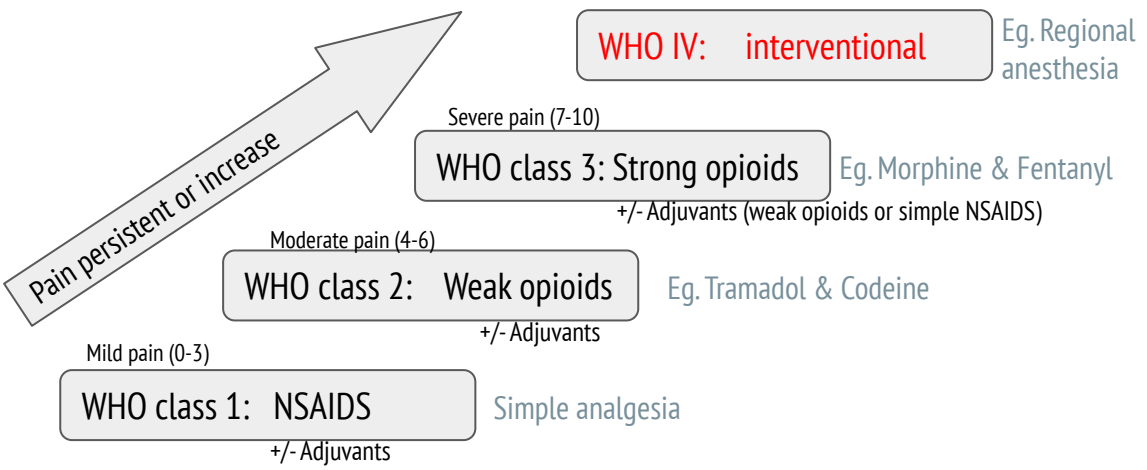
Pharmacotherapy

1. **Non Opioid Analgesics**
   - NSAADs (Non-Steroidal Analgesic Antipyretic drugs)
     - ASA (Aspirin)
     - Paracetamol
   - NSAIDs
     - Non-selective COX inhibitors
     - Selective COX-2 inhibitors
2. **Opioids**
   - Weak Opioids.
   - Strong Opioids.
   - Mixed agonist-antagonists
3. **Adjuvants**
   - alpha-2 Agonists
   - LA
   - SP inhibitors
   - NMDA inhibitors
   - Anticonvulsant / Antidepressants
   - Calcitonin
   - Relaxants
   - Cannabinoids
   - Others

Regional Techniques

1. Local infiltration
2. Wound perfusion
3. Intra-abdominal inj. of LA/Analg.
4. Intercostal & Interpleural
5. Paravertebral
6. USG-RA: e.g. TAP, Plexus & PNB
7. Neuraxial:
   - Epidural:
     - Thoracic
     - Lumbar
   - Spinal:
     - Single shot
     - CSA
   - CSE

➔ **WHO Ladder "updated"**



-By the mouth
-By the clock
-By the ladder

WHO class 1: non-opioids analgesics

1. Non Opioid Analgesics

➔ **NSAADs** non steroidal analgesic antipyretic drugs

- Analgesic / Anti-inflam / Antipyretic / **Anticoagulant**:
  ASA dont use it postop.
- Analgesic / Antipyretic:
  Paracetamol simple, most common used, with all routes of administration, for all adults/pediatric, and Avoid in patient with advanced liver disease.

➔ **NSAIDs** gastric and renal side effects

- Non-selective COX inhibitors:
  Diclofenac & Ketoprofen
- Selective COX-2 inhibitors:
  Celecoxib

Avoid it in asthmtic patient and only give paracetamol, the main SEs renal, gastric, and coagulation.
"you can use paracetamol with one of NSAIDs, but you can't use two drugs from NSAIDs together it's contraindicated it's called a selling effect"

➔ **Gabapentoids**:

- Gabapentin
  (Neurontin 400 mg)
- Pregabalin
  (Lyrica 75 – 150 mg)

WHO class 2: Weak opioids

You can increase the dose increase the analgesic effect but increase the SEs
Most common for moderate pain

1. **Tramadol**: (Tramal : Morphine = 1 : 10)
   - Dose: 200 – 400 mg/d
   - It has a lower risk of respiratory depression (Level II).
   - It is an effective treatment for Neuropathic pain (Level I)
   - Side effects: Sedation & N/V dependance
2. **Codeine:** (Codeine : Morphine = 1 : 10) Prodrug, doesn't have effect by its own
   - A very weak mu-receptor agonist
   - Metabolized to morphine. converted to morphine(prodrug)

WHO class 3: Strong opioids

1. **Morphine:** most common postop
   - Standard opioid
   - All route of administrations
   - Metabolites: + M6G & - M3G take care if the patient has liver or renal disease as some metabolites can be accumulated
   - Side effects: Sedation, PONV, Respiratory Depression(most severe)
2. **Fentanyl:** (Fentanyl : Morphine = 10:1)
   - Commonly used in acute pain
   - Rapid action & Short duration. Better to use it as continuous infusion by patient control analgesia
   - Forms: iv, sc, trans-nasal, NXL, TTS for postoperative pain in epidural or intrathecal analgesia or for labor analgesia

3. **Pethidene:** (Pethidene : Morphine = (1:10)
   - May be used post op. Shivering , less respiratory depression but dangerous SEs
   - Side effects:
     - Toxic active metabolite: increase t½ .
     - N/V > morphine
     - Addiction liability most dang.

"Deleted from our list here because of the SEs renal, neurotoxic, and highest addiction liability"

4. **Oxycodone**
   - Available Oral & IV
   - It has a faster onset > morphine,
   - Longer duration of action,
   - Lower rate of adverse effects, less nausea and vomiting
   - Effective in **visceral pain**
   - Better oral bioavailability
   - Used in pts who can use oral route. (Level 1)

Oxycodone: strong opioid, similar to morphine, for patient going under **laparoscopic surgery oxycodone is more better than morphine**. Also effective for neuropathic pain and less N/V. So oxycodone has some priority in obese, bariatric patients, laproscopic and some procedure with nuropathic pain.

WHO IV: interventional

Regional Anesthetic Techniques

1. Local infiltration
2. Wound perfusion
3. Intra-abdominal LA
4. Intercostal
5. Interpleural
6. Paravertebral
7. USG - PNB: BPB, TAP, Femoral
8. Neuraxial:
   - ➔ Epidural:
     - Thoracic
     - Lumbar
   - ➔ Spinal
     - Single shot
     - CSA
   - ➔ CSE

OPIOID THERAPY - Prescribing Principles

1. Drug Selection

➔ Right: Analgesic, Dose, Route & Schedule
➔ At any given time:
- Only one long acting opioid should be ordered.

➔ Increase the dose if there is still pain (but not the number of opioids don't use two strong opioids at the same time) until:
- Adequate pain relief, or
- Intolerable side effects occur.

➔ Anticipate & Prevent:
- Side effects: **N/V is the most common**
- Breakthrough pain: Incidental pain, unexepected, sudden pain

➔ If ++ side effects: Opioid Rotation; changing the type of opioids and route of administration

2. Route of administration use simplest route but cause mostly postop we use IV

- Oral can take oral?give
- Rectal
- S.C.
- Intranasal
- Sublingual
- IM
- IV
- TTS
- Neuraxial: Spinal, Epidural
- Other

Methods of administration:
- Continuous infusion
- Regular
- On-demand analgesia / or "PRN":
  Patient>Nurse
  Physician>Nurse>Patient
- Combined "the ideal method and can be achieved by PCA 👇"

3. PCA "Patient Controlled Analgesia"

- Systemic: IV & SC
- Regional: Neuraxial, Plexus & PNB.
- Sitting:
  - Pre-set by the physician.
  - Activated by the patient.
  - Programming modalities include:
    a. Loading dose or infusion.
    b. Demand bolus dose.
    c. Constant background infusion
    d. Lock-out interval.
    e. Maximum hourly dose.

safety

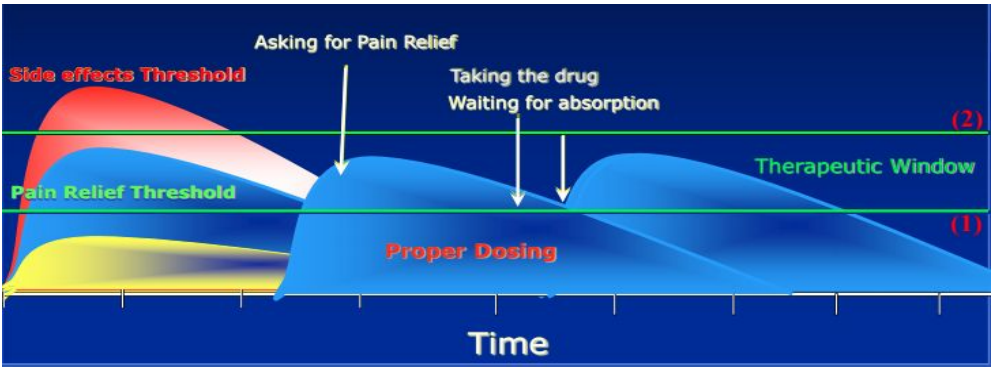
It is a machine connected to the patient by IV as an example, you got to explain how it work to the patient, like each time the patients in pain they press a button so the machine can give them analgesia. You can set up the device if drug abuser and like so.

اللوك اوت تشرح للمريض مثلاً كل نص ساعة تقدر تضغط الزر مره وحدة

4. Dose Adjustments

There is no simple or fixed dose for opioid you have to start according to the patient, if sever start with strong opioid, mild/moderate start with weak opioid. Also, better to start with lowest dose with high risk patient. High rist patient are: morbid obese patient, obstucted sleep apnea, greatric patients & neonates.

Therapetics window

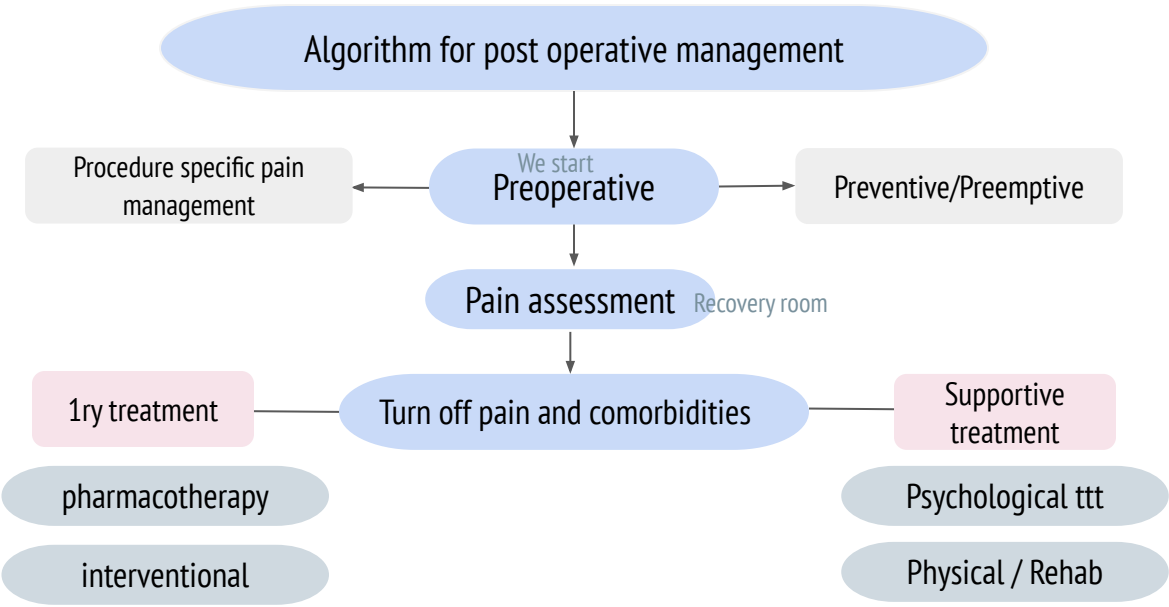


5. Treating side effects

Such as prescribing opioids with antiemetic for patient with N/S

- Sedation / Dizziness (49-70%) most common
- Nausea / Vomiting (31-48%) most common, prevented by antiemetic
- Respiratory depression (20-41%) uncommon but dangerous. High risk: morbid obese patient, obstructed sleep apnea, greatric patients & neonates. Give them the lowest effective dose. **Sedation is the early stage for respiratory depression**, so if the patient become sedated stop the opioids before they get into respiratory depression.
- Itch / Rash (0.5-5%)
- Tolerance *
- Urinary retention
- Drug interactions
- Constipation (30-70%)
- Dependence
- Addiction
- Opioid induced pain

Summary & conclusions



- WHO Ladder System should be followed. (Evidence III)
- Analgesia should be selected depending on the initial Pain Assessment. (III)
- If the disease is not controlled on a given step > Move directly to the Next Step. (III)
- For continuous pain: Analgesics should be prescribed on a Regular Basis.
- Only **one strong opioid** should be ordered at a given time.

Case mentioned by the doctor

70 yo scheduled for total knee replacement, he's hypertensive, asthmtic, COPD. What your plan for postoperative pain management?
-Pain assessment.
-Simple analgesia & strong opioids.
-Regional technique: spinal anesthesia for lower limb surgery, or continuous technique epidural (neuraxial epidural).
-Patient control analgesia and explain it to the patient, especially lock-out.
-HTN no intervention needed.
-Asthmtic and COPD: NSAIDs are contraindicated it causes bronchospasm. So, if you need to give him simple analgesic give him paracetamol only.

Questions:

Q1: The circulating levels of which of the following hormones is not increased postoperatively?

A. Insulin
B. Glucagon
C. ADH
D. Growth hormone

Q2: Which of the following is true regarding "Neuropathic pain"?

A. Pain of the central origin can be because of the direct insult to nociceptive pathways.
B. Complete lesion of the dorsal roots causes severe neuropathic pain
C. Neuropathic pain due to injury to PNS is more well characterized than due to central cause.
D. Inflammatory pain is not associated with tactile allodynia, heat/cold hyperalgesia and spontaneous pain unlike neuropathic pain

Q3: Which one of the following is the earliest sign of lidocaine toxicity?

A. Nystagmus
B. Light-headedness
C. Tonic-clonic seizures
D. Shivering

Q4: End results of the surgical stress response include all of the following except?

A. Hyperglycemia
B. Poor wound healing
C. Positive nitrogen balance
D. Impaired immunocompetency

Q5: The "Snap" felt just before entering the epidural space represents passage through which ligament?

A. Posterior longitudinal ligament
B. Ligamentum flavum
C. Supraspinous ligament
D. Interspinous ligament

Q6: Which of the following concentrations of epinephrine corresponds to a 1:200,000 mixture?

A. 0.5 µg/mL B. 5µg/mL C. 50µg/mL D. 0.5 µg/mL

Answers: Q1: A Q2: C Q3: B Q4: C Q5: B Q6: B

Q6 explanation: 1:200,000 means, 1g/200,000m L = 1000mg/200,000mL = 1mg/200 mL1mg/200mL = 1000 µg/200 mL = 10µg/2 mL = 5µg/mL

Thank You

Alfahdah Alsaleem

Rahaf Althnayan

Reem Alqarni

Alanoud Binmethem

Sarah Alkathiri

Special thank you to team 436