*Pain

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

*Classification

* Acute pain ≤12 weeks — Chronic pain >12 weeks
* Surgical — * non-surgical
* nociceptive ⇒ stimulation of nociceptors — * Neuropathic ⇒ nerve damage

most common
2 types Somatic & visceral
localized : poor localization
Sharp, hot ---- might be refered
dull

* History of peripheral / Central nerve damage
* poorly localized
* Spontaneous & Paroxysmal phantom phenomena ↗ Post amputation
* Responds to neuropathic analgesia & poorly to opioids

*Nociceptive Receptors

free unmyelinated nerve ending ⇒ able of transmitting pain
* K^+, Histamine, Bradykinin, Leukotrienes and Prostaglandins
Serotonin

nociceptive ⇒ Superficial ⇒ Skin — sharp well localized

⇒ Deep ⇒ arising from structres muscles, tendons ligaments — dull aching poorly localized

⇒ Visceral ⇒ arising from viscera spasm, overdistention of hollow viscus — dull diffuse poorly localized.

* Phantom phenomena

→ Pain that comes & goes

Shooting, stabbing

Cramping . pins &

needles . crushing

throbbing , burning

→ Pain pathways :-

⇒ 1st order neuron
from receptors to dorsal horn of SC

C & Aδ nerve fibers. ⇒

⇒ 2nd order → decussation
from dorsal horn to thalamus ⇒ lateral spinothalamic tract

⇒ 3rd order
thalamus → somatosensory cortex

* Neuropathic pain MCC → DM ∴
- trauma - systemic disease

⇒ Acute Pain → nociceptive → somatic (Sup.f / Deep) / visceral

*caused by noxious stimulation from injury / disease process
last less than 3-6 weeks.

as nociceptive pain → to detect, localize, limit tissue damage.

** types of Acute pain → Somatic & visceral

1 Somatic pain "superficial" from skin & SC
well localized, sharp, burning, throbbing

2 Somatic "Deep" from muscles, tendons, joints, bones
dull, less localized

⇒ types of visceral pain
*disease process or abnormal function involving an internal organ or its covering
pleura, pericardium, peritoneum
⇒ dull, aching, poorly localized
⇒ Reffered

Phantom Pain

⇒ Pain is pain that's feels like it's coming from a body part that's no longer there.

*Post amputation

Symptoms:-

⇒ onset within first weeks after amputation, can be delayed by months or longer.

⇒ pain comes & goes or is continuous

⇒ Symptoms affecting the part of the limb farthest from the body

⇒ Can described as shooting, stabbing, cramping, burning, pins, needles crushing, throbbing or burning

*Causes:-

(1) ⇒ exact cause → unclear

(2) ⇒ as response to mixed signals from the brain after

⇒ lose of input from the missing limb and adjust to this detachment in unpredictable way

⇒ Result triggers the body's most basic massenge ⇒ pain

(3) ⇒ Studies shows that after an amputation the brain Remap that part of the body's sensory circuitry to another part of the body

(4) ⇒ multiple factors ⇒

* damaged nerve ending
* scar tissue at the site of the amputation
* physical memory of pre-amputation pain in the affected area

Risk factors:-

(1) Pain before amputation (2) Residual limb pain

Chronic Pain :-
persists beyond the usual course of an acute disease or after a reasonable time for healing to occur 1-6 months
may be nociceptive, neuropathic, mixed

⇒ Sympathetically maintained pain

→ * Systemic Response to pain

⇒ Acute pain
- Can effect nearly every organ
- may affect perioperative morbity & mortality

with Acute Pain

Cardiovascular
- hypertension
- ↑ HR
- ↑ myocardial irritability
- myocardial ischemia

Respiratory
↑ O_2 consumtion
↑ CO_2 production

Gastrointestinal & urinary
ileus & urinary Retention

Endocrine
↑ Catabolic hormones
Catecholamines
Cortisol
glucagon
↓ anabolic hormones
human growth hormone
insulin

with chronic

Neuroendocrine
Stress response observed → Severe recurring Pain only

Sleep & affective disturbances
depression

* evaluation of pain *

- numerical rating scale
- Wong-Bakes Faces
- Mc Gill Pain Questionnaire
- rating scale
- visual analog scale (VAS) 10cm

* Psychological evaluation
MMPI , Beck Depression Inventory.

⇒ other tools for chronic pain

⇒ electromyography & nerve conduction studies
↳ to distinguish between neurogenic & myogenic cause

⇒ to confirm diagnosis of entrapment syndromes
- radiculer syndromes
- neural trauma
- polyneuropathies

treatment

Pharmacological
- NASID
- opioids
- Neuroleptics
- Antispasmodics
- Corticosteroids
↳ good for acute & chronic pain

Peripheral & neuraxial nerve blocks
- local anesthetics
- Steroids
- α2 agonists
- opioids

- physiotherapy
- Acupuncture
- Cryoanalgesia
- Radio-frequency ablation
- Chemical neurolysis

⇒ Adult Oral analgesics step ladder

*

Start with

Paracentamol
1g 4 times
weight > 50 Kg

if weight < 50 then ⇒

15 mg/Kg
4 times

If no contraindications

Add NSAIDs

Ibuprofen
400mg
3 times
OR
Naproxen
500mg
+ Paracetamol

Tramadol MR 100mg
2 times
+ 50mg 6 hourly
PRN
+ NSAIDs + Paracentamol

Stop tramadol ⇒ Oramporh
10 - 20 mg / hour
1 hour
or oxycodone 5 or 10 mg
2 Hourly
+ NSAID + Paracetamol

mild pain

Severe pain

* Classification of opioid components :-

⇒ Natural
- morphine
- codeine
- Papaverine
- Thebaine

Synthetic :-
- morphinan (Levorphanol, butor
- Diphenylpropylamine
- Benzomorphan
- phenylpiperidine

* Opioids receptors :-

μ δ κ

* effect of opioids ⇒
(1) Produce euphoria, tranquility, alteration of mood.
(2) analgesia without loss of consciousness
(3) well used nociceptive, poor response of neuropathic

*effect on the body
- Parasympathetic activation → miosis
  pruities (Itching)
  bradycardia
  histamine release
  Vomiting & Constipation

*

meperdine
- mydriasis "anticholinergic effect"
- no bradycardia might cause tachycardia

morphine

Metabolized :- liver by conjugation & extrahepatic metabolism by kidney

Onset :- 1-2 min IV

Peak effect :- 3-5 min IV, 20 min 90 min

products of metabolizems M6G 10% of morphine
more potent μ-receptor agonist.
smaller duration of action

minimal tolerance

⇒

- Meiosis
- Constipation.
- Hyperalgesia → ↑↑ sensitivity to pain

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- phenylpiperidine

ds acceptors:-

μ δ κ

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- meperdine *

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Metabolized:- Liver by con
& extrahepat

om by kidney

* with pts with renal dysfunction M6B accumulation ⇒ ↑ incidence of side E Including respiratory depression

Fentanyl

Products of metabolism- Norfentanyl
1° metabolite

Combining of loading dose of fentanyle
2 → 6 (μg/kg)

⇒ long acting, widespread distribution

Use it in induction of Anesthesia

Alfentanil

⇒ very fast onset
Short duration
un-ionized 90% at normal pH

Remifentanil

* ester linkage
* Rapid metabolism
* Rapid reduction of [blood] after cessation of infusion.

* IV, transdermal, Iontophoresis, Transmucosal, extended-Release epidural morphine, orally

Meperidine

⇒ excitation of CNS
- ⇒ tremors
- ⇒ muscle twitches
- ⇒ seizures

Caused by metabolite
⇒ Mr. normeperidine

⇒ well-known local anesthetic properties

*dose (12.5 - 35 mg) → to prevent post operative shivering

Opioid antagonists

⇒ to reverse → RD
⇒ N & V
⇒ rigidity
⇒ biliary spasm
⇒ Urinary Retention
⇒ pruritus

Naloxone ↑HR ↑BP , may cause pulmonary edema

(1-2) onset of A IV (can be used intratracheal)

$t_{\frac{1}{2}}$ 30-60min

Recurrence of RD after naloxone results from the short t ½ of naloxone

✱ chromaffin T-T /Pheochromocytoma

↳ rare - non cancerous benign tumor develop in adrenal gland