Drugs affecting The Central Nervous system

Narcotic Analgesics and Antagonists

I. Narcotic Analgesics:

- It includes opium such as morphine, codeine and opium derivatives such as Meperidine (Demerol) is the best known.

II. non-opioid analgesics and non-steroidal anti-inflammatory drugs -NSAIDs

acetylsalicylic acid, paracetamol, analgen, indomethacin, butadiene, ibuprofen, piroxicam, diclofenac-sodium(voltaren), ketoprofen.

III. Substances with mixed mechanism of action

(opioid and non-oioid components) tramadol.

Tolerance

Tolerance happens when a person no longer responds to a drug in the way they did at first. So, it takes a higher dose of the drug to achieve the same effect as when the person first used it.

Dependence

People who take prescription medicine every day over a long period of time can become dependent; when they go off the drug, they need to do it gradually, to avoid withdrawal discomfort.

Addiction

Unlike tolerance and dependence, addiction is a disease; If a person keeps using a drug and can't stop, but like tolerance and dependence, addiction can result from taking drugs or alcohol repeatedly. despite negative consequences from using the drug.

pain: unpleasant sensory and emotional experience associated with either actual or potential tissue damage.

What is pain?

– A protective mechanism to warn of damage or the presence of disease

– Part of the normal healing process.

I. Narcotic Analgesics:

Action of narcotic analgesics:

Narcotic analgesics attach to specific receptors in the CNS resulting in analgesia- action Subtypes of opioid receptors: mu, delta, kappa, epsilon, sigma

Effects of narcotic analgesics:

1.respiratory depression

2. analgesia

3.urinary retention

4. Cough suppressants

5. Euphoria

The nurse is preparing to administer an opioid analgesic to the patient; factors should be assessed before the dose is given:

1. The level of pain rated on a scale

2. Prior analgesic use (time, type, amount, and effectiveness)

3. Allergies

Acute toxicity:

Characterized by respiratory depression, deep sleep, coma, pinpoint pupil, cyanosis, hypotension, decreased urinary output, decreased temperature, clammy skin, and finally Death (due to Respiratory failure).

Treatment of acute overdose:

- **Naloxone (antagonist of opioid receptors)**

general dose of naloxone should not overcome 10 mg

- **stomach lavage (for morphine enterohepatic circulation is typical) with 0,05-0,1% solution of potassium permanganate and 0,5 % tannin solution**
- **suspension of 20-30 g of activated charcoal**

- salt laxative agents (sodium sulfate)
- forced diuresis
- atropine sulfate

Nursing considerations:

1- Use supportive nursing measures as relaxation techniques to relieve pain before using narcotics.
2- Explore the source of pain, use non-narcotic analgesia if possible.
3- Monitor vital signs and mental status.
4- Monitor Respiratory rate (drug may lead to respiratory depression).
5- Monitor blood pressure (hypotension may occur)
6- Monitor pulse rare (if 60\m withhold the drug).
7- Watch for constricted pupils. Document it and notify the physician.
8- Monitor bowel function, since drug may cause constipation.
9- Encourage clients to empty bladder every 3-4 hrs. (since drug may cause urinary retention).

1.Codeine sulfate:

Uses:
- Relief of mild to moderate pain(analgesic).
- Antitussive and is an ingredient in many cough syrups

2. Meperidine Hydrochloride

Trade name: Demerol
- It has no antitussive effect.
- The duration of action is less than that of opium.
Side effects: Transient hallucinations, hypotension.

4. Morphine Sulfate:

Class: Narcotic analgesic, morphine type.
N.B: To facilitate induction of anesthesia or to decrease the dose of anesthesia.
N.B.: It is given in lower doses for continuous pain and in higher doses in sharp intermittent and all kinds of pain.

5. Percodan:

Class. and content:

- Percodan consists of 2 drugs.

1. A non-narcotic analgesic (aspirin 325 mg)

2. A narcotic agonist (oxycodone Hcl 4.5 mg and oxycodone terephthalate 0.38 mg.

Uses: Relief of moderate to severe pain.

6. Tramadol hydrochloride

Trade name: Ultram, Tramal

Class. : Narcotic analgesic, synthetic.

Action: Thought to bind to opioid receptors and inhibit reuptake of norepinephrine and serotonin.

Indications

Moderate to moderately severe pain

Contraindications

Contraindicated in patients hypersensitive to drug or other opioids, in breast-feeding women, and in those with acute intoxication from alcohol, hypnotics, centrally acting analgesics, opioids, or psychotropic drugs.

Naloxone Hydrocholoride:

Trade name: Narcan.

Class.: Narcotic antagonist.

Action: (mechanism of action)

- Naloxone and naltrexone are opioid antagonists, and they bind to and occupy all of the receptor sites (mu, kappa, delta). They are competitive antagonists with a strong affinity for these binding sites.

- The duration of action of naloxone is shorter than that of the narcotic analgesic so the respiratory depression may return when the narcotic antagonist has washed off the body.

N.B.: Naloxone is not effective when respiratory depression is induced by hypnotic, sedative or other no narcotic drugs.

Nursing considerations:

1- Determine the etiology of respiratory depression.
2- Assess and obtain baseline vital signs.
3- Monitor respiration closely after the duration of action.
4- Have emergency drugs and equipment available.
5- If the patient is comatose, turn him to his side to avoid aspiration.
6- Maintain safe environment (side rails and soft support).

Non-narcotic Analgesics and Antipyretics

- Drugs such as aspirin and acetaminophen are available without a prescription, thus consumed in large quantities for the relief of pain and fever.
- If they were used improperly, their administration may cause serious effects.
- They are responsible for accidental poisoning in small children.

Salicylates:

1-Acetylsalicylic Acid:

Trade name: Aspirin
Classification:
Non-narcotic analgesic, antipyretic, anti-inflammatory, antirheumatic, antiplatelet, NSAID.
Action:
- The antipyretic effect is due to an action on the hypothalamus that results in heat loss by vasodilation of peripheral blood vessels and promoting sweating.
- The anti-inflammatory effects probably by decreasing prostaglandin synthesis and other mediators of the pain response.
- It may cause analgesia by inhibiting CNS prostaglandin syntheses.
N.B.: Aspirin also produces inhibition of platelet aggregation.

Contraindications:

- Hypersensitivity to salicylates.
- Vitamin deficiency (risk for bleeding increase with Vitamin K deficiency).
- Chickenpox or influenza (potential risk for Reye's syndrome among children and teenagers).
- Pregnancy and lactation.
- One week before and after surgery.
- Patients receiving anticoagulants.
- History of GI ulcers.

Salicylate toxicity (Salicylism)

- nausea, vomiting, dizziness, tinnitus, difficulty hearing, diarrhea, mental confusion.
- Acute aspirin poisoning: Respiratory alkalosis, hyperpnea, tachypnea, hemorrhage, confusion, pulmonary edema, convulsion, tetany, metabolic acidosis.

Drug interactions:

- Risk for bleeding increase if taken with other anticoagulants.
- Increased risk for salicylate toxicity if taken with Furosemide (Lasix)

Nursing considerations:

1. Take drug with or after food or with milk to decrease GI irritation.
2. Assess the history of asthma and history of hypersensitivity.
3. Do not use it with other anticoagulants.
4- Note any history of peptic ulcers.
5- Report signs of side effect e.g. gastric irritation if occurs.
6- Aspirin is not given 1 week before and after surgery to prevent bleeding.

2-Acetaminophen: "paracetamol"

Trade names: Panadol

Class.: non-narcotic analgesic, para-aminophenol type.

Action:

a- Acetaminophen decreases fever by an effect on hypothalamus leading to sweating and vasodilation.
b- It may cause analgesia by inhibiting CNS prostaglandin syntheses, So it has no anti-inflammatory effect.

Uses:

decreases fever and analgesia
Contraindications: renal insufficiency, anemia.

Side effects:

- Acute toxicity can occur after long symptom-free usage.
- Hemolytic anemia, Skin rashes, fever, jaundice, hypoglycemia.

Symptoms of overdosage:

Hepatic toxicity, depression seizures, coma and death, nausea, vomiting, fever, and vascular collapse.
Treatment of overdose:
1- Induction of Emesis.
2- Gastric lavage.
3- Activated charcoal.
4- Oral N-acetylcysteine is said to reduce or prevent hepatic damage by inactivating acetaminophen metabolites which cause liver effects.

Nursing considerations:

1- Suppositories should be stored below 27c.
2- Liver function studies for long term therapy.
3- Note signs of met-hemoglobinemia: bluish discoloration of gum and fingernails.
4- Teach patient signs of toxicity to be reported immediately.