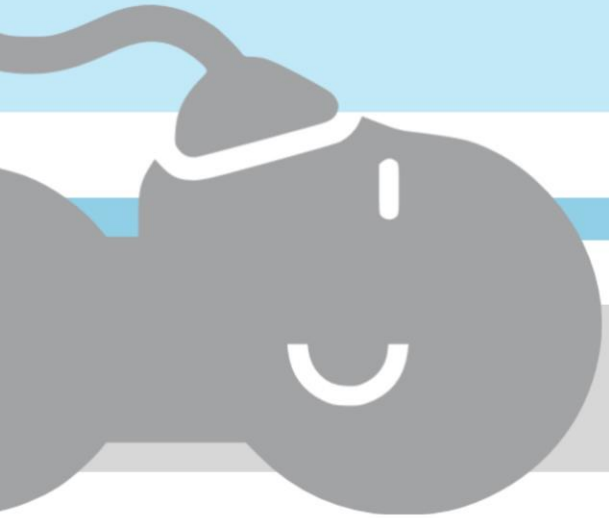

ANESTHESIA

(11) Post-operative Management

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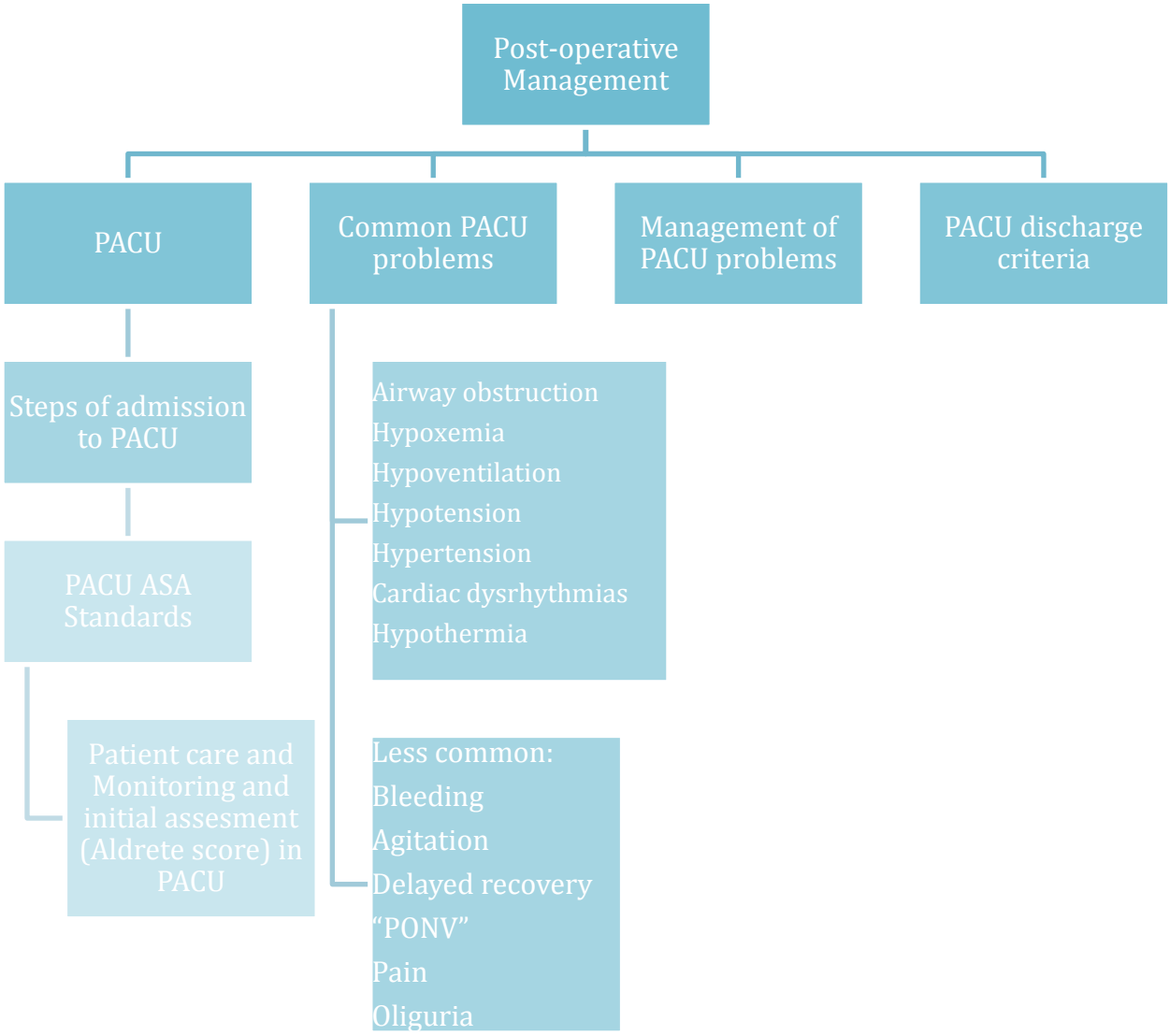
Doctor's note Team's note Not important Important 431 teamwork

(431 teamwork do not highlight it in yellow, but put it in a yellow "box")

Objectives:

1. Learn a common approach to emergency medical problems encountered in the postoperative period.
2. Study post-operative respiratory and hemodynamic problems and understand how to manage these problems.
3. Learn about the predisposing factors, differential diagnosis and management of PONV.
4. Understand the causes and treatments of post-operative agitation and delirium.
5. Learn about the causes of delayed emergence and know how to deal with this problem.
6. Learn about different approaches of post-Operative pain management



Post Anesthesia Care Unit (PACU)

Design should match function so:

- Location:

  -Close to the OR. (For easier transportation)
  -Access to x-ray, blood bank & clinical labs.
  (The area should have enough space)
- Monitoring equipment (Standard monitor: HR ECG BP. Invasive and non-invasive BP, also designed for airway management like in OR)
- Emergency equipment (In case of emergency airway complication)
- Personnel (recovery nurse)

❖ Anesthesia stages: 1st Preoperative anesthesia, 2nd intraoperative 3rd post anesthesia care unit

❖ The patient should be stable when transferring him to PACU. It's a major mistake to take the patient to the recovery room without controlling the presented problems and stabilizing him.

❖ If complications where managed very well inside theatre it's less likely you see them in recovery room.

Admission to PACU

Steps:

- Coordinate prior to arrival
- Assess airway
- Administer oxygen
- Apply monitors
- Obtain vital signs
- Receive report from anesthesia personnel

PACU - ASA Standards (American society of anesthesia)

The American society of anesthesia standards should be applied in all recovery rooms

- **Standard I**

All patients should receive appropriate care (from the anesthetist and the nurse)

- **Standard II**

All patients will be accompanied by one of anesthesia team

- **Standard III**

The patient will be reevaluated & report given to the nurse

If any incidents happened intra-op and continued post-op the nurse should know all about it.

- **Standard IV**

The patient shall be continually monitored in the PACU

(At least for 45 mins)

- **Standard V**

A physician will sign for the patient out of the PACU

Before moving any patient from recovery room to ward, a discharge paper should be signed by the anesthetist allowing the nurse to take the patient to the ward.

Patient Care in the PACU

1. Admission
   -Apply oxygen and monitor
   -Receive report
   - You apply oxygen before attaching any monitor, because any complication can be due to hypoxia so you must prevent it.
   - When everything is set and patient is stable the nurse should receive the report from the doctor about any crucial incidents happened during the procedure.

2. Monitor, Observe & Manage
   To Achieve:
   -Cardiovascular stability
   -Respiratory stability
   -Pain control

3. Discharge from PACU

Monitoring in PACU

- Baseline vital signs (HR, RR, O2 saturation, BP, Temperature)
- Respiration
  -RR/min, Rhythm
  -Pulse oximetry
- Circulation
  -Pulse rate/min & Blood pressure
  -ECG
- Level of consciousness
- Pain scores

- After taking the vital signs, you must assess the level of consciousness of the patient. A patient may be sedated but conscious, if you stimulate him

- He should wake up, if he didn't, he'll start hypo-ventilating and become hypoxic, and complications of airway will happen.

Pain scoring should be done. If there was any pain it should be controlled before leaving the recovery room. Patient can't be discharged unless he is pain free or has mild pain.

Initial Assessment

- Color
- Respiration
- Circulation
- Consciousness
- Activity

❖ First assessed by the doctor then continued by the nurse every 5 minutes and If patient is stable every 15 minutes (use aldrete score). Everything should be documented to avoid future problems (medicolegally).

Aldrete Score

Score	Activity	Respiration	Circulation	Consciousness	Oxygen Saturation
2	Moves all extremities	Breaths deeply and coughs freely.	BP ± 20 mm of preanesth. level	Fully awake	Spo2 > 92% on room air
1	Moves 2 extremities	Dyspneic, or shallow breathing	BP ± 20-50 mm of preanesth. level	Arousable on calling	Spo2 >90% With suppl. O2
0	Unable to move	Apneic	BP ± 50 mm of preanesth. level	Not responding	Spo2 <92% With suppl. O2

❖ One of the requirements of patient assessment and care after sedation is to evaluate the patient's recovery as the sedation wears off.
❖ It's out of 10 and should be done during the patient stay in the recovery room.
❖ 7 or less >> ask for help and call anesthetist for any complications.
8 or more >> patient is okay and stable.
❖ To apply this scale, it is very important to know the patient "pre-anesthesia" score. Some patients may have "normal" abnormalities that change the score.

Common PACU Problems

Most common

- Airway obstruction
- Hypoxemia
- Hypoventilation
- Hypotension
- Hypertension
- Cardiac dysrhythmias
- Hypothermia

Less common

- Bleeding
- Agitation
- Delayed recovery
- "PONV"
- Pain
- Oliguria

❖ Most common problem that happens inside the recovery room is airway obstruction, followed by the rest.

❖ The major complications are not usually seen in recovery room, because they are usually managed intra operatively (inside OR)

1. Airway Obstruction

- Tongue falls back (The most common cause of airway obstruction) ⟹ Posterior pharynx

  Because the patient is still sedated (he received opioid as anesthesia) to resolve that you do simple maneuver, manipulate the chin (chin lift) just to elevate the tongue up, open the airway and he'll start to breathe again. Sometimes we need to put naso/oro-pharyngeal airway, and if it didn't work we need to go more advance, use ambu bag, ventilate then intubate (recovery room should contain all equipment for intubation and checked every day by the technician)

- *Presence of a foreign body*

Can be secretions, blood, throat packs left inside after airway surgery, ENT surgery.
Main cause is blood, which obstructs the airway and cause nerve stimulation.
If the foreign body was deeper it'll lead to laryngospasm (not fixed by simple maneuver here the vocal cords are closed so we must facilitate the patient breathing by CPAP or give muscle relaxants to open the vocal cords).
Best way to avoid airway obstruction is to put the patient in recovery position (left lateral) post-surgery (post tonsillectomy and any airway surgery) especially in pediatrics and if there is a risk of aspiration to avoid secretions stimulating the vocal cords causing spasm.

- *Inadequate muscle relaxant reversal*

- *Residual anesthesia*
  - It can be muscle relaxant or inhalation or opioid
  - In opioid: there is big tidal volume, low respiratory rate, but deep breathing. The respiratory rate is 5 or 4 but the big tidal volume is what is compensating for this patient if it decreases then he will desaturate.
  - In inhalation: it can stay for longer action
  - In residual muscle relaxant: if the doctor didn't check the nerve simulator and he reversed the patient before he spontaneously breathes on his own.

Management of Airway Obstruction:

- Patient's stimulation
  1st thing stimulate the patient (wake him up) especially with opioids, ask them to breathe. If he is not responding you must take an action and reverse the effect of each drug that was given to him give naloxone if opioid or give flumazenil if midazolam.
- Suction You apply suction to clear secretions and blood.
- Oral Airway
- Nasal Airway
- Others:
  - Tracheal intubation
  - Cricothyroidotomy
  - Tracheotomy

2. Hypoventilation

- *Residual anesthesia*
  - Narcotics
  - Inhalation agent
  - Muscle Relaxant
- *Post-operative Analgesia*
  -Intravenous
  -Epidural

Treatment of Hypoventilation:

- Close observation
- Assess the problem
- Treatment of the cause: e.g. reverse (or give antidote)
  - Muscle relaxant ⇨ Neostigmine
  - Opioids ⇨ Naloxone
  - Midazolam ⇨ Anexate (flumazenil)

First by close observation, make sure the patient is stable and not desaturated, if everything is okay the nothing dangerous it's only the effect of opioid, leave him till the effect is gone. Once the patient desaturates try to figure out the problem and treat it.

3. Hypertension

- *Common causes*: e.g.

  -Pain (treat the pain, bp will go back to normal)

  -Full Bladder (Specially if there's no folly catheter and long procedure, patient been on IV fluid for hours -usually missed-)

- *Hypertensive patients*

  Sometimes they stop their meds pre-op. so we advise them to take their drugs before the surgery. We can give them antihypertensive intra-op if BP increases or wait until you transfer the patient to recovery room and give him the drug orally if it's possible.

- *Fluid overload*
- *Excessive use of vasopressors*

Treatment of Hypertension:

- Effective pain control
- Sedation (sedation in the recovery room isn't advisable until you know the cause)
- Anti-hypertensives:

  Beta blockers
  Alpha blockers
  Hydralazine (Apresoline)
  Calcium channel blockers

4. Hypotension

Decreased venous return due to:

1- Hypovolemia:

- Hypovolemia can be avoided by good intra-op management: blood transfusion of the cause is bleeding or fluid replacement.
- If patient is still hypotensive in recovery room you can give another bolus of fluid or blood transfusion.

-Decreased fluid intake

-increased losses

-Bleeding

2- Sympathectomy

happens in regional anesthesia causing hypotension and it can continue to the recovery room until it the anesthetic effect fades away. You can manage this intra-op by giving fluids and vasopressin.

3- 3rd space loss

Inadequate fluid replacement. Each surgery has a specific amount of fluid replacement according to body exposure:

- If it's mild (2-4), moderate (4-6) extensive (10-15) ml/kg/hr
- But in renal and cardiac patients we can't over load them with fluids so we give them blood, colloids, or vasopressor. They can't tolerate large volume or else they'll develop pulmonary edema, cardiac Failure.

4- Left ventricular dysfunction

If the patient is old and has cardiac condition. the cause of hypotension can be left vent dysfunction if its associated with arrhythmia and ECG changes.

Treatment of Hypotension:

- Initially treat with fluid bolus (Main treatment of hypotension is fluid replacement)

±Vasopressors,

+ Correction of the cause

- You must know the cause in order to treat accordingly (deficit from OR/ bleeding or cardiac cause/regional anesthesia)
- If cardiac cause Dysfunction: do all cardiac related tests, consult cardiology.

5. Dysrhythmias

Secondary to:

- Hypoxemia (Main cause of dysrhythmia in recovery room, put patient on oxygen right away. If patent didn't get better and heart about to arrest give atropine)
- Hypercarbia
- Hypothermia
- Acidosis
- Catecholamines
- Electrolyte abnormalities.

❖ Dysrhythmias are rarely seen in normal patients except in known cases of dysthymia, cardiac patients, and old age.

❖ Dysrhythmias can cause hypotension in cardiac patients

Treatment of dysrhythmias:

- Identify and treat the cause
- Assure oxygenation
- Pharmacological

6. Urine Output:

- Oliguria

-Hypovolemia
-Surgical trauma (post CS because of traumatizing the ureters)
-Impaired renal function
-Mechanical blocking of catheter. (Manipulation of the catheter solves the problem)

- *Treatment:*

-Assess catheter patency
-Fluid bolus
-Diuretics e.g. Lasix

❖ Folly Catheter is mandatory in recovery room. Urine output should be calculated in recovery room, starting from OR every hour.

7. Post op Bleeding:

Causes:

- Usually Surgical Problem
- Coagulopathy (if patient underwent major blood transfusion even if it was his blood type)
- Drug induced (ex: Plavix, heparin and went for emergency surgery)

Treatment of Post-op Bleeding:

- Start i.v. lines >>> push fluids
- Blood sample:
  - CBC
  - Cross matching,
  - Coagulation profile to detect coagulopathy
- Notify the surgeon,
- Correction of the cause

8. Hypothermia

Most of patients will arrive cold and shivering.

Very common in recovery room most of pts arrive cold.

The best thing for shivering is to warm the patient and cover him with warm blankets or a bair hugger.

Complications of Hypothermia:

- Decreases metabolism rate which prolongs the duration of action of anesthesia drugs
- Predisposes to infections
- Affects coagulation and increases bleeding tendency

Treatment of Hypothermia:

- Get baseline temperature
- Administer oxygen if shivering

  Oxygen should be given for shivering patients because shivering increases oxygen consumption especially in geriatric and pediatric patients whose oxygen consumption is high in the normal setting so they easily become hypoxic when their temperature drops.

Take care for pediatric and geriatric patients

9. Altered Mental Status:

Causes: (all these causes make the pt. agitated)

- Reaction to drugs?

Drugs e.g. sedatives, anticholinergics

Intoxication / Drug abusers

- Pain
- Full bladder
- Hypoventilation
- Low COP
- CVA

Treatment: (never give sedation in agitated pt. immediately; you have to know the cause & treat it first)

- Reassurances,
- Always protect the patient (from self-harm)
- Evaluate the cause
- Treatment of symptoms
- Sedatives / Opioids if necessary "last choice"

If the pt. is hypoxic and hypoventilating & you gave him sedatives > it will worsen the problem

10. Delayed Recovery: (can be drug cause or metabolic cause)

- Systematic evaluation
  - Pre-op status. If you know that your pt. is diabetic & he didn't wake up at the end of the surgery & you're sure that you've reversed everything > the cause will be either hypoglycemia or electrolytes imbalance
  - Intraoperative events e.g. hypoxemia, hypercarbia
  - Ventilation hypoventilation
  - Response to stimulation. if the pt. is stimulated > the cause is mainly opioids
  - Cardiovascular status. hypotension will delay the recovery
- The most common cause:

Residual anesthesia ➢ Consider reversal

- Hypothermia, (because of delayed metabolism, the duration of action of anesthetic drugs is prolonged)
- Metabolic e.g. diabetic coma,
- Underlying psychiatric problem
- CVA affects the mental status

Reversal of medications:
- Opioids > naloxone
- Muscle relaxant > neostigmine

11. Postoperative Nausea & Vomiting "PONV":

- *Risk factors:*

Type & duration of surgery,
Type of anesthesia,
Drugs (opioids are the main cause)
Hormone levels e.g. low level of thyroid hormones
Medical problems e.g. motion sickness
Autonomic involvement e.g. spinal anesthesia "only if it caused hypotension"

PONV Risk factors can be divided into:
1- patient related:
Young, female, pregnancy, previous hx. of PONV, full stomach pts.
2- surgical related:
ENT, ophtha, laproscopic procedure, abdominal surgery, spinal surgery, prolonged surgeries
3- anesthesia related:
GA, inhalational, opioids

Prevention of PONV:

- NPO status (the more NPO hrs, the more dehydrated the pt., and the more nausea & vomiting > so you have to hydrate the pt. to prevent PONV)
- Dexamothasone,
- Droperidol,
- Metoclopramide,
- H_2 blockers, e.g. ranitidine
- Ondansetron,
- Acupuncture

The main cause of PONV after a spinal anesthesia is **hypotension**. So when a patient complains of nausea post-op immediately give vasopressors (because the 1st sign of hypotension in those pts. is nausea).
1st line vasopressors: ephedrine *"if with bradycardia"* or phenylephrine *"if with tachycardia"*
2nd line: epinephrine

12. Postoperative Pain:

Causes:

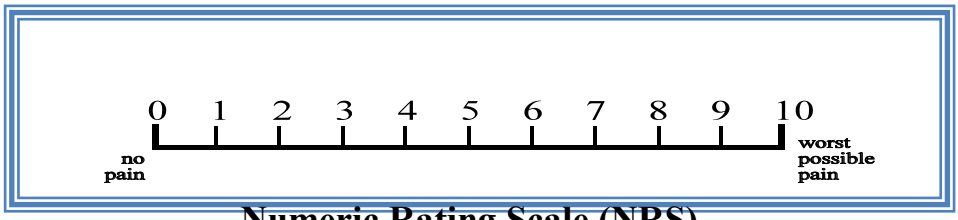
- Incisional "main cause": Skin and subcutaneous tissue
- Laparoscopy: Insuflation of Co_2
  laproscopic procedure mainly causes referred pain usually to shoulders
- Others:
  - Deep: cutting, coagulation, trauma
  - Positional: nerve compression, traction & bed sore.
  - IV site: needle trauma, extravasation, venous irritation (by drugs e.g. propofol > so to decrease the burning sensation you can either choose a big vein & use a big cannula OR you can give the pt. IV lidocaine or opioid before injecting propofol)
  - Tubes: drains, nasogastric tube, ETT
  - Surgical: complication of surgery
  - Others: cast, dressing too tight, urinary retention

PAIN MEASUREMENTS: (doctor said that this is advanced for us)

Subjective		Objective
Uni-Dimensional	Multidimentional	❖ Behavioral.
❖ VRS, VAS & NRS.	❖ McGill P Q,	❖ Physiological.
❖ Facial expression.	❖ Pain Inventory.	❖ Neuro-endocrinal.
		❖ Algometry.
❖ ACUTE PAIN	❖ Chronic Pain	❖ Both

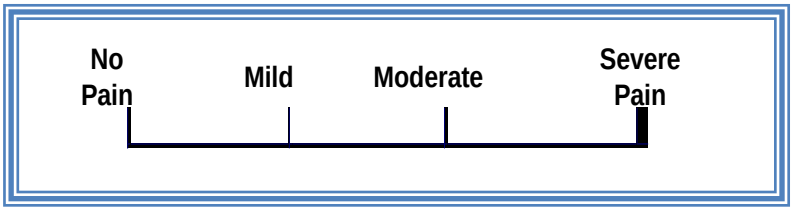
Pain Scores:

For adults



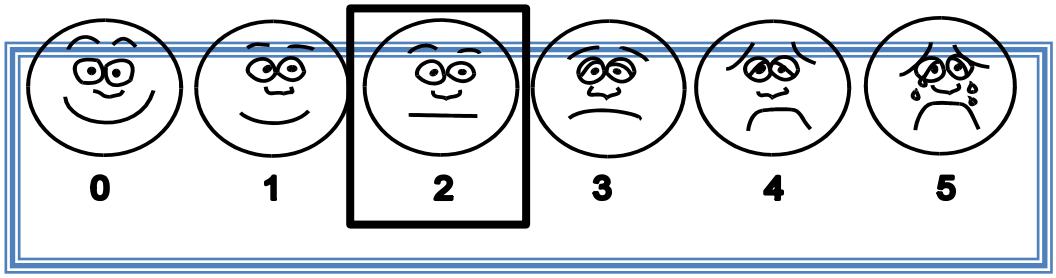
Numeric Rating Scale (NRS)

Verbal scale:



Wong-Baker "Faces Scale":

For pediatrics



ACUTE POSTOPERATIVE PAIN MANAGEMENT TOOLS: 1st line

for pain management in general is NSAIDs + paracetamol. But in the recovery room we know that the pain is caused by the surgery & it's severe > so we start immediately with opioids.

Pharmaco - Therapy

1. **Non Opioid Analgesics**

   NSAADs
   Analgesic /Antipyretic
   Analgesic/Anti-inflam/Antipyretic
   NSAIDs
   Non-selective COX inhibitors
   Selective COX-2 inhibitors
2. **Opioids**

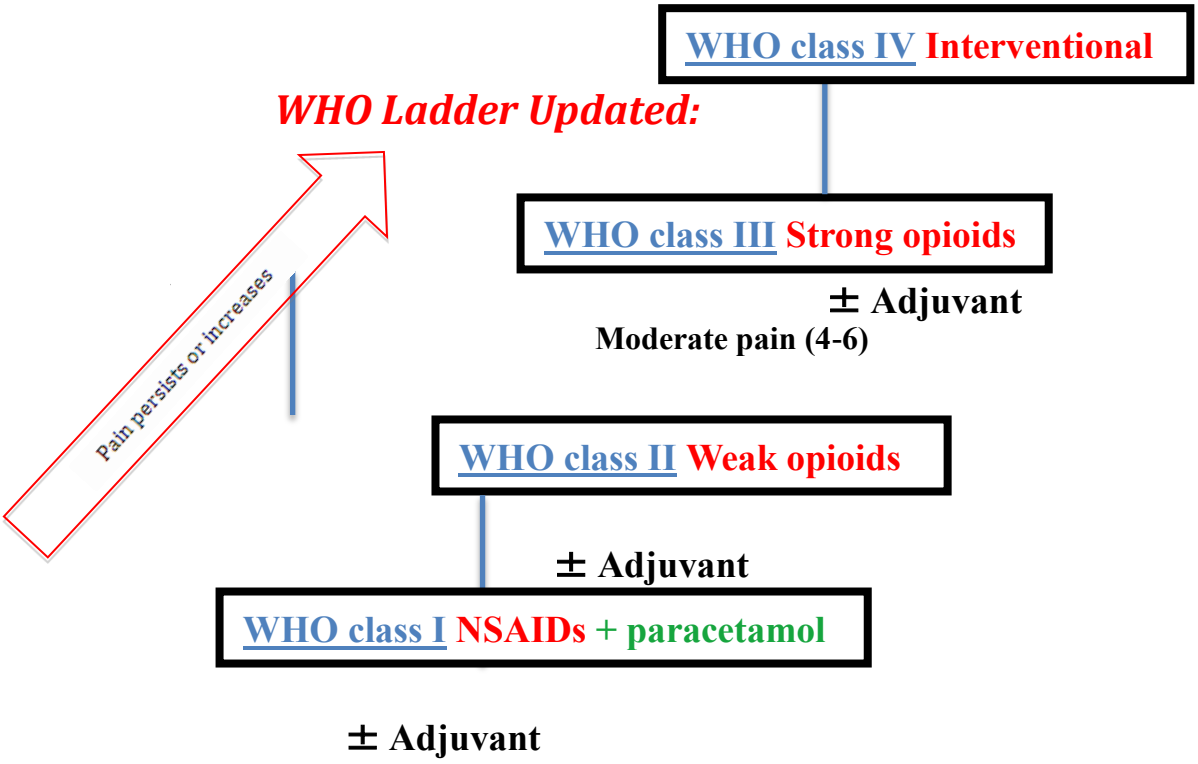
   Weak Opioids.
   Strong Opioids.
   Mixed agonist-antagonists
3. **Adjuvants**

   α-2 Agonists
   LA
   SP inhibitors
   NMDA inhibitors
   Anticonvulsant / Antidepressants
   Calcitonin
   Relaxants
   Cannabinoids
   Others

Regional Techniques

1. **Local infiltration**
2. **Wound perfusion**
3. **Intra-abdominal inj. of LA/Analg.**
4. **Intercostal & interpleural**
5. **Paravertebral**
6. **USG-RA: e.g. TAP** for abdominal pain
7. **Neuraxial:**
   - Epidural:
     Thoracic
     Lumbar
   - Spinal:
     Single shot
     CSA (continuous spinal anesthesia)
   - CES (Combined epidural and spinal)

Regional techniques used in pts. with severe pain e.g. chronic pain in the leg or the hand.



WHO (I) Non Opioid Analgesics:

1. NSAADs:
   - Analgesic / Anti-inflam / Antipyretic/Anticoagulant: *ASA* (Acetylsalicylic acid = aspirin)
   - Analgesic /Antipyretic: *Paracetamol*
2. NSAIDs:
   - Non-selective COX inhibitors: *Diclofenac & Ketoprofen*
   - Selective COX-2 inhibitors *Celecoxib & Rofecoxib*

Non-selective COX inhibitors: "more histamine release"
Should not be given for renal pts. Or asthmatics (it causes bronchospasm)
Selective COX inhibitors: "less histamine release"
Can be given in case of mild renal impairment or pts. with mild asthma.
But doctor said that we usually avoid giving NSAIDs to those pts.

Patients are given multimodal analgesia post-op: Paracetamol, NSAIDs, and Opioids.

Scientific Evidence – NON OPIOID ANALGESICS:

1. Paracetamol:
    A. Is an effective analgesic for acute pain; the incidence of adverse effects comparable to placebo *(Level I [Cochrane Review]).*
    B. Paracetamol / NSAIDs given in addition to PCA Opioids ⇒ ↓ Opioid consumption *(Level I).*
2. NSAIDs:
    A. Are effective in the treatment of acute postoperative *(Level I).*
    B. With careful patient selection and monitoring, the incidence of renal impairment is low *(Level I [Cochrane Review]).*
    C. NSAIDs + Paracetamol improve analgesia compared with paracetamol alone *(Level I).*

WHO Ladder II - Weak Opioids:

1. Tramadol:

Tramadol : Morphine:
Parenteral = 1 : 10 & Oral = 1 : 5
Dose: 200 – 400 mg/d

2. Codeine: very weak opioid, used for chronic pain

Metabolized to morphine.
Codeine : Morphine = 1 : 10

3. Dextro-propoxyphene: not used in KKUH

Methadone Derivative
Prolongation of Q-T interval.

Scientific Evidence – WEAK OPIOIDS:

1. Tramadol: high risk of nausea & vomiting

Has a lower risk of respiratory depression & impairs GIT motor function < other opioids
(Level II).

- ❖ Is an effective treatment for neuropathic pain

(Level I [Cochrane Review]).

2. Dextropropoxyphene:

Has low analgesic efficacy
(Level I [Cochrane Review]).

WHO Ladder III - Strong Opioids:

1. Morphine:
    - Sedation
    - PONV
    - Respiratory Depression
    - pruritis
2. Fentanyl
    - Rapid action, Short duration.
    - Fentanyl : Morphine = (1:10)
3. Pethidene:
    - Active metabolite: ↑ t½. not used so much in the recovery room
    - Prolongs Q-T interval.
    - Pethidine : Morphine = (1:10)
4. Hydromorphone:
    - Powerful, rapidly acting.
    - Release is in distal gut.
    - Hydromorphone : Morphine = 1 : 5

Potency (from strongest to weakest):
1- Fentanyl
2- Morphine
3- Hydromorphone
4- Pethidene

WHO Ladder IV – Regional Anesthetic Techniques:

"newly added step"

1. Local infiltration
2. Wound perfusion
3. Intra-abdominal LA
4. Intercostal
5. Interpleural
6. Paravertebral
7. USG - RA: e.g. TAP
8. Neuraxial:
    1. Epidural:
       Thoracic
       Lumbar
    2. Spinal:
       Single shot
       CSA
    3. CSE

All of these should be US guided or under X-ray

Neuraxial (Spinal / Epidural)
(LA / Opioids / others):

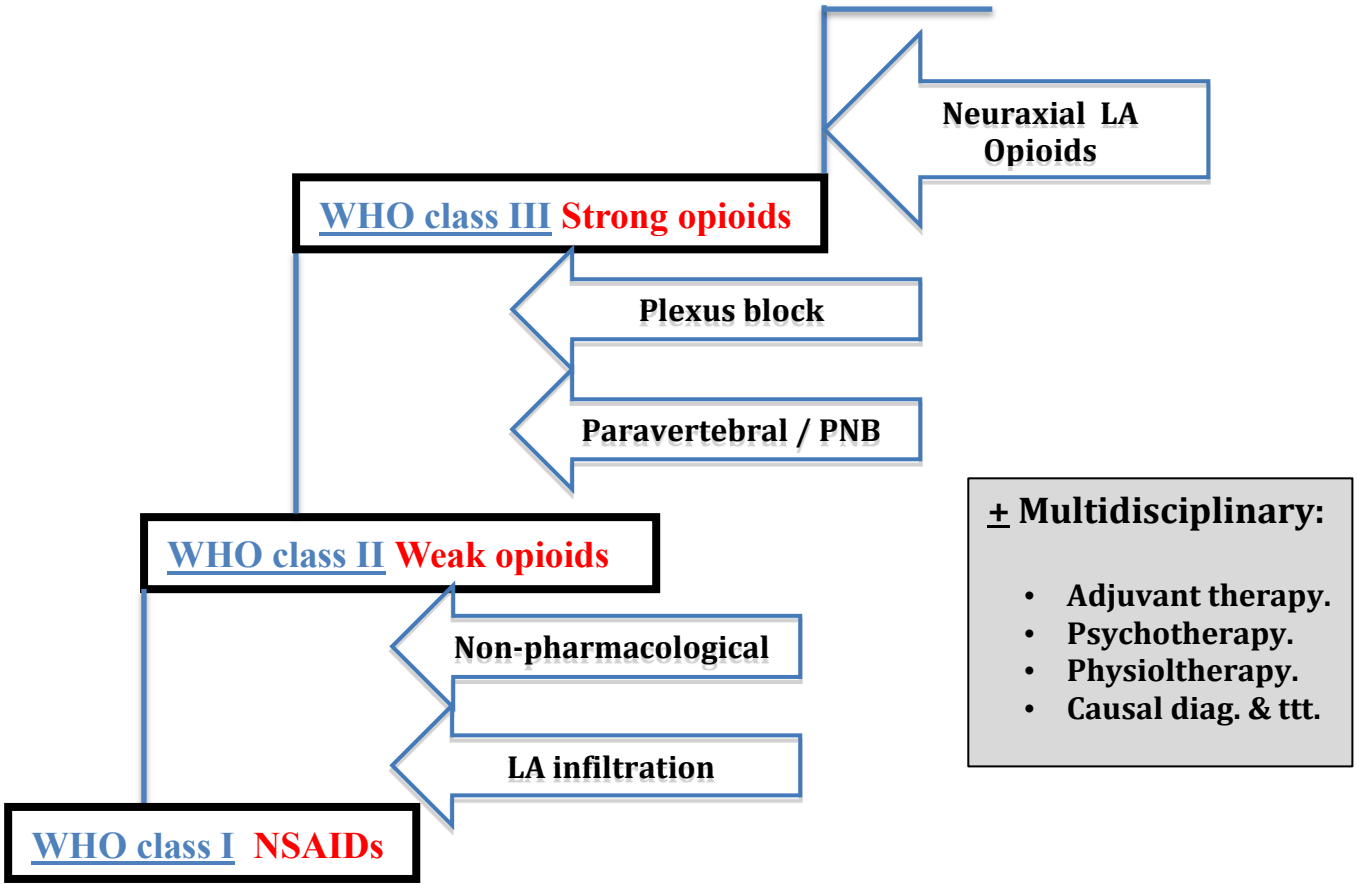
- Advantages:

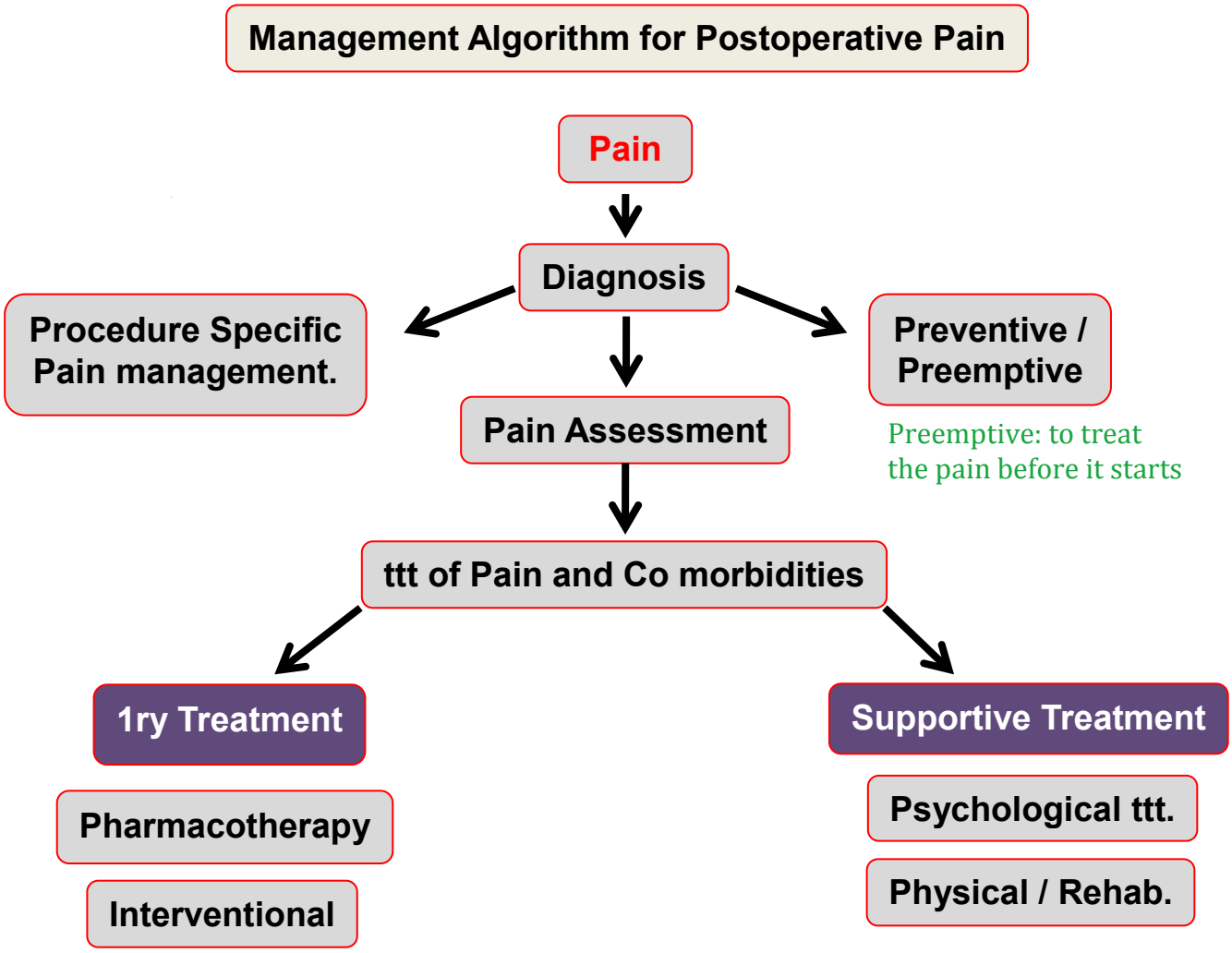
Provide prolonged & effective analgesia

- Side effects (the same whether you give opioids spinal or by IV)

Respiratory depression.
N/V.
Pruritis.
Urinary retention.

WHO Algorithm for Management of Pain:




Management Algorithm for Postoperative Pain
Pain
Diagnosis
Procedure Specific Pain management.
Preventive / Preemptive
Preemptive: to treat the pain before it starts
Pain Assessment
ttt of Pain and Co morbidities
1ry Treatment
Pharmacotherapy
Interventional
Supportive Treatment
Psychological ttt.
Physical / Rehab.

PACU Discharge Criteria:

- Fully Awake
- Patent airway
- Good respiratory function,
- Stable vital signs
- Patency of tubes, catheters, IV's
- Pain free
- Reassurance of surgical site

Postanesthesia Discharge Scoring System: score should be 10 to discharge the pt.

Vital Signs (PR & ABP)	Activity	PONV	Pain	Surgical Bleeding
2: Within 20% of preoperative baseline	2: Steady gait, no dizziness	2: Minimal: treat with PO meds	2: Acceptable control per the patient; controlled with PO meds	2: Minimal: no dressing changes required
1: 20-40% of preoperative baseline	1: Requires assistance	1: Moderate: treat with IM medications	1: Not acceptable to the patient; not controlled with PO meds	1: Moderate: up to 2 dressing changes
0: >40% of preoperative baseline	0: Unable to ambulate	0: Continues: repeated treatment	0: Severe Uncontrolled pain	0: Severe: more than 3 dressing changes

Summary (anesthesia booklet)

Box Signs of airway obstruction

- 'See-saw' respiration pattern
- Suprasternal and intercostal recession
- Tachypnoea
- Cyanosis
- Tachycardia
- Arrhythmias
- Hypertension
- Anxiety and distress
- Sweating
- Stridor

Box Factors associated with postoperative vomiting

- Patient predisposition
  - age, sex, menstrual cycle, obesity
  - history of postoperative vomiting
  - history of motion sickness
  - anxiety, pain
  - recent food intake, prolonged fasting
- Surgical factors
  - type of surgery
  - emergency surgery
- Anaesthetic factors
  - inhalational agents
  - intravenous induction agents
  - opiates
  - duration of anaesthesia
  - distension of gut
  - oropharyngeal stimulation
  - experience of anaesthetist
- Postoperative factors
  - pain
  - hypotension
  - hypoxaemia
  - movement of patient
  - first intake of fluids/food
  - early mobilisation

Box Common causes of postoperative airway obstruction

- Anaesthesia
  - unconsciousness with obstruction by tongue
  - laryngeal oedema
  - laryngeal spasm
- Surgery
  - vocal cord paralysis (thyroid surgery)
  - neck haematoma
  - preoperative neck and face inflammation (infection)

Box Common causes of failure to breathe

- Central nervous system
  - depression from drugs:
    - opiates
    - inhalational agents
  - decreased respiratory drive:
    - hypocapnia
    - Peripheral
  - failure of neuromuscular transmission:
    - inadequate reversal of competitive relaxants
    - overdosage of competitive relaxants
    - cholinesterase deficiency

Box Causes of delayed recovery

- Hypoxaemia
- Hypercapnia
- Residual anaesthesia
- Drugs, especially opiates
- Emergence delirium from ketamine, scopolamine, atropine
- Neurological causes
- Surgery: neurosurgery, vascular surgery
- Metabolic causes:
  - hypoglycaemia
  - hyponatraemia
- Medical causes: hypothyroidism
- Sepsis
- Hypothermia

Box Unusual causes of failure to breathe postoperatively

- Hypothermia
- Drug interactions:
  - aminoglycosides and competitive relaxants
  - ecothiopate and suxamethonium
- Central nervous system damage
- Electrolyte disorders:
  - hypokalaemia
- Undiagnosed skeletal muscle disorders:
  - myasthenia gravis
- Extensive spinal anaesthetic in combination with general anaesthesia

Box Factors predisposing to postoperative hypothermia

- Ambient theatre temperature
- Age, young and elderly
- Surgery
  - duration
  - size of incision
  - insulation
- Concomitant disease
- Intravenous fluid administration
- Drug therapy such as vasodilators

Box Causes of hyperthermia

- Infection
- Environmental
- Mismatched transfusion
- Drugs
  - interactions
  - atropine overdose
- Metabolic
  - malignant hyperthermia
  - phaeochromocytoma
  - hyperthyroidism

Box Prevention of body heat loss

- Ambient theatre temperature
- Airway humidification
- Warm skin surface
  - passive insulation
  - active warming
    - water blanket
    - radiant heater
    - forced air warmer
- Warm intravenous fluids
- Oesophageal warming

MCQ's :

Q1: Spinal anesthesia used on a patient needs monitoring for:
A. Hypotension
B. Hypertension
C. Glucose level
D. Renal function

Q2: A patient can experience what type of temperature due to anesthesia up to 12 hours after surgery?
A. Increased
B. Decreased

Q3: Assessment in PACU needs to be done every:
A. 10-15 min
B. 20-30 min
C. 5-10 min
D. 30-60 min

Answers:
Q1 A
Q2 B
Q3 C

For mistakes or feedback

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