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Short Communication

Research Anaesthetics and Analgesics for Kids and Adults

Sohaila Ashiq*

General Dentist and Dental Surgeon, Cairo University, Egypt

***Corresponding Author:** Sohaila Ashiq, General Dentist and Dental Surgeon, Cairo University, Egypt.

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Analgesics

- An analgesic or painkiller is any member of the group of drugs used to achieve analgesia, relief from pain.
- Analgesic drugs act in various ways on the peripheral and central nervous systems. They are distinct from anesthetics, which reversibly eliminate sensation. Derived from the Greek word "an- " meaning "without" and "algia-" meaning "pain".

How do Analgesics work on pain?

- **Injury:** mechanical injuries such as pressure, punctures and cuts or chemical (burn).
- **Reception:** A specialized nerve cell called a nociceptor senses the stimulus and the chemicals released from injured tissues
- **Transmission:**
    - The nociceptor sends signals to the brain through several neurons within the central nervous system.
    - The signals travel up the spinal cord to the brain through a "neural freeway" called the sphinothalamic tract.
- **Pain center reception:**
    - Within the brain, a relay station called the thalamus distributes the signals to various parts of the brain; there is no single pain center.
    - Areas like somatosensory cortex process the information and you feel pain.
- **Pain suppression or relief (analgesia):** Prevent inflammation and block key enzymes and the release of chemicals that stimulate nociceptors.

Types of analgesics

1. Paracetamol.
2. Non-steroidal Anti-inflammatory Drugs (NSAIDs).
3. Opioids.
4. Corticosteroids.
5. Neurological Analgesia.
6. Anesthetic nerve blockade.

Paracetamol

- Reduces pain only.
- Act centrally in the brain rather than peripherally in nerve endings.
- Also known acetaminophen.
- Dose:
    - 1-5 years, 120-250 mg every 4-6 hours.
    - 6-12 years, 250-500 mg every 4-6 hours.
    - Adults: 0.5-1 g every 4-6 hours.

Indication

Acetaminophen appears to be a good analgesic for mild pain, but its relatively short-acting analgesia limits its usefulness as a monotherapy for the treatment of moderate to severe postoperative pain.

Contraindication

- Renal failure, papillary and tubular necrosis.
- Asthma.
- Liver failure.

Non-steroidal anti-inflammatory drugs

- Can reduce pain, fever and suppress inflammation.
- Work by blocking cyclooxygenase (COX), an enzyme in various tissues that produce the chemical mediators which are the cause for inflammation, related pain, and fever.

Types of NSAIDs

COX-1 and COX-2

- Aspirin.
- Ibuprofen.

- Ketorolac.
- Flurbiprofen.
- Ketoprofen.
- Diclofenac.

COX-2

- Celecoxib.
- Rofecoxib.
- Nimesulide.

Aspirin

- Aspirin is a salicylate.
- It works by reducing substances that cause pain, fever and inflammation.
- **Dose:**
    - 2 - 11 years: 10 - 15 mg/kg orally or rectally every 4 to 6 hours, not to exceed 4g/days
- **12 years and Adults:** 325 - 650 mg orally or rectally every 4 hours as needed, not to exceed 4g/day.

Indication

Aspirin besides acting as a pain killer also has anti- platelet properties, which helps in the treatment for heart attacks, strokes and chest pain (angina).

Contraindication

- Bleeding disorder such as hemophilia.
- Recent history of stomach or intestinal bleeding.
- Allery to NSAIDs.
- Child or teenager with a fever, flu symptoms, or chicken pox. Salicylates can cause Reye's syndrome, a serious and sometimes fatal condition.

Drugs that will affect Aspirin

- Anti-depressant. Taking any of these medicines with an NSAIDs may cause bruising or bleeding.
- Warfarin or Coumadin.
- Other salicylates.

Ibuprofen

- It works by reducing hormones that cause inflammation and pain in the body.
- **Dose:**
    - 6 months - 11 years: 7.5 mg/kg/dose every 6 to 8 hours; maximum daily dose is 30 mg/kg
- **Infants and Children**: 4-10 mg/kg orally every 6 to 8 hours as needed; maximum daily dose is 40mg/kg.
- **Adults:** 200-400 mg orally every 4 to 6 hours. 400- 800 mg IV over 30 minutes every 6 hours as needed.

Indication

Ibuprofen is used to reduce fever and treat pain or inflammation caused by many conditions such as headache, toothache, back pain, arthritis, or minor injury.

Contraindications

- Do not use this medicine just before or after heart bypass surgery (coronary artery bypass graft, or CABG).
- Do not use this medicine if ever had an asthma attack after taking aspirin or an NSAIDs.
- Allergic to NSAIDs.

Diclofenac

- It works by reducing substances in the body the cause pain and inflammation.
- It is used to treat mild to moderate pain, or signs and symptoms of osteoarthritis or rheumatoid arthritis.
- **Brands**: Cataflam, Voltaren.

Dose

- **Adults**
- **Oral**
    - Diclofenac potassium liquid-filled capsules: 25 mg orally 4 times a day
    - Diclofenac free acid capsules: 18 mg or 35 mg orally 3 times a day
    - Diclofenac potassium immediate-release tablets: 50 mg orally 3 times a day; an initial dose of 100 mg orally followed by 50 mg oral doses may provide better relief in some patients.
- **Parenteral**
    - 37.5 mg IV bolus over 15 seconds every 6 hours as needed for pain
    - Maximum Dose: 150 mg per day

Contraindication

- Do not use this medicine just before or after heart bypass surgery (coronary artery bypass graft, or CABG).
- Should not use this medicine if ever had an asthma attack or severe allergic reaction after using aspirin or NSAIDs.

Opioids

- Are also known as narcotics.
- The opioid analgesics relieve pain by binding to opioid receptors in the central nervous system.
- Act as agonists to produce the effect of analgesia.
- Give relief for moderate to severe pain.
- Used when pain is too severe to be controlled by NSAID analgesics.
- All narcotic analgesics are prescription medications.

Types of Opioids

- Morphine.
- Codeine.
- Tramadol.
- Oxycodone.
- Hydrocodone.
- Dihydromorphine.
- Pethidine.

Codeine

- Used to treat mild to moderately severe pain.
- **Dose:**
  - **Pediatrics:** 0.5-5 mg/kg or 15 mg/m2 orally, IM, or subcutaneously every 4 to 6 hours.
  - **Adults:** initial dose: 30 mg orally, IM, subcutaneously, or IV every 6 hours as necessary.

Contraindications

- Uncontrolled breathing disorder.
- Bowel obstruction Paralytic Ileus.
- Frequent asthma attacks.
- Hyperventilation.
- Allergic to codeine.

Tramadol

- Tramadol is a synthetic, centrally acting analgesic indicated for moderate to moderately severe pain.
- **Dose:** 50 -100 mg then 50 -100 mg every 4-6 h (400 mg/day maximum).

Misuse of opoids or narcotic medicine can cause addiction, overdose, or death, especially in a child or adult using the medicine without prescription.

Corticosteroids

- Not exactly pain killing medications, but they are anti-inflammatory.
- But due to their inflammatory processes, they can reduce pain.

Indications

1. **Aphthous ulcers:** for serious cases prescribe dexamethasone, used topically as a solution, rinsed and spit out twice a day for five days, prednisone orally, in tablet form, starting at 40 milligrams per day then tapered for 10 days.
2. **Oral lichen planus:**
   - Topical corticosteroid-clobetasol propionate 0.05% 3-4 times per day.
   - Flucocinomide 0.05% 3-4 times per.
   - Moderate cases: intralesional injection- triamcinolone 10-20mg.
   - Severe-prednisolone 30-60mg then taper 20 to 30 mg - 10 to 20mg.
3. **Erythema multiforme**: In moderate to severe case: Prednisolone initial dose 40 to 80 mg/day then taper. Recurrent infections-400 mg.
4. **Pemphigus:** Steroids-mainstay of treatment: Prednisone-1 to 2 mg/kg/day. Only oral involvement-low dose prednisolone or Topical and systemic steroid combination- betamathasone- 0.01% - 3 to 4 times/day.
5. **Desquamative gingivitis**: Topical- triamcinolone 1% 3 to 4 times/day Or flucocinamide. Systemic- prednisolone-30 to 40 mg/day.
6. **Pulpal hypersensitivity:** Resulting from operative trauma, bacterial invasion of pulp, exposure of dentin- glucocorticoids can be used as a component of endodontic sealer as anti-inflammatory agent.
7. **Temporomandibular joint disorders:** Intraarticular injection of glucocorticoid such as prednisolone or dexamethasone used to relieve temporary or permanent symptoms.
8. **Post-operative sequalae:** Mainly glucocorticoids used - edema, trismus. After dental surgical procedures.
9. **Anaphylactic and other Allergies:** Urticaria, contact dermatitis, allergic rhinitis, conjunctivitis, serum sickness, etc.
10. **Oral submucous fibrosis:** Corticosteroids cause a dose dependent enhancement of fibroblast collagen phagocytosis. Hydrocortisone
    - Topical - Hydrocortisone (0.05%).
    - Betamethasone (.1%). Intralesional injection - triamcinolone suspension 3mg/ml, 2-3ml/day.

Contraindications

- Primary bacterial infection.
- Peptic ulcer.
- Diabetes mellitus.
- Hypertension.
- Pregnancy.
- Tuberculosis and other infections.
- Osteoporosis,
- Herpes simplex virus.
- Epilepsy.
- Congestive heart failure.
- Renal failure.

Topical treatment causes adverse effects such as, skin atrophy, hypopigmentation contact dermatitis, oral thrush, subcutaneous fat wasting, and cushingoid effect from systemic absorption.

Inhaled corticosteroid-induced side effects are oro- pharyngeal candidiasis, dysphonia, reflex cough, Broncho-spasm, pharyngitis.

Neurological Analgesia

- Certain drugs that are mainly used for neurologic and psychiatric conditions but they can also relieve neuropathic pain, which occurs without any external pain triggers like heat or sharp points.
- They include the antidepressant amitriptyline (Elavil) and the anticonvulsant gabapentin (Neurontin).

Anesthetic nerve blockade

- Pain relief at times is required with a nerve blockade.
- An anesthetic drug, like lidocaine, can be injected into a nerve branch so that a certain part of the body becomes desensitized to pain.
- For example, anesthetic injection around the spinal cord produces pain relief in areas in the lower half of the body.

Analgesics side effects

1. Nausea and vomiting.
2. Stomach ulcers.
3. Headache.
4. Loss of appetite.
5. Constipation or diarrhea.
6. Kidney damage.
7. Aggravation of asthma.
8. Dizziness.
9. Skin rash.
10. Tinnitus.
11. Heart burn.

Negative Effects will depend on

- The type of analgesic being used.
- The number of analgesics consumed.
- How long the analgesics are being used for.
- The health of the user.
- Existing medical conditions.
- Whether other drugs are also being used.

Several things to remember before use of Analgesics

- Analgesics should be used strictly as directed.
- Read the instructions on the label and take the recommended dose.
- Taking more than the recommended dose will not increase the positive effects, and may cause unpleasant side effects such as vomiting, diarrhea or dizziness.
- Analgesics should only be used when in date (the expiry date is on the packet).
- Paracetamol becomes toxic after its expiry date.

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