

Review On PAIN MANAGEMENT

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Abstract :

- Pain is defined as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage.
- In general, pain is underestimated by healthcare providers. This underestimation might lead to poor management which negatively affects patients' outcomes, quality of life, and satisfaction.
- Therefore the purpose of this review was to understand what pain means, its physiology, types and what are the different therapies available to manage pain.

Keyword: pain, types of pain, Acute pain, Chronic pain, Breakthrough pain, Bone pain, Nerve pain, Phantom pain, Soft tissue pain, Referred pain.

Introduction:

Pain:

Pain is still one of the most challenging prevalent problems. Worldwide, the prevalence of chronic pain reaches up to 30%.

[1] In the United States, it was estimated that 126 million American adults reported some pain in the last three months.

[2] In Canada, more than 47% reported that they experienced pain

[3] In Italy, pain was reported by more than 80% of patients.

[4] The situation is approximately the same or even worse in the developing countries. For instance, 55% of chronic low back pain patients were classified to have neuropathic pain in Arabian Gulf region.

[5] In Jordan the prevalence of pain experienced by cancer patients is estimated up to 73.3%.

[6] Moreover, in another recent study conducted in Jordan, it was found that 72.0% of patients surveyed experienced moderate to severe postoperative pain at rest.

[7] In the United States, it has been estimated that the cost of chronic pain may exceed \$635 billion annually, which divided to direct medical expenditures and loss of work productivity.

[8] Among Swedish patients, the socioeconomic cost burden of chronic pain was approximately €32 billion.

[9] In Ireland, the cost of chronic pain was €5,665 per patient annually.

[10] There are numerous difficulties in defining the concept of pain.

This lack of definition is mainly because of the nature of the phenomenon.

However, pain is defined as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage.

Advantage:

- Patient comfort and therefore satisfaction
- Earlier mobilization
- Fewer pulmonary and cardiac complications
- Reduced risk of deep vein thrombosis
- Faster recovery with less likelihood pain
- Reduced cost of care
- Extensive experience and training in pain management.
- access to speciality equipment and treatment options that are highly focused on specific types of chronic pain.
- the ability to prescribe and manage the types of medication that can help suppress chronic pain during.

Disadvantage:

- Risk of renal dysfunction
- Risk of respiratory and CNS depression.
- of hypotension
- Poor analgesic effect in moderate to severe pain.

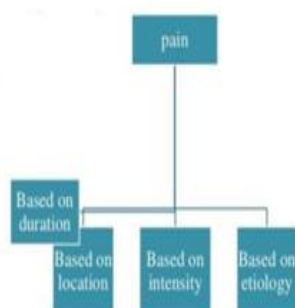
Objective:

1. The overall goal is for residents to understand the fundamentals of caring for patients with acute, chronic, and cancer pain.
2. Residents will become knowledgeable in an interdisciplinary approach to pain management specialties to provide the best care to patients. This will include experience in both inpatient and outpatient facilities.
3. Residents will become familiar with the principles of acute pain management, using common modalities to treat postoperative pain, including intravenous patient-controlled analgesia, epidural and other neuraxial analgesia, other regional anesthetic techniques, and their management and side effects.
4. Residents will also become knowledgeable about chronic pain management. They should learn about the diagnosis, evaluation, and treatment of chronic pain syndromes, with particular attention paid to obtaining a history, performing a physical exam, and proposing a multimodal treatment plan.

Sign and symptoms of pain:

- Increased heart rate
- Increase respiratory rate
- Peripheral vasoconstriction
- Pallor
- Elevated BP
- Increased blood glucose level
- Diaphoresis
- Dilated pupils

Types of pain:



I. Based on duration:

- i. Acute
- ii. Chronic
 1. Chronic non cancer pain
 2. Chronic cancer pain
 3. Chronic episodic pain

II. Based on location

III. Based on intensity

1. Mild pain
2. Moderate pain
3. severe pain

IV. Based on etiology:

- i. Nociceptive pain
 1. Somatic pain
 2. Visceral pain
- ii. Neuropathic pain
 1. Peripheral

Acute pain

- When pain lasts only through the expected recovery.
- Acute pain is protective as an identifiable cause, is of short duration and has limited tissue damage and emotional response.
- It eventually resolves with or without treatment after an injury area heals.
- Complete pain relief may not be achievable but reducing pain to a tolerable level is realistic.
- And relieved acute pain can progress to chronic pain.

Cronic pain

- i. Is the pain lasts longer than 6 months and is constant or recurring with mild to severe intensity.
 - ii. It does not always have an identifiable cause.
Eg. arthritic pain, headache, peripheral neuropathy.
- Chronic pain is pain that has persisted for longer than six months and is experienced most days.
 - It may have originally started as acute pain, but the pain has continued long after the original injury or event has healed or resolved.
 - Chronic pain can range from mild to severe and is associated with conditions such as:
 - Arthritis
 - Back pain
 - Cancer
 - Circulation problems
 - Diabetes
 - Fibromyalgia

- Headache.

Chronic pain can severely affect a person's quality of life and prevent them from returning to work or participating in physical activity. In some people, it may lead to depression or social isolation.

Breakthrough Pain

- Breakthrough pain may also be called a pain flare and it may occur with exercise or physical activity, coughing, illness, stress, or during the period between pain medication doses.
- The pain level is often severe, but the location of the pain is usually the same as the person's chronic pain. Bone Pain This is a tenderness, aching or discomfort in one or more bones that is present during both exercise and rest
- Bone pain is commonly associated with conditions or diseases that affect the structure or function of bone, such as cancer, a fracture (broken bone), infection, leukemia, mineral deficiency, sickle cell anemia, or osteoporosis.
- Many pregnant women experience pelvic girdle pain.

Nerve Pain .

- Nerve pain is caused by nerve damage or inflammation. It is usually described as a sharp, shooting, burning or stabbing pain and
- may also be called neuralgia or neuropathic pain. Some people describe it as being like an electric shock and it is often worse at night. Nerve pain can severely interfere with a person's life and affect their sleep, work, and physical activity levels. They are often very

sensitive to cold and may experience pain with even the slightest touch.

- Many people with chronic nerve pain also develop anxiety or depression. People with neuropathic pain are often very sensitive to touch or cold and can experience pain as a result of stimuli that would not normally be

Common causes of nerve pain include:

- Alcoholism
- An injury to the brain, a nerve, or the spinal cord
- Cancer
- Circulation problems
- Diabetes
- Herpes zoster (shingles)
- Limb amputation
- Multiple sclerosis
- Stroke
- Vitamin B12 deficiency.

Phantom Pain

- Phantom pain is pain that feels like it is coming from a body part that is no longer there. It is common in people who have had a limb amputated, but is different from phantom limb sensation, which is usually painless.
- Historically, Doctors believed phantom pain was a psychological problem but they now realize these are real pain sensations that originate in the spinal cord and brain.
- It often gets better with time, but managing phantom pain can be challenging in some people.

Soft Tissue Pain

- This is pain or discomfort that results from damage or inflammation of the muscles, tissues, or ligaments. It may be associated with swelling or
- Back or neck pain
- Bursitis
- Fibromyalgia
- Rotator cuff injury
- Sciatic pain
- Sports injuries, such as sprains or strains
- Temporomandibular joint (TMJ) syndrome.

Pain Management

- Pain management is complex due to several causes, including the mechanisms of pain, classification, individualization, lack of commonly accepted guidelines, knowledge, psychological and social factors.
- Pain management is well known since many decades. It has been improved a lot lately and is starting to involve plenty of diverse methods.
- Certainly, the management of pain is a multidisciplinary task, the control of pain can be pharmacological and non-pharmacological, or a combination of these two therapies.

1. Pharmacological Methods

- Pain that affects patients' physical function or their quality of life should be recognized as a significant problem.
- Elderly, cancer, postoperative, and traumatic patients with functional impairment or diminished quality of life are ideal candidates for pharmacological therapy. However, the intervention decision either to be pharmacologic or non-pharmacologic is based on a cautious weighing of risks and benefits.
- Pharmacotherapy are generally classified into two lines therapy which are first line or non opioid analgesics and second line or opioid analgesics,

Non opioid drugs

- Generally, a recommended practice by clinicians is usually to start with non opioid analgesics such as Acetaminophen, Non Steroidal Anti-Inflammatory Drugs (NSAIDs), and gradually advance to more potent analgesics till the pain is relieved.
- Acetaminophen is useful as a primary analgesic or in combination with other drugs for treating mild to moderate pain.
- Acetaminophen has analgesic and antipyretic effects similar to NSAIDs, it works by inhibiting the synthesis of neurotransmitter prostaglandins in central nervous system (CNS), and this is why it has no specific anti-inflammatory effect.
- Acetaminophen safe dose should not exceed four gram per day to reduce the risk of asymptomatic elevations of aminotransferase levels, thus, hepatotoxicity . Moreover, the very low cost and apparent risks of acetaminophen therapy suggest a highly favorable risk-benefit ratio that might justify the repetitive use of Acetaminophen.

- However, it was reported that the use of acetaminophen and an NSAID as a combination was superior to use acetaminophen alone .
- Aspirin and other related compounds constitute a category of drugs known as (NSAIDs) . The NSAIDs are useful analgesics for managing mild to moderate pain, particularly of somatic origin such as bone, muscle, and skin.
- These medication are frequently used if there are no contraindication because of gastrointestinal, renal, or cardiovascular disease .
- Traditional NSAIDs have three major effects: analgesics, anti-inflammatory and antipyretic, because of their effect as inhibitors of prostanoid synthesis via blockade of both cyclo-oxygenases (COX-1 and COX-2) .
- Although it is known that NSAIDs are less potent than opioids for the treatment of pain, several NSAIDs drugs provide a documented percentage of 30–50% of Morphine-sparing effect and improve analgesia when coadministered with patient control analgesia (PCA) morphine .
- It is well known that the use of these drugs is associated with gastrointestinal, cardiac, renal and other adverse effects.
- In order to reduce the incidence of severe gastrointestinal adverse effects associated with long-term use of traditional NSAIDs, selective COX-2 inhibitors weIn order to reduce the incidence of severe gastrointestinal adverse effects associated with lore developed .
- In the meantime, the use of these drugs remains under scrutiny, especially for those who are at cardiovascular risk .However, American Heart Association recommended acetaminophen, nonacetylated salicylates and even opioids instead of NSAIDs and particularly COX-2 agents in patients with coronary artery disease .
- Further, in some situations, NSAIDs can cause acute renal failure due to the inhibition of the biosynthesis of prostaglandins involved in the maintenance of renal blood flow .

Opioid drugs

- Opioid analgesics are commonly used as the first-line treatment of moderate to severe pain either in acute, chronic, cancer related or at the end of life .
- However, opioids are very effective analgesics in the short term, but the evidence showed some limitations of efficacy in long-term.
- As a consequence, patients on opioids therapy should have regular check up for both; drug efficacy, patients' tolerability ; the need to increase the dose to achieve the needed effect of analgesia.Despite the controversy about the use of opioids in the treatment of non-cancer pain, opioids drugs reported effective response in the treatment of selected patients with persistent non-cancer pain .

- In contrast, the long term use of opioids in the treatment of persistent pain may be associated with few serious potential risks compared with long term use of NSAIDs, [34].
- Opioids have their specific potential risks such as respiratory depression, sedation, impaired cognition and psychomotor function, constipation, nausea and vomiting, and urinary retention [34, 36] Generally, the available opioids are either μ -opioid receptor agonists or drugs with direct affinity for μ -opioid receptors which appear to be responsible for pain relief [30].
- In this review we discussed the main available opioids, which are currently used in clinical practice such as Morphine, Meperidine, Fentanyl and Tramadol.

Morphine

- Morphine deemed as the drug of choice for treatment of moderate to severe cancer pain [37].
- It can provide clear reductions in pain intensity, therefore, it is one of the most commonly prescribed opioids in critical care units [37].
- Morphine act as μ -receptor pure agonist, it is hydrophilic, which contribute to its slow onset and long duration of action [38]. Morphine is primarily effective for the treatment of nohand, it was found that Morphine could be effective for the treatment of neuropathic pain particularly when combined with antidepressants and the gabapentinoids [38].
- Mainly, Morphine is metabolized in the liver and eliminated by the kidneys. For this reason, Morphine should be prescribed cautiously for patients with renal failure [37, 39]

Meperidine

- Meperidine is less potent opioid than Morphine and is considered as the weakest of the opioids [40]. Most often, it is administered in frequent doses because of its short duration of action.
- Meperidine has a several disadvantages particularly when compared with other opioids [40]. Its analgesic effects are not pronounced [41].
- Further, Meperidine has numerous potential drug interactions, which includes the possibility of serotonergic crisis, and metabolite toxicity that may induce central nervous system dysfunctions which includes seizure [41, 42].

Fentanyl

- pain, classification, individualization, lack of commonly accepted guidelines, knowledge, psychological and social factors [26]. Pain management is well known since many decades. It has been improved a lot lately and is starting to involve plenty of diverse methods. Certainly, the management of pain is a multidisciplinary task, the control of pain can be pharmacolog

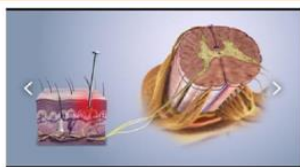
Tramadol

- Tramadol is a centrally acting as μ -opioid receptor agonist [30]. It acts as a weak nor-epinephrine and serotonin reuptake inhibitor.
- Although the mechanism of action of tramadol is not fully understood, it is known that tramadol have dual activity: an opioid like mechanism and non-opioid like mechanism [44, 45].
- It is actually indicated for the management of moderate to severe pain [44]. Tramadol therapy is associated with seizures, thus, this medication is contraindicated for those patients.
- In addition, patients who are on the following medications: a) tricyclic or selective serotonin reuptake inhibitors (SSRI), b) antidepressant, c) a monoamine oxidase inhibitor, and d) an antipsychotic drugs should not take Tramadol; because of increasing risk of seizures [32].
- Tramadol dose should not exceed 400 mg daily. Moreover, dose reduction is recommended, particularly, in older adult patients and for those with renal impairment or cirrhosis [30].

2 Non-pharmacological Methods

- Non-pharmacologic treatments are important adjuncts to treatment modality for patients with pain [46]. Non-pharmacological methods may be used independently with mild pain.
- In addition, it can be used along with pharmacological therapy as a complementary option for moderate to severe pain [47, 48].
- Non-pharmacological treatments are defined as: therapies that do not require taking medication or any other active substances, but make pain more tolerable and give patient a sense of control over the situation [49].
- In the scope of non-pharmacological pain management, the systematic research still very little and the evidences are contradictory [50].
- However, non-pharmacological treatments are divided into multiple categories: a) cognitive behavioral, b) emotional support, c) physical technique, d) creating a comfortable environment, and e) helping with activities of daily living [51, 52]. Cognitive-behavioral: focuses on the interactions between the brain, body, mind and behaviors. This is done with the intention to use the mind to affect physical functioning such as: thinking about something else, hypnosis, imagery, relaxation, distraction, breathing techniques and preparatory information [51, 53].
- Emotional support: concentrates on sensitive, caring and understanding approaches.
- These approaches facilitate communication of anxiety or fears and provide assistance in the management of difficulties [53]. Physical technique: usually focuses on the systems and structures of the body, including the joints, bones, soft tissues, circulatory and lymphatic systems. These techniques include positioning, massage, and thermal regulation, heat/cold application, and rubbing over the painful area [53]
- .Creating a comfortable environment: focuses on ameliorate the intensity/amount of stress and making comfortable environment as much as possible. Examples include:: minimizing noise, providing the patient's with his favorite belongings and maintaining a pleasant room temperature [51]. Helping with activities of daily living: focuses on assistant needed to perform these activities; bathing eating, and walking [51].

Mechanism of pain :



Nociceptiv pain.

- Nociceptive pain is caused by stimulation of sensory nerve fibers that respond to stimuli approaching or exceeding harmful intensity (nociceptors), and may be classified according to the mode of noxious stimulation. The most common categories are "thermal" (e.g. heat or cold), "mechanical" (e.g. crushing, tearing, shearing, etc.) and "chemical" (e.g. iodine in a cut or chemicals released during inflammation).
- Some nociceptors respond to more than one of these modalities and are consequently designated polymodal.
- pain may also be classed according to the site of origin and divided into "visceral", "deep somatic" and "superficial somatic" pain. Visceral structures (e.g., the heart, liver and intestines) are highly sensitive to stretch, ischemia and inflammation, but relatively insensitive to other stimuli that normally evoke pain in other structures, such as burning and cutting.
- Visceral pain is diffuse, difficult to locate and often referred to a distant, usually superficial, structure. It may be accompanied by nausea and vomiting and may be described as sickening, deep, squeezing, and dull. [79] Deep somatic pain is initiated by stimulation of nociceptors in ligaments, tendons, bones, blood vessels, fasciae and muscles, and is dull, aching, poorly-localized pain.
- Examples include sprains and broken bones. Superficial somatic pain is initiated by activation of nociceptors in the skin or other superficial tissue, and is sharp, well-defined and clearly located.
- Examples of injuries that produce superficial somatic pain include minor wounds and minor (first degree) burns.
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Neuropathic

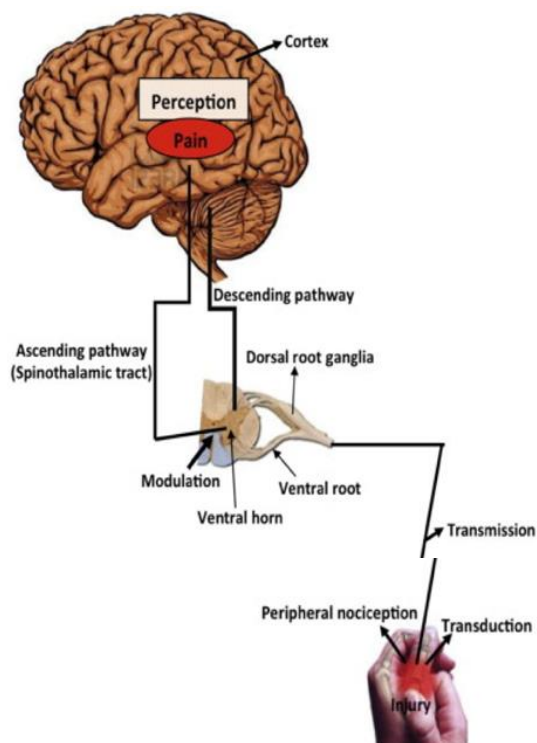
- Neuropathic pain is caused by damage or disease affecting any part of the nervous system involved in bodily feelings (the somatosensory system). [80] Neuropathic pain may be divided into peripheral, central, or mixed (peripheral and central) neuropathic pain.
- Peripheral neuropathic pain is often described as "burning", "tingling", "electrical", "stabbing", or "pins and needles". [81] Bumping the "funny bone" elicits acute peripheral neuropathic pain.

Nociplastic

- Nociplastic pain is pain characterized by a changed nociception (but without evidence of real or threatened tissue damage, or without disease or damage in the somatosensory system)

Psychogenic

- Psychogenic pain, also called psychalgia or somatoform pain, is pain caused, increased, or prolonged by mental, emotional, or behavioral factors.[83] Headache, back pain, and stomach pain are sometimes diagnosed as psychogenic.
- [83] Sufferers are often stigmatized, because both medical professionals and the general public tend to think that pain from a psychological source is not "real". However, specialists consider that it is no less actual or hurtful than pain from any other source.
- When long-term pain is relieved by therapeutic intervention, scores on the neurotic triad and anxiety fall, often to normal levels. Self-esteem,



Conclusion

- Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage. In general, pain is underestimated by healthcare providers.
- This underestimation might lead to poor management which negatively affects patients' outcomes, quality of life, and.
- This review focused on different pain management techniques that are used in the clinical settings; including pharmacological and non-pharmacological.

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