Concepts of Pain Management Module I

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What Is Pain?
Prevalence

• Pain affects 9 out of 10 Americans over age 18 at least once a month and affects 42% every day. It is one of the most common problems we face. For the most part the mechanisms and management of chronic pain is poorly appreciated and misunderstood by physicians, nurses and other health care professionals.
Definition of Pain

- The International Association for the Study of Pain states that it is an unpleasant sensory and emotional experience which we primarily associate with tissue damage or describe in terms of such damage or both.
Transduction of the Nociceptors.

- Specific nerve endings called nociceptors perceive noxious stimuli. They are termed transduced when activated. The impulse is then carried by the A-delta and C fibers to the dorsal column of the spinal cord where primitive processing occurs resulting in a spinal reflex. It has been estimated that the skin may contain as many as 1,300 nociceptors in one square inch. These nociceptors respond to thermal, chemical, and mechanical stimuli.
Transduction of the Nociceptors

• The impulse then goes to the limbic/thalamic system where more sophisticated processing occurs and finally to the sensory cortex and other parts of the brain where interpretation of the pain occurs, emotional relationships with the pain occur and attitudes are developed.
Neurophysiology of Pain

• Complex signaling occurs at the dorsal column internuncial region and several pathways are involved. Both excitatory and inhibitory activity may result. More complex events occur after the impulse travels to the cerebral cortex. Besides going to the sensory cortex, the painful stimulus is sent to other deep portions of the brain.
Neurophysiology of Pain

• Though pain can come from tissue damage though select nerve (nociceptors) and dedicated afferent pathways, the pain can also be modulated by psychological factors and abnormal nervous system processing at various levels.
A Second Mechanism

- Inflammation, modulated by leukotrienes, nerve growth factor, braykinin, various cytokines, prostaglandins, histamine, and hydrogen ions, as well as neurosignalling chemicals such as norepinephrine and neuropeptides, all cause both direct painful stimuli as well as lower the threshold in nociceptor afferent peripheral terminals.
Wind-up

- The two processes of increased excitability at the peripheral pain transducer cell and at the dorsal horn are termed "wind-up", and explains why patients feel continuing or increasing pain even when the peripheral stimulus has been withdrawn or is decreasing.
The postoperative treatment of pain poses special challenges since co-morbidities occur after surgery.

Post-operatively the patient will have:

- emotional responses
- decreased renal function
- respiratory suppression (particularly with thoracic or abdominal surgery)
- gastrointestinal suppression
- increased systemic vascular resistance and increased cardiac work
Post-operatively

- Increased myocardial oxygen consumption,
- Increased risk of deep venous thrombosis, and
- Immunological suppression.
Inadequate Relief of Pain

• Studies have shown that 50-80% of pain patients experience inadequate pain relief or suffer moderate or severe pain (Warfield, 1995). Since these studies were carried out at large medical centers with active pain management programs, the actual incidence is almost certainly higher.
Conclusions

• A prominent researcher has concluded that the consensus of international pain management specialists is that the majority of patients experience unsatisfactory pain relief. (Rawal, 1999). This is clearly unacceptable.
Brain Mind Body Connection

• There are three levels of any pain.
  – The sensory-discriminatory
  – The affective – motivational level
  – The cognitive – evaluation level
Modulation

• The primary modulator of pain is the endorphinergic system. Endorphins, natural opiates, bind to opiate receptors (mu, delta and kappa). Serotonin and norepinephrine also play a role in pain modulation. Chronic pain tends to lower serotonin levels.
Chemicals Released

• C- nerve endings can release a variety of chemicals including substance P, a tachykinin, histamine, acetylcholine, bradykinin, and serotonin. These stimulate other nociceptors to spread the inflammation. Prostaglandins produced locally contribute to altered pain threshold. Neural changes then may occur to contribute to chronic pain problems.
Types of Pain

• The three types of pain are nociceptive, neuropathic and idiopathic. Nociceptive pain means that noxious stimuli are demonstrated to be present to provide normal activation of the nociceptive system during tissue damage. There are two types of nociceptive pain - somatic and visceral. Pain can then be acute or chronic.
Somatic or Structural Pain

Somatic nociceptor pain is

• Aching,
• Stabbing
• Squeezing or Throbbing

Joint pain, bone pain, muscle pain are examples.
Visceral Nociceptive Pain

- Cramping
- Gnawing
- Pressure
- Often referred
- More like somatic pain if the capsule is involved.

Examples; Heart pain referring to left arm, Gall Bladder pain to right side.
Neuropathic Pain

- If pathophysiological changes occur in the peripheral nerve or central nervous system, the pain is said to be neuropathic. It is often chronic, lasts even when a stimulus is no longer present and is electric like, burning, lancinating. These may be associated with allodynia (pain induced by light touch), hyperalgesia (increased response to a noxious stimulus).
Hyperpathia

- Hyperpathia is an exaggerated pain response that persists even when the stimulus is not present.
- It is found in relationship usually to neuropathic pain syndromes.
- If a peripheral nerve is damaged, it may regenerate incorrectly sprouting new nerve endings abnormally.
Neuromas

• These abnormal nerve endings can grow into a discreet lesion called a neuroma.

• They are more sensitive to physical pressure and produce a Tinel’s sign so that tapping on them produces a reproducible tingling or pins and needles effect over the nerve.
Cross-Talk

• After while the abnormal nerve ending may interconnect with other nerves and even those of the autonomic nervous system. This serves to cause persistence of the pain and secondary autonomic effects such as sweating, cold hands, paleness.
Idiopathic Pain

• At times the nature of the pain is uncertain or idiopathic.
• Psychogenic factors fall under this category and can also drive pain and modulate it considerably. The patient's attitudes ethnically, psychosocially, and his past experiences all play a role in this. The emotional component should be addressed but not confused as a cause for pain per se. It may well be a part of a true pain problem.
Examples of Idiopathic Neuropathic Pain

• Often neuropathic pain occurs with no obvious cause. This puzzling idiopathic type of pain usually comes from a malfunction in the peripheral nervous system, with various manifestations: Examples are certain cases of low back pain, tennis elbow, repetitive strain injury, whiplash, frozen shoulder, fibromyalgia.
Subjective Nature of Pain

• As we can’t measure pain directly like we can a blood test or blood pressure, most experts believe that the best approach is for us to assume that the patient is telling us the truth. A belief such as this increases patient-doctor rapport though it may or may not lead to actual treatment.
What Is Chronic Pain?

• Now that we understand pain let us define chronic pain.
• Chronic pain is that pain that persists longer than one month beyond when the acute illness is over or the disease process should have healed, or when associated with a chronic progressive illness or that which occurs recurrently over months or years.
Chronic Pain Management

- The first step is proper assessment of the patient.
- The goal for this is for a proper diagnosis to be made.
- To establish co-morbidities
- To permit the best pain treatment plan to assist the patient.
Chronic Pain

- Chronic pain includes a broad clinical group. These include cancer, non-malignant states such as sickle cell anemia, hemophilia, connective tissue diseases, osteoporosis with fractures, reflex sympathetic dystrophy (CRPS I And II), post herpetic neuropathy, idiopathic polyneuritis, fibromyalgia and others.
Breakthrough Pain

• Acute exacerbations that are superimposed on a chronic pain state are called breakthrough pain.
• They may occur with certain activities
• A majority of cancer patients report breakthrough pain.
Tools for Assessment.

• History with special attention to factors that can cause pain such as alcoholism, diabetes, occupational factors, ergonomic issues.

• Physical exam with special attention to neurological and musculoskeletal areas.

• Psychosocial testing.
Assessment

• Activities of Daily Living determination
• Medical testing to help objectify cause of pain.
• Describe the pain by its characteristics and intensity. See next slide.
Evaluation of Pain Characteristics and Intensity

Pain is inherently subjective and the patient self-report is the gold standard in assessment. Ideally, the description the pain should characterize its temporal relations, intensity, location, quality and factors that exacerbate or relieve (Table: Pain Characteristics). Each of these elements may be relevant to diagnosis or management.

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<th>Characteristics</th>
<th>Potential Elements</th>
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| Temporal             | Acute, recurrent, or chronic  
Onset and duration  
Course and daily variation, including breakthrough pain |
| Intensity            | Pain *"on average"*  
Pain *"at its worst"*  
Pain *"at its least"*  
Pain *"right now"* |
| Topography           | Focal or multifocal  
Focal or referred  
Superficial or deep |
| Quality              | Any descriptor (e.g., aching, throbbing, stabbing or burning)  
Familiar or unfamiliar |
| Exacerbating / relieving factors | Volitional ("incident pain") or non-volitional |

One of the most common mnemonics for remembering the steps involved in pain assessment is PQRST: Provoking factors, Quality, Region/Radiation, Severity/Symptoms, and Timing.
Determining Pain Intensity

• Next try to determine the degree and location of the pain by standardized methods.
• A VAS or Visual Analog Scale and a NRS (Numerical Rating Scale) are numerical rating scores from 1 to 10.
• A faces pain scale
• Verbal Rating scale, i.e. mild moderate severe
Visual Analog Scale

An Example of a Visual Analog Scale
Determining Pain Intensity

- McGill Pain Questionnaire
- Memorial Pain Assessment Card
- Brief Pain Inventory
- Neuropathic Pain Scale
- Dallas Pain Questionnaire
- Oswestry for back pain
- SF36 for ADL
Summary

ABCDEs of Pain Management

Ask about pain regularly. Assess pain systematically.
Believe the patient and family in their reports of pain and what relieves it.
Choose pain control options appropriate for the patient, family and setting.
Deliver intervention in timely, logical and coordinated fashion.
Empower patients and their family. Enable them to control their course to the greatest extent possible.
Summary

- Ask about pain regularly. Assess pain systematically.
- Believe the patient and family as to degree and what relieves pain.
- Choose appropriate pain options to assist.
- Treat timely and logically
- Empower the patient.