Paracetamol
Naloxone
Opkast
Kul

- HVAD VED VI ?

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......nothing to disclaim
• **Paracetamol**
  NAC treatment is not indicated when *s*-paracetamol is zero

• **Naloxone**
  After reversal of an opioid overdose the patient MUST always be admitted for observation for at least 4-6 hours

• **Activated charcoal**
  Is only effective if administered within 1 hour of drug ingestion

• **Induced emesis (vomiting)**
  Syrup of ipecac is an effective way of gastric decontamination

...what we know......myths?
Paracetamol – initial assessment
Paracetamol poisoning
Toxic hepatitis

- Symptoms develop with a latency of 1-3 days
- Day 1 – nausea and vomiting may occur, but otherwise the patient is unaffected and normal has biochemistry
- Day 2 – increases in transaminase levels, INR and s-creatinin
- Day 3 - progressing liver and renal failure
- ANTIDOTE – N-Acetylcysteine (NAC) - stimulates glutathion production

Paracetamol poisoning
- S-paracetamol = 0
- Transaminase = normal

- Parentdrug – not metabolites

- NAPQI – $T^{1/2}$ - unpredictable in overdose

- Substantial amounts of toxic metabolites

- Before hepatic damage is measurable

**S-paracetamol = 0**
Suspicion!

- Unknown dose or large dose
- Start **upon arrival** regardless of time interval from ingestion
- Don’t wait for S-paracetamol
- Liver function tests - may be normal even in severe cases

**NAC – indications**
- Rash
- Nausea
- Vomiting
- Cramps
- Diarrhea
- Angioedema (edema or swelling of the skin)

NAC is SAFE
• Don’t wait for S-paracetamol – treat if suspected ingestion

• NAC is SAFE

• If paracetamol poisoning is confirmed, highly likely or cannot be ruled out treat with NAC even if s-paracetamol is ZERO

Paracetamol - conclusion
Naloxone
Naloxone

- Primarily competitive $\mu$-receptor antagonist
- Rapid reversal
- Duration 1-4 hours

After reversal of opioid overdose the patient MUST always be admitted for observation for at least 4-6 hours

ref – Tintinalli J. Emergency medicine - a comprehensive study guide, 6th edition
Contact and death pattern among heroin users after initial contact with a MECU in Copenhagen

- To describe the development and pattern in the number of overdoses in Copenhagen during a 10 year period and to examine 48h and 1 year mortality rate

S. Rudolph, K. Nielsen and S.L. Nielsen. Contact and death pattern among heroin users after initial contact with a doctor staffed mobile emergency care unit (MECU) in Copenhagen Resuscitation; Volume 77, Supplement 1, May 2008, Page S69
• The unresponsive patient
  - 0.8 mg naloxone IV
  - ....in some cases 0.4 mg IM/SC supplement

• The responsive but obtunded patient
  - naloxone is titrated to effect

• The patient is **released on scene** if a substantial and lasting improvement is obtained and mental status, hemodynamics, and pulse oximetry results are **acceptable**

In 5.7 % (n=99) cases the patients had another MECU contact within 48 hours.

14 patients (0.8 %) died within 48 hours of a MECU contact and a post treatment release on-scene.

**Naloxone**
Autopsy reports

- 6 found with a *needle in the arm* - considered a *new overdose*

- 5 found with a single *fresh needle mark* – 2 with multiple - but *no needles or other drugs* - inconclusive - *likely new or possible rebound overdose*

- 1 found with *no signs* of new overdose - considered *possible rebound overdose*

Naloxone - 14 deaths......
TOX SCREENING

- in 5 of 7 inconclusive cases METHADONE was the suspected drug
- new overdose?
- rebound overdose?
• Reversal of heroine/morfin overdose and release on-scene is safe

• Only in 0.4% of cases a rebound overdose was considered possible

• Consider admittance if Methadone

Naloxone - conclusion
Does naloxone alone increase resuscitation rate during cardiopulmonary resuscitation in a rat asphyxia model?

Meng-Hua Chen MD,*, Tang-Wei Liu MD, Lu Xie DPharm, Feng-Qing Song MM, Tao He MM

Naloxone alone can increase resuscitation rate following asphyxial cardiac arrest in rats.

Naloxone – cardiac arrest?
Activated charcoal
• Gastric decontamination
• Superb adsorptive properties
• Reduces systemic absorption
• Enhances elimination by interruption of the enterohepatic cycle for some drugs

• ...theoretically the single most useful treatment of acute oral overdose

Activated charcoal
• Lack of sound evidence of its benefits as defined by clinically meaningful endpoints

"a single dose of activated charcoal should not be administered routinely"

"the administration of activated charcoal may be considered if a patient has ingested a potentially toxic amount of a poison (which is known to be adsorbed to charcoal) up to one hour previously"

Most patients do not present to the ED within 1 hour

In 63 patients
- median arrival time 136 minutes
- only 15 presented within 1 hour
- 4 of 10 who qualified for treatment received charcoal within 1 hour

Problem

• **Meta-analysis** - data from 64 controlled studies

• **Evaluate:**
  - the effect of activated charcoal on xenobiotic absorption during the first 6 hours after ingestion
  - influence of physical and pharmacologic properties

• Most effective when administered immediately

BUT....

• 4 hours after ingestion, 25% of the participants achieved at least a 32% reduction in absorption - especially when activated charcoal was given with large charcoal-to-drug-ratios
• An 18-month consecutive case series - activated charcoal can be administered successfully in the home by the lay public

• Significantly reduced the time to treatment

- ED: mean of 73 ± 18.1 min
- Home: mean of 38 ± 18.3 min

• However, many still consider this evidence insufficient to recommend that activated charcoal be stored in the home.

Activated charcoal – at home

Prospective follow-up study from Finland

Activated charcoal by either the first-response unit or paramedics

Activated charcoal was administered to 555 patients with a mean of 88 minutes after ingestion

No adverse effects noted, although 72 patients refused to drink the charcoal slurry

Feasible to administer activated charcoal in the prehospital setting

Activated charcoal – prehospital

• Activated charcoal should be given routinely up til \textbf{4 hours} after ingestion

• The 1 hour limit is a guideline more than a cut off point

• In life-threatening poisonings, activated charcoal should be given \textbf{regardless of time of ingestion}

• Consider \textbf{prehospital use}

\textbf{Activated charcoal – conclusion}
Syrup of ipecac
• Gastric decontamination

• Acts **locally** and **centrally**

• 1997 Position statement
  American Academy of Clinical Toxicology
  European Association of Poisons Centres
  Clinical Toxicologists

• No additional useful materials were found

**Syrup of IPECAC**

• Time to performing GI decontamination is critical

Delaying factors

• Time delay from administration to onset of emesis – mean time 58 minutes

• Uncertainty of the effect of the administered dose

• Ipecac can cause sedation

Syrup of IPECAC – a delay?
### Indications
- The patient meets criteria for gastric emptying.
- Orogastric lavage cannot be performed or is contraindicated because of the size of the formulation of xenobiotic.
- Likely significant amount of xenobiotic in the stomach.
- The benefits outweigh the risk from the contraindications.

### Contraindications
- The patient does not meet criteria for gastric emptying.
- Activated charcoal is expected to be necessary in the next several hours.
- Airway maybe lost in the next hour.
- Caustic ingestion.
- Foreign body ingestion.
- Drugs of high aspiration potential.
- Infant < 6 months.
- Premorbid conditions that be decompensated.

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**Syrup of IPECAC**

*Goldfrank's Toxicologic Emergencies*
**Indications**

- **VERY FEW !!!!!**
  - *only recommended once in 2009!*

- Xenobiotics that don’t adsorb to charcoal
  - Iron and Lithium

- **Only children**
  - to small for NG tube for aspiration of pills

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**Syrup of IPECAC**

Giftliniens pratical guideline
• No clinical benefit vs the recognized benefit of activated charcoal

• Administration of syrup of ipecac delays the administration of activated charcoal

• Given the lack of evidence demonstrating a clinically meaningful benefit and the significant contraindications, the routine administration of syrup of ipecac should be abandoned

• Contact your local poison center

Syrup of IPECAC - conclusion
• Don’t wait for S-paracetamol – treat if suspected ingestion even in the face of normal transaminase levels

• A release on scene is safe in severe heroine/morfine overdose

• Activated charcoal should be given routinely until 4 hours after drug ingestion

• Induction of emesis has an extremely limited role in the contemporary management of poisoned patients and should probably be abandoned

so...in conclusion