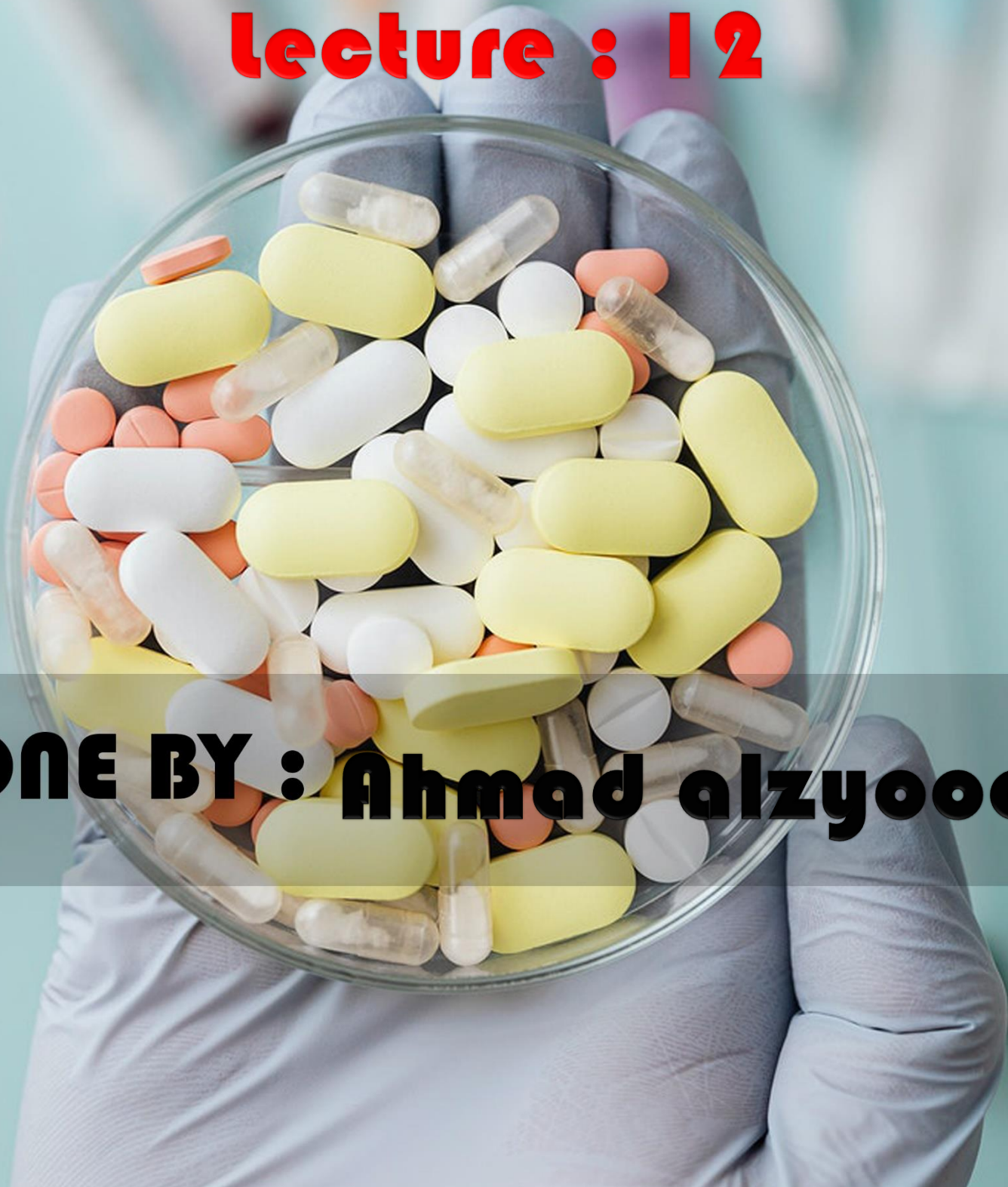




PHARMACOLOGY

Lecture : 12



DONE BY : Ahmad alzyood

Anesthetics drug-P1

General Anesthesia: is a reversible state of CNS depression → loss of responses to and perception of stimuli.

إذا كان التخدير ليس منعكسا irreversible هيك احنا بنموت المريض دماغيا لهيك من خصائص التخدير انه بعد فترة المريض يستعيد وعيه

اثناء العملية ، بنضل نعطي المريض مخدر عشان ما يستعيد وعيه بنص العملية ولما خلص يقرر الدكتور انه المريض يستعيد وعيه بنعمل terminate للدوا

Why are they “general”?

General → impair several functions of CNS

- Sensory

- Absence of intraoperative pain (surgery without pain)

- Cognitive:

- Absence of intraoperative awareness (complete not aware)

- Absence of recall of intraoperative events (anterograde amnesia)

- Motor: → suppress motor function + reflexes

- Absence of movement

- Adequate muscular relaxation

مثلا لما بدك تفتح فتحة بروح المريض يضربك كردة فعل او ال tone تاع العضله الطبيعي يكون مش مناسب للعملية لهيك لازم يكون واطي

- Autonomic:

- Absence of hemodynamic response

- Absence of tearing, flushing, sweating, and gastric secretions

المريض يفقد القدرة على التنفس active respiration لهيك بندخله tube للتنفس(عضلات الصدر بكونو مثبته) ، ايضا اغلب مواد التخدير بيعملو انخفاض بالقلب low COP and decrease BP

What are the benefits of anesthesia?

- Sedation and reduction of anxiety (وهيك سير العمليه بكون ممتاز وفش مشاكل)
- Lack of awareness and amnesia
- Analgesia (most anesthetics drugs are weak analgesics)
- Skeletal muscle relaxation
- Suppression of undesirable reflexes

What is the “perfect” anesthetic?

- chemical stable with low flammability (مواد التخدير القديمه زي الايثر بتعمل انفجار لانه عالي ك flammability)
- produces “reversible” loss of consciousness
- produces analgesia, suppresses reflexes and produces muscle relaxation
- **minimal** cardiovascular and respiratory side effects
- cheap and easy to manufacture and administer

لكن لسوء الحظ صعب تلاقي كل الصفات بدوا واحد لهيك بنلجاً للكومبينيشن

NO SINGLE DRUG HAS ALL THESE CHARACTERISTICS!

Several categories of drugs are combined!

GENERAL ANESTHETICS: INTRAVENOUS

Barbiturates
Benzodiazepines
Dexmedetomidine PRECEDEX
Etomidate AMIDATE
Ketamine KETALAR
Opioids
Propofol DIPRIVAN

GENERAL ANESTHETICS: INHALED

Desflurane SUPRANE
Halothane FLUOTHANE
Isoflurane FORANE
Nitrous oxide NITROUS OXIDE
Sevoflurane ULTANE

PREANESTHETIC MEDICATIONS

Antacids
Anticholinergics
Antiemetics
Antihistamines
Benzodiazepines
Opioids

NEUROMUSCULAR BLOCKERS (see Chapter 5)

Cisatracurium, pancuronium, rocuronium, succinylcholine, vecuronium

Patient Factors in The Selection of Anesthesia (العوامل التي بتساعدنا باختيار ادوية التخدير)

1- Cardiovascular (majority suppress CV function)

- Anesthetics suppress cardiovascular function

• Hypotension → ↓ perfusion → ischemia

• Patient's history is important

بعض المرضى عملياتهم خطيرة وبدها كتنترول عالي وبعضهم بنتجنب قدر الإمكان ما نعملهم عليه

2- Respiratory (for example, opioid suppress RS function)

- Inhalational/intravenous anesthetics and opioids depress respiration
- Asthma/ventilation/anatomical abnormalities

3- Hepatic or Renal (drug-drug interaction)

- Metabolism
- Clearance
- Drug-interaction e.g., alcohol use

4- Nervous

- Pre-existing neurological disorders

e.g., epilepsy, myasthenia gavis (anesthetic are suppressor drugs so with a disorder like Myasthenia gravis → the result is very high suppression of CNS)

5- Gestational

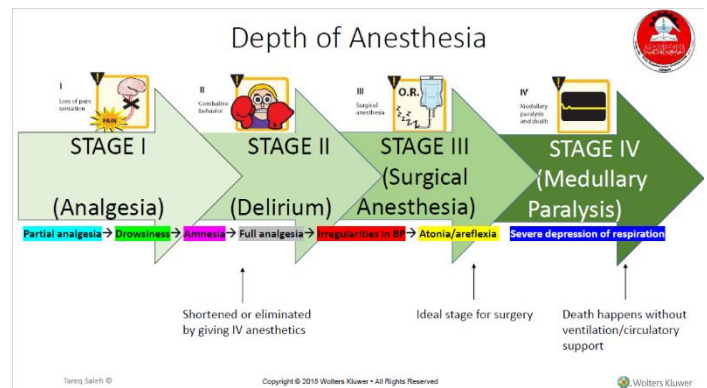
- Fetal organogenesis
- Postnatal complications

لما نحقن المريض بالمخدر، بمر المريض بمر ارحل .
طبعاً كلها ثواني وبمر فيهم كلها لكن لازم نشرح شو هم
المر ارحل .

Stage 1 → loss of pain
sensation

Stage 2 → Combative behavior → only in inhalation anesthetics

Stage 3 → surgical anesthesia (ideal stage for surgery)



Stage 4 → RS suppression so here death happens without ventilation/circulatory support

Anesthetics

- 1- Intravenous
 - Injection
 - Anesthetics or induction agents
- 2- Inhalation
 - Gasses or vapor
 - Usually halogenated

Route of Administration:

- 1- IV → Blood → CNS (rapid – for induction of Anesthesia)
- 2- Inhalation → Alveoli → Blood → CNS (less rapid than IV – for maintenance)
(عشان نخلي المريض متخدر طول العمليه (عملية مثلا مدتها 4 ساعات)

In this summary, we will talk about intravenous anesthetics.

Intravenous Anesthetics

- Rapid induction of anesthesia “*arm-brain circulation time*”

المخدر الي بنعطا بالوريد ؛ خلال ثواني يكون فقد وعيه حتى الدكاتره بحكوله عد من 1-10 ما بوصل 3 او 4 والا هو فاقد وعيه

- Could be used for **maintenance** –short surgeries –TIVA
- At low doses** →sedative/hypnotic
- Mechanism of action is unknown

INDUCTION

- multiple factors affect induction of anesthesia:

- 1- must reach brain (COP, Blood volume)
- 2- Size, ionization, protein-binding and lipid solubility (to cross BBB)

- what happens if patient has low COP or shock ?

A: in this case, the cerebral blood flow is reduced so the effect of drug is more potent so we should reduce the dose.

RECOVERY

Every drug has a metabolism in liver/kidney and this is the main cause for their half-life but effect of anesthetics drugs is reduce due to redistribution rather than metabolism.

- redistribution: it happens due to concentration gradient between brain and blood. At injection of the drug, the drug increase in blood(high) so the drug is transferred to brain (low). After some time, the drug transfer from brain(high) to blood(low) → so the effect is terminated and patient wakes.

- the drug is go to brain firstly due to high blood supply of brain.

Muscle and adipose tissue have few blood supply.

I. Propofol

- IV sedative/hypnotic

- First choice for **induction of general anesthesia and sedation**

- “mill-like appearance”

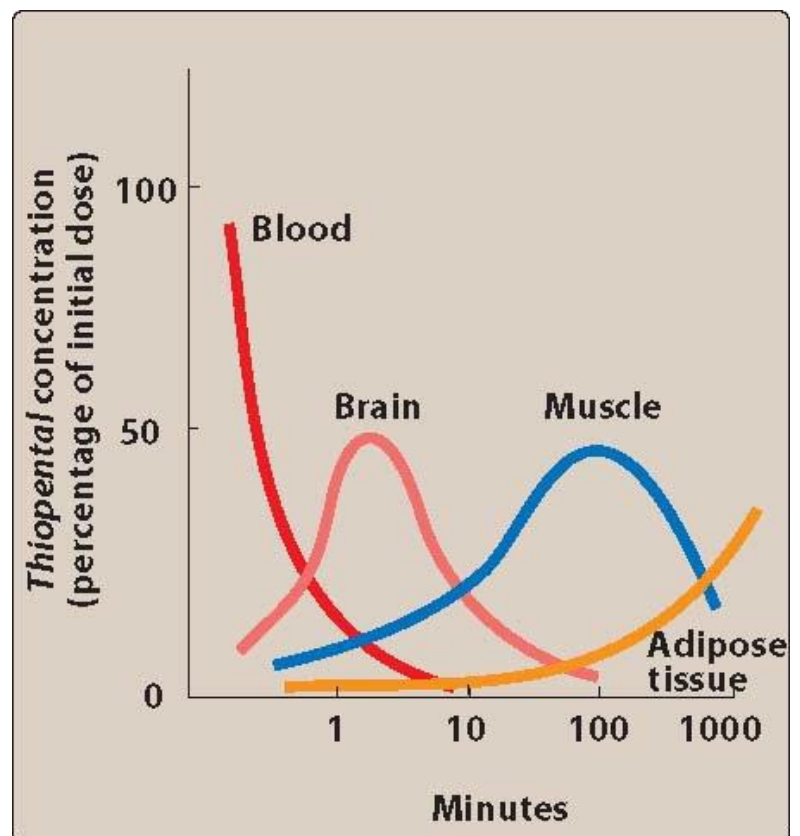
- Induction: 30-40 seconds

- Redistribution: 2-4 minutes

- No analgesia

- No postoperative nausea/vomiting (common complication due to use of combination drugs)

- decreases BP and ICP



II. Barbiturates (thiopental)

- Ultra-short acting barbiturate

- Induction ~ 1 minute

- Potent anesthetic – weak analgesic
- Largely replaced by propofol (no longer used in the US)

لازال مستخدم بالأردن

III. Benzodiazepines (midazolam, diazepam)

- Used in adjunct with other anesthetics for their sedative/amnestic effects

anterograde amnesia - midazolam

IV. Opioids (fentanyl)

V. Ketamine

- Short-acting, non-barbiturate
- NMDA receptor antagonist (shutting down excitatory neurons)
- Induces **dissociative anesthesia** (يعني المريض يكون مش حاس باشي) (لكن عينيه فاتحه) + **analgesia**(strong as analgesic – not like propofol)

• **Cardiovascular effects:** ↑ blood pressure ↑ cardiac output and bronchodilator
(عكس اغلب الادويه)

--good for hypovolemic, cardiogenic shock, asthmatics

---contraindicated in hypertensive, stroke

- May induce hallucinations/dream-like state

Good Luck

