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Review Article

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A Review on Analgesic available in Pakistan

Shumaila Arshad*, Sehrish Tahir, Mariam Nasir, Marium Sharif and Farah Abid

Assistant Professor, Faculty of Pharmacy, University of Lahore, 1-Km Defence Road, Bhubatian Chowk,
Raiwind Road Lahore, Pakistan.

*Corresponding author: shumailapharmacist@gmail.com

Abstract

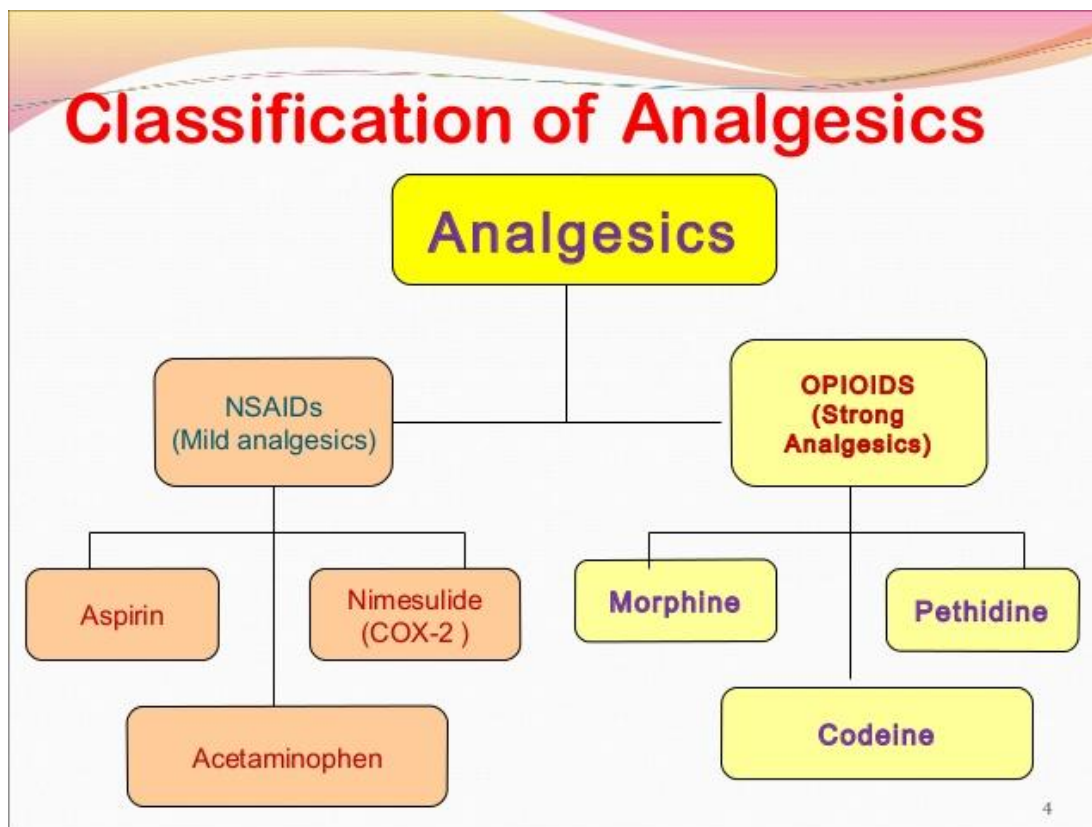
Medications that relieve pain without causing loss of consciousness are classified as analgesics. They are also commonly referred to as painkillers. There are various classes of analgesics, determined by their chemical structures and mechanisms of action. There are no single approach to effective pain management. Instead, pain management should be tailored to each patient's needs and should consider the cause of the pain, the existence of concurrent medical conditions; the characteristics of the pain; and the psychologic and cultural characteristics of the patient. It also requires ongoing reassessment of the pain and the effectiveness of treatment. To provide quality patient care, nurses must be well informed about both pharmacologic and nonpharmacologic methods of pain management.

Keywords: Pain, Analgesic, Opioids, Painkiller.

Introduction

An **analgesic** or **painkiller** is any member of the group of drugs used to achieve analgesia, relief from pain. Analgesics are further classified as (Figure: 1). Pain is most commonly defined as an unpleasant sensory and emotional experience associated with either actual or potential tissue damage. It is a very personal and individual experience. Pain can be defined as whatever the patient says it is, and it exists whenever the patient says it does. Although the mechanisms of pain and the nature of pain pathways are becoming better understood, a patient's perception of pain is a complex process. Pain involves physical, psychologic, and even cultural factors. Because pain intensity cannot be precisely quantified, health care providers must cultivate relationships of mutual trust with their patients to provide optimal care. There is no single approach

to effective pain management. (2) Pain can be categorized according to its duration, acute or chronic, as well as based on other 50 characteristics, such as breakthrough pain, acute episodes of pain that occur on a background of 51 well-controlled, chronic pain. Pain is subjective in nature and is measured by patient self- 52 reporting of its intensity, and other subjective qualities.(1)acute pain is defined as pain that is self-limited and generally 55 requires treatment for no more than up to a few weeks (e.g., postoperative or acute 56 musculoskeletal pain). Even in the setting of acute pain, analgesics generally are used repeatedly 57 over some period of time and not as single-dose treatments. (1) Chronic pain is defined as either pain persisting for longer than 1 month beyond resolution of the 63 underlying insult, or pain persisting beyond 3 months.



(Figure 1)

What are painkillers?

Painkillers are the drugs that help to reduce pain. Drugs may be available under several different names. Each has approved name but manufacturer often give their own brand or trade name to drugs as well. For example Nurofen and Panadol are brands name for ibuprofen and paracetamol which are the approved names.(3)

Analgesics and addiction:

Non-narcotic analgesics are not addictive. When narcotic analgesics (opioids) are used occasionally under the guidance of a physician, they can be a safe and effective pain reliever. Regular use of opioids can be psychologically (the individual feels they need it) addictive and physically addictive (the individual's body needs it). Tolerance develops rapidly with regular narcotic analgesic (opioid) use, which means a person requires a greater amount of the drug to get same effects. (4)

Analgesics and withdrawal:

Non-narcotic analgesics are not physically addictive; therefore withdrawal effects are not

experienced. Narcotic analgesics (opioids) are physically addictive, causing withdrawal symptoms such as craving, hot/cold sweats, uncontrollable coughing, yawning, sneezing, nasal discharge, muscle pain, insomnia, diarrhea, stomach pain, nausea, vomiting, sweating, chills, fever, tremors, increased blood pressure and heart rate, anxiety, depression, restlessness and irritability. The type of opioid used determines when withdrawal symptoms occur and their intensity. Withdrawal symptoms usually last 7 to 10 days.(4)

Analgesics and the law:

Non-narcotic analgesics are available without a prescription. It is not illegal to use narcotic analgesics (opioids) when prescribed by a physician. However, according to the Controlled Drugs and Substances Act, it is illegal to obtain prescribed opioids without an authorized prescription. It is also illegal to obtain any prescription drug containing opioids without notifying the physician that you have received a similar prescription within the last 30 days. Possessing and selling narcotic analgesics for the purposing of trafficking is a criminal offense.(4)

Mechanism of action of Analgesics:

The analgesia system is mediated by 3 major components:

- The periaqueductal grey matter (in the midbrain)
- The nucleus raphemagnus (in the medulla)
- The pain inhibitory neurons within the dorsal horns of the spinal cord, which act to inhibit pain transmitting neurons also located in the spinal dorsal horn.

Sources of Analgesic Drugs:

There are various sources of analgesic drugs, they are classified into two types:

- a) Synthetic Drugs b) Natural sources

Synthetic Drugs: There are various synthetic drugs available in market which gives analgesic activity like Peracetamol, Ibuprofen, COX-2 inhibitors, NSAIDs, diclofenac etc.

Analgesics from Natural Sources: There are various medicinal plants available in nature which shows analgesic activity, these are as follow:

(A) Opioid Analgesics:

Opioids are drugs derived from Opium, derived from the juice of the opium poppy, *Papaversomniferum*. Opioids are medication which bind to opioid receptors in the central nervous system. Opioids are used as strong analgesics for relief of severe or chronic pain. Opioids are primarily metabolized by the liver through dealkylation, conjugation, hydrolysis, and oxidation, and their resulting metabolites undergo renal excretion. These are classified into following types

- Endogenous opioid peptides (endorphins, dynorphins)
- Opium alkaloids (morphine, codeine)
- Semi-synthetic opioids (heroin, oxycodone, hydrocodone, hydromorphone)

- Fully synthetic opioids (pethidine, methadone, propoxyphene, pentazocine, bupren).[1]

(B) Other medicinal plants:

On the contrary many medicines of plant origin had been used since ages without any adverse effects. Plants represent a large natural source of useful compounds for the development of novel drugs. It is very important that profound research with ethno botanical plants possessing anti-inflammatory and analgesic properties can definitely inflammatory disorders. Purified natural compounds from plants can serve as template for the synthesis of new generation anti-inflammatory drugs with low toxicity and higher therapeutic effect.

Aloevera Barbedensis:

Aloe Vera is used as gel is its analgesic effect. The Aloe Vera gel is used in reducing pain during dental treatments. It can be effectively used in treatment of mouth ulcers, blisters. It provides quick relief of pain after dental surgical procedures.

Andrographis paniculata:

Andrographis paniculata, a popular medicine, is commonly used for treating infection, inflammation, analgesic and diarrhea.

Burns sempervirens (Roots):

In this study ethanolic extract of the roots of *Buxus sempervirens*, when studied for its analgesic activity in intact mouse tail immersion method, showed highly significant analgesic effects.

Buxus sempervirens (Aerial):

The extract of aerial parts of *Buxus sempervirens* showed changeable degree of analgesic effects in this study.

Cissus quadrangularis:

This study was intended to assess the analgesic anti-inflammatory and antipyretic activity of ethanolic extract of *Cissus quadrangularis* in experimental standard models.

Curcuma alismatifolia:

The antioxidant and analgesic potential of the 80% methanol extract of the leaves of *Curcuma alismatifolia*.

Fumaria vaillantii (Aerial):

Fumaria vaillantii is another very promising Turkish medicinal plant which showed highly significant analgesic effects.

Mimosa pudica:

Mimosa pudica L. is a creeping annual or perennial herb. It has been identified as *Lajaluin* in Ayurveda and has been found to have antiasthmatic, analgesic and antidepressant.

Landolphia owariensis:

The aqueous, methanol and chloroform extracts of *Landolphia owariensis* leaves were investigated for anti-inflammatory and analgesic activities.[2]

Paracetamol and NSAID:

Non-steroidal anti-inflammatory drug:

The exact mechanism of action of paracetamol is tentative but appears to act centrally in the brain rather than peripherally in nerve endings. Aspirin and the other non-steroidal anti-inflammatory drugs inhibit cyclooxygenases, leading to a decrease in prostaglandin production. Paracetamol has few side-effects. While paracetamol is usually taken orally or rectally, an intravenous preparation introduced in 2002. NSAIDs can predispose to in some patients peptic ulcers, renal failure, allergic reactions, and occasionally tinnitus with excess dosage, and they can increase the risk of hemorrhage. The use of aspirin in children under

16 suffering from viral illness has been linked to Reye's syndrome, but severe liver disorder.[3]

Classification of non-steroidal anti-inflammatory analgesics:

Nonsteroidal anti-inflammatory drugs are the mostly prescribed medications worldwide and are widely used for patients with low back pain.[4] The classification of NSAIDs, based on their differing clinical and pharmacological characteristics. These are based on their capacity for inhibiting COX-1 and COX-2, which is to say on their method of inhibition. This classification system has few limitations, since some NSAIDs inhibit both COX-1 and COX-2, though they may predominantly affect one isoenzyme more than the other. Furthermore, COX-3 inhibitors are currently in clinical investigation. Classification based on the half-life of each agent, as the serum half-life does not always correspond to the half-life of the drug effects. NSAIDs with short half-lives include aspirin, diclofenac, flufenamic acid, ibuprofen, indomethacin, ketoprofen and tolmetin. Those with long half-lives include diflunisal, naproxen, nalmibutone, phenylbutazone, tenoxicam, piroxicam and oxaprozin. Chemical classification is the oldest of all the classification systems, but it remains the most regularly used system to date given their similar clinical characteristics:

1. **Salicylic acid derivatives:** aspirin, sodium salicylate, choline magnesium trisalicylate, diflunisal, salicylsalicylic acid, sulfasalazine and olsalazine.
2. **Para-aminophenol derivatives** (acetaminophen)
3. **Indoleacetic acids:** indomethacin, sulindac, zomepirac and etodolac
4. **Pyrazole derivatives:** phenylbutazone, oxyphenylbutazone and azapropazone
5. **Anthranilic acids:** mefenamic acid, meclofenamic acid
6. **Pyrazolone derivatives:** metamizol
7. **Pyrrole acetic acid derivatives:** tolmetin, alclofenac, diclofenac, ketorolac and bromfenac
8. **Propionic acid derivatives:** ibuprofen, naproxen, fenoprofen, ketoprofen, suprofen and oxapram.

9. **Benzothiazide or oxicam derivatives:** piroxicam, tenoxicam, meloxicam
 10. **Arylalkanoic acid derivatives:** nabumetone

suggest paracetamol to pregnant patients.11. **COX-2** selective inhibitors: celecoxib, rofecoxib and nimesulide.

Conclusion

Trends

The current value growth rate of analgesics was 20% in 2015. It was observed that the majority of adults consume analgesics as part of their daily routine. The increasing presence of analgesics in supermarkets and independent small grocers also supports its growth.

Competitive Landscape

Brufen of Abbott Laboratories Pakistan Ltd has a 12% value share in 2015, thanks to its increasing popularity with doctors. Many doctors suggest Brufen syrup to parents for their children. Brufen syrup also attracts the attention of parents with its packaging design featuring a colourful cartoon.

Prospects

Over the forecast period, analgesics are expected to post a value CAGR of 10% at constant 2015 prices because of increasing demand from psychiatrists and pregnant women. Doctors even

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