OPIOIDS TOXICITY IN PEDIATRICS

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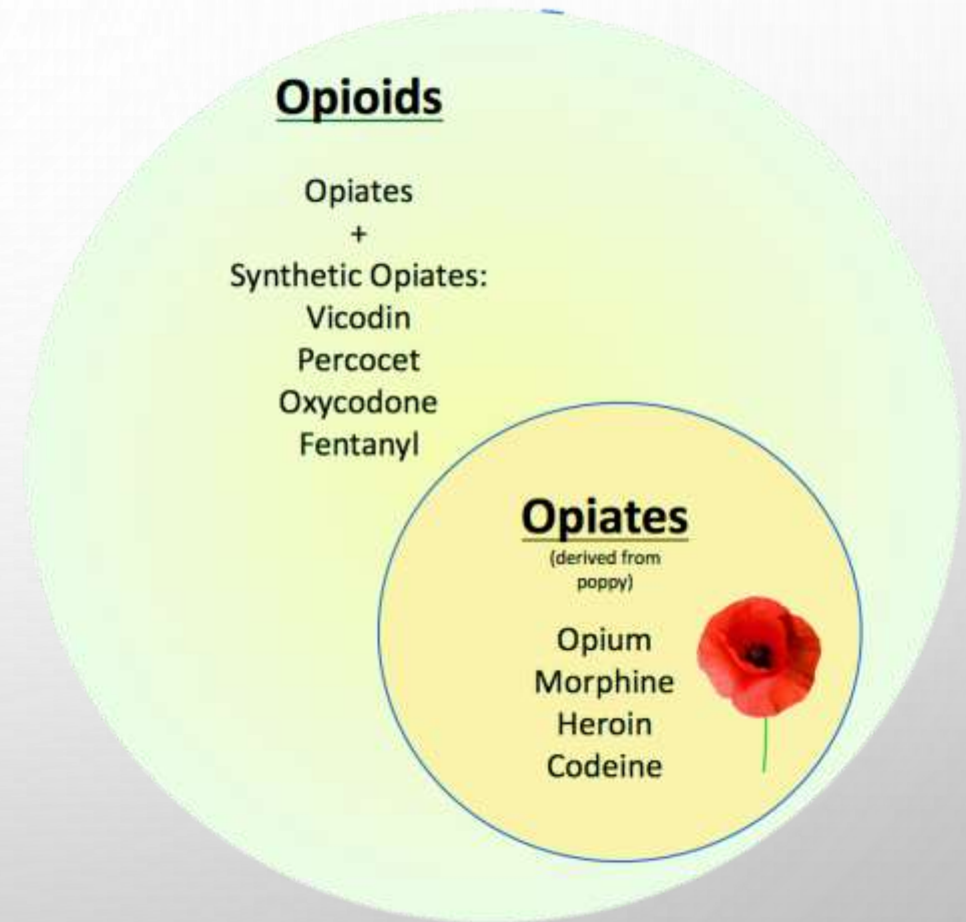
INTRODUCTION

- THE TERM OPIATE REFERS TO THE ALKALOIDS DERIVED FROM THE OPIUM POPPY AND INCLUDES MORPHINE AND CODEINE.
- THE TERM OPIOID REFERS TO AN AGENT WITH RESULTS IN A CLINICAL STATE SIMILAR TO OPIATES AND OR EXERTS ITS EFFECT AT THE OPIOID RECEPTORS.
- SEMISYNTHETIC OPIOID: HEROIN, OXYCODONE
- SYNTHETIC OPIOID: FENTANYL



DIAGNOSIS

- MANAGEMENT OF INTOXICATION IS BASED ON THE HX OF EXPOSURE AND THE PRESENCE OF CLINICAL SYMPTOMS.
- CLASSIC OPIOID TOXIDROME :
  - RESPIRATORY DEPRESSION
  - DEPRESSED MENTAL STATUS
  - MIOSIS

- NORMAL PUPILS DO NOT EXCLUDE OPIOID TOXICITY: MEPERIDINE/CO-INGESTANTS
- DDX OF COMA: INTRACRANIAL HEMORRHAGE, ELECTROLYTE ABNORMALITIES AND
- SEPSIS, ETHANOL AND SEDATIVE-HYPNOTICS, CLONIDINE INTOXICATION (MIOSIS).

Narcotic (Opioid) Toxidrome

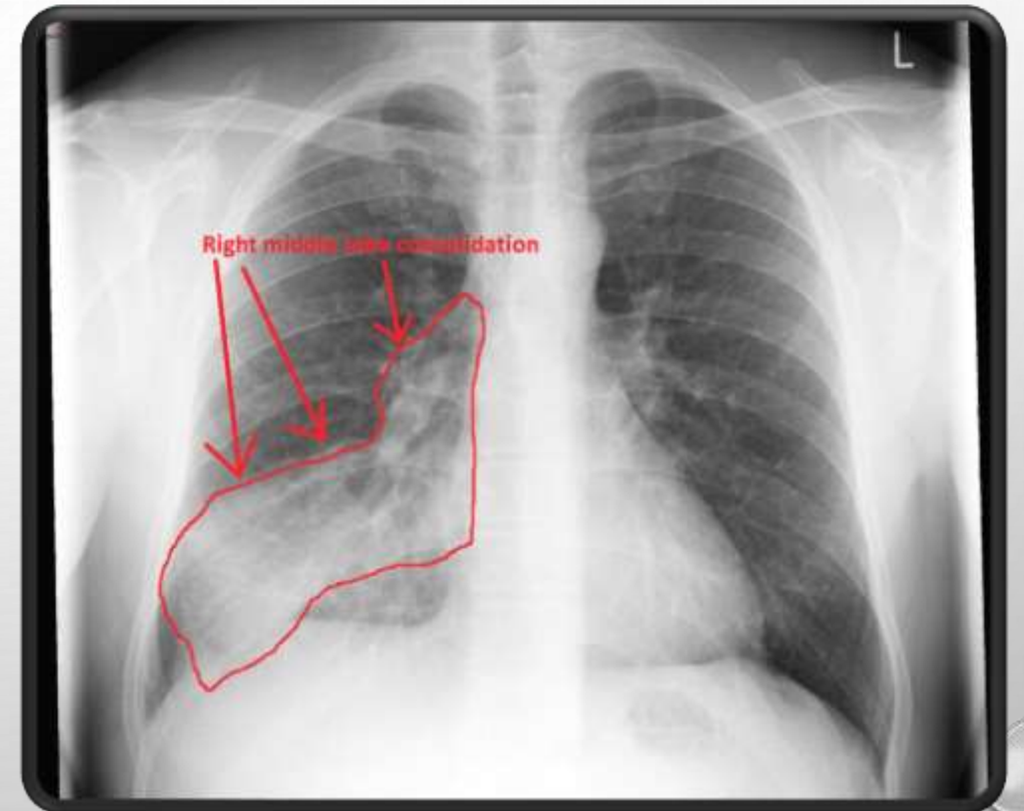
Mnemonic : "CPR-3H"

- **C** : Coma
- **P** : Pinpoint pupils
- **R** : Respiratory depression
- **H** : Hypotension
- **H** : Hypothermia
- **H** : Hyporeflexia

NOTE: Meperidine (*Demerol*) will not cause miosis

Antidote: Naloxone
Start with **0.04 mg** and titrate up q 2-3 min as need for ventilation to 0.5 mg, 2 mg, 5 mg, up to max 10-15 mg

- CENTRAL-MEDIATIED **VOMITING** PLUS RESPIRATORY DEPRESSION AND A DIMINISHED GAG REFLEX, PLACES THE PATIENT AT RISK FOR **ASPIRATION PNEUMONITIS**.
- **BRONCHOSPASM** FROM HISTAMINE RELEASE OR FROM INSUFFLATING OR INHALING FUMES OF OPIOID COMPOUNDS
- LESS COMMON EFFECTS OF OPIOID TOXICITY INCLUDE GENERALIZED **SEIZURE** FOLLOWING OVERDOSE OF PROPOXYPHENE, MEPERIDINE, TRAMADOL, FENTANYL. OR PENTAZOCINE.
- NEONATES RECEIVING CONTINUOUS INTRAVENOUS MORPHINE CAN ALSO SUFFER SEIZURES FROM TOXICITY OR DURING ACUTE OPIOID **WITHDRAWAL**.



GOOD TO KNOW

ADDITIONAL TOXICITIES	
Serotonin toxicity	Meperidine, Dextromethorphan
Seizures	Meperidine, Tramadol
Arrhythmias	Loperamide: wide complex tachycardias Methadone, oxycodone: prolonged QT
Acetaminophen toxicity (co-ingestant)	Hydrocodone, Oxycodone

MANAGEMENT

- SUPPORT OF **OXYGENATION** AND **VENTILATION**
- SHORT ACTING OPIOID ANTAGONIST; **NALOXONE**
- TRAUMA W/U
- **BEDSIDE GLUCOSE**: FOR ALL PATIENTS WITH AN ALTERED MENTAL STATUS.
- AN **ACETAMINOPHEN** LEVEL SHOULD BE OBTAINED.
- BASIC LABS INCLUDING A BETA HCG, ETHANOL LEVEL AND CPK MAY BE INDICATED.
- AN EKG MAY INDICATE THE CO-INGESTION OF COCAINE OR TCA.
- A POSITIVE URINE TOXICOLOGY SCREEN FOR OPIOIDS DOESN'T NOT NECESSARILY INDICATE AN ACUTE INGESTION AND FALSE NEGATIVE RESULTS CAN OCCUR.

MANAGEMENT

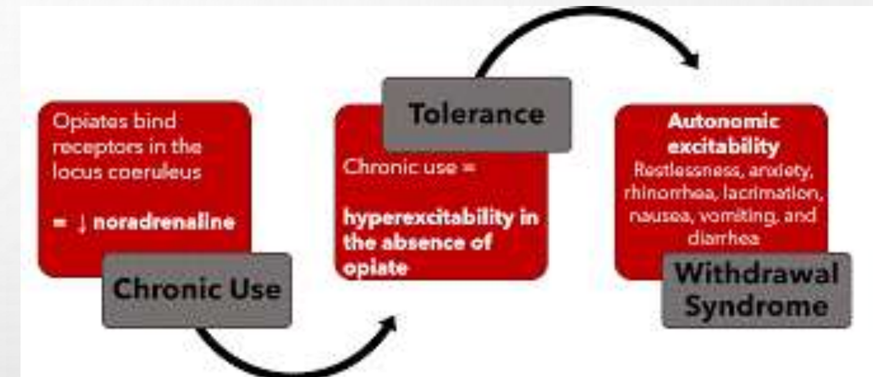
- ~~GASTROINTESTINAL DECONTAMINATION:~~
  - ASSOCIATED RISKS IN A PATIENT WITH A DEPRESSED MENTAL STATUS
  - EFFECTIVE ANTIDOTE EXISTS.
- CARDIOPULMONARY MONITORING: RR, O2 SATURATION, ET-CO2.
- PATIENTS WHO ARE AWAKE AND ALERT WITH A RESPIRATORY RATE > 12 BREATHS/MINUTE AND O2 SAT>90% : OBSERVATION UNTIL SYMPTOMS RESOLVE.

NALOXONE

- AIRWAY OBSTRUCTION OR RESPIRATORY FAILURE: SUPPLEMENTAL O2 AND ASSISTED VENTILATION.
- ANY PATIENT WITH RESPIRATORY DEPRESSION AND IS SUSPECTED OF AN OPIOID INGESTION SHOULD RECEIVE AN EMPIRIC TRIAL OF NALOXONE.
- NALOXONE CAN BE ADMINISTERED IV, IM, SC, ENDOTRACHEALLY.
- BOTH DIAGNOSTIC / THERAPEUTIC , MAY PRECLUDE THE NEED FOR INTUBATION.
- THE ONSET OF ACTION IS 1-2 MINUTES WITH A DURATION OF 20-90 MINUTES.
- NO RESPONSE TO NALOXONE WITHIN 10 MINUTES, OTHER ETIOLOGIES SHOULD BE CONSIDERED.

NALOXAN DOSING

- AN ESCALATING DOSING SCHEME ALLOWS TITRATION OF SUFFICIENT NALOXONE TO REVERSE RESPIRATORY DEPRESSION WITHOUT PRECIPITATING WITHDRAWAL SYMPTOMS.
- INITIAL DOSE OF 0.04 MG WITH ADDITIONAL DOSES TITRATED TO REVERSE RESPIRATORY DEPRESSION. INCREASING TO 0.4 MG, THEN 2 MG AND THEN 10 MG AS NEEDED.
- INFUSION OF 2/3 OF THE DOSE REQUIRED TO RESTORE VENTILATION IS ADMINISTERED PER HOUR.
- THE **PALS** COURSE RECOMMENDS A DOSE OF 0.1 MG/KG WITH A MAXIMUM DOSE OF 2 MG. THIS MAY BE AN APPROPRIATE DOSING SCHEME IN THOSE WHO ARE OPIATE NAIVE.



DISPOSITION

- A PSYCHIATRIC CONSULTATION IF TOXICITY IS A RESULT OF INTENDED SELF HARM.
- TOXICITY DUE TO A LONG ACTING OPIOID SUCH AS METHADONE SHOULD BE HOSPITALIZED.
- PATIENTS WITH SIGNIFICANT OPIOID SYMPTOMS WHO HAVE RECEIVED HIGH DOSES OR A CONTINUOUS INFUSION OF NALOXONE REQUIRE HOSPITALIZATION.
- THOSE WHO RESPOND APPROPRIATELY TO NALOXONE WITHOUT ANY OF THE ABOVE CONCERNS MAY BE SAFELY DISCHARGE AFTER AN OBSERVATION PERIOD OF SEVERAL HOURS.