

# Salicylate Poisoning

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Only the dose makes the poison.

Paracelsus

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# Abbreviations

- ASA = Aspirin
- APAP = Acetaminophen



# Case

- 75 year old female presents to the ED
- Awake and Alert to Person, Place and Time
- BP 181/82
- HR 78
- RR 22

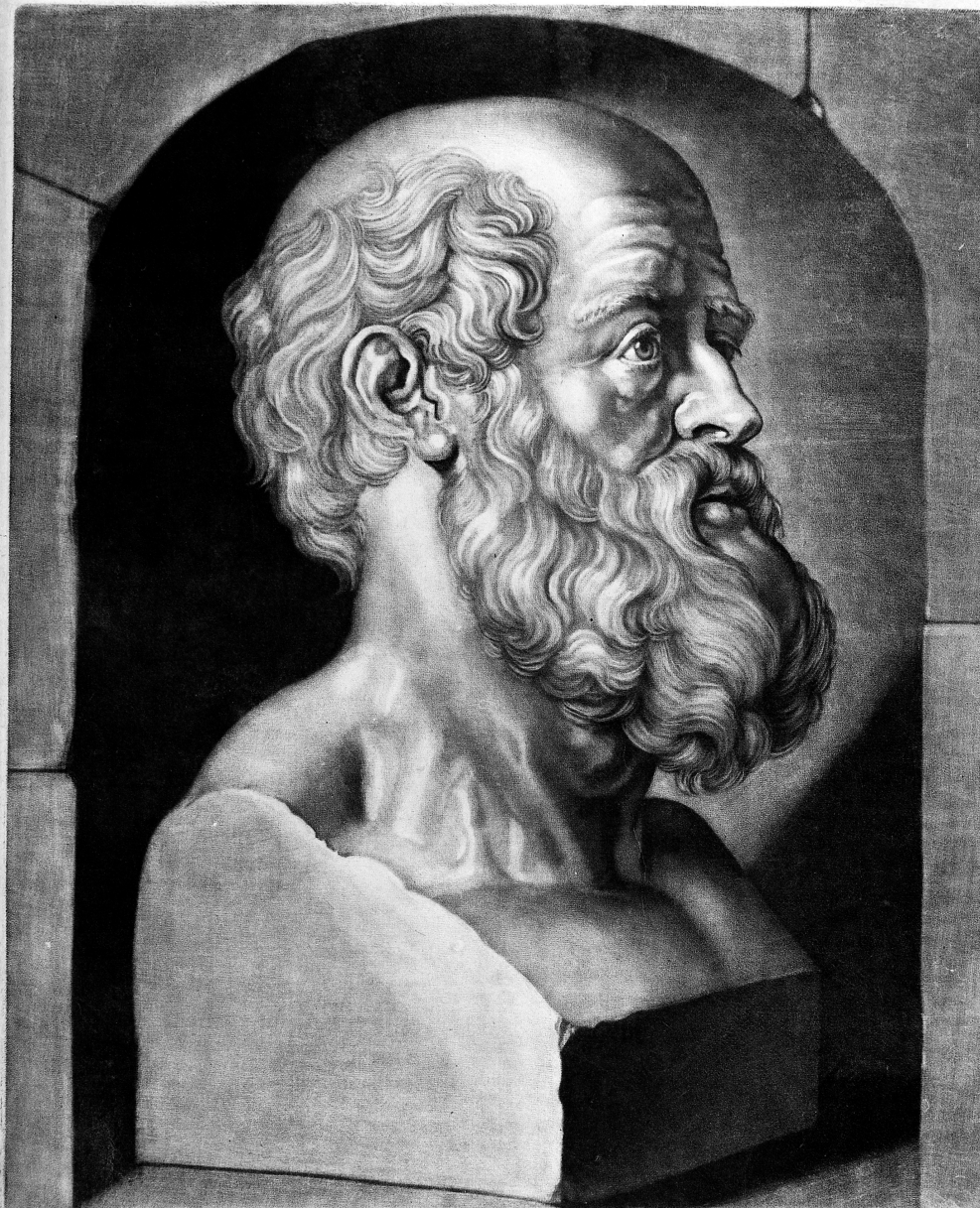
What is Aspirin?

# History









*P. P. Rubens Del.*

*Ex Marmore Antiquo*

*J. Faber Fecit*

# HIPPOCRATES HIRACLIDÆ. F. COVS.

*He grounded his Precepts upon Asculapius. He was by Some Stiled by Prince of Physicians, & by Others honoured as a God, and his Works are to this Day greatly esteem'd in most parts of Europe. He dyed at 104 Years of Age about 425 Years before the Birth of Christ.*

*Printed for R. sold by Tho. Boudes next to Chapter House in Pauls Ch. Yard and John Kerrie at the Black Horse in Strand*



FARBENFABRIKEN vorm. FRIEDR. BAYER & CO

250 gr.

ELBERFELD

**ASPIRIN**

Name gesetzlich geschützt in Deutschland und den  
meisten übrigen Industrielandern.

Registered in Germany and most of the other  
industrial countries.

Nom déposé en Allemagne et dans la plupart des  
autres pays industriels.

# History

Today

- Anacin: ASA or APAP
- Excedrin: ASA, APAP, or both
- Alka Seltzer: ASA or APAP
- Pepto Bismol: ASA

What does ASA do?

# Pharmacology

- Cyclooxygenase (COX) I & II inhibition
- Direct inhibition of neutrophils



# Without ASA

## COX-1:

Arachidonic Acid

-> Thromboxanes

-> Platelet aggregation & Vasoconstriction

## COX-2:

Arachidonic acid

-> Prostaglandins

-> Inflammation

# With ASA

COX-1 (Acetylated = Irreversibly inhibited):

Arachidonic Acid

-> Thromboxane A<sub>2</sub>

-> Platelet aggregation & Vasoconstriction

COX-2 (Enzymatically modified):

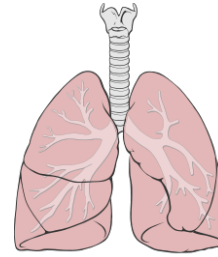
Arachidonic acid

-> Lipoxins (anti-inflammatory)

-> No Inflammation

What effects do we expect to see in  
our patient?

Nausea  
Vomiting

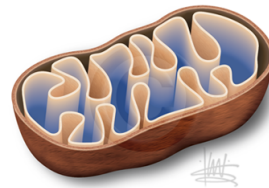
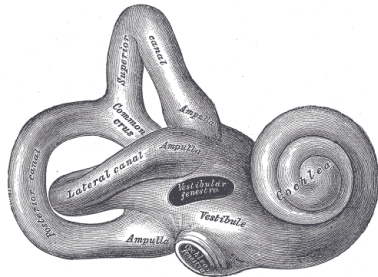


Respiratory  
Alkalosis

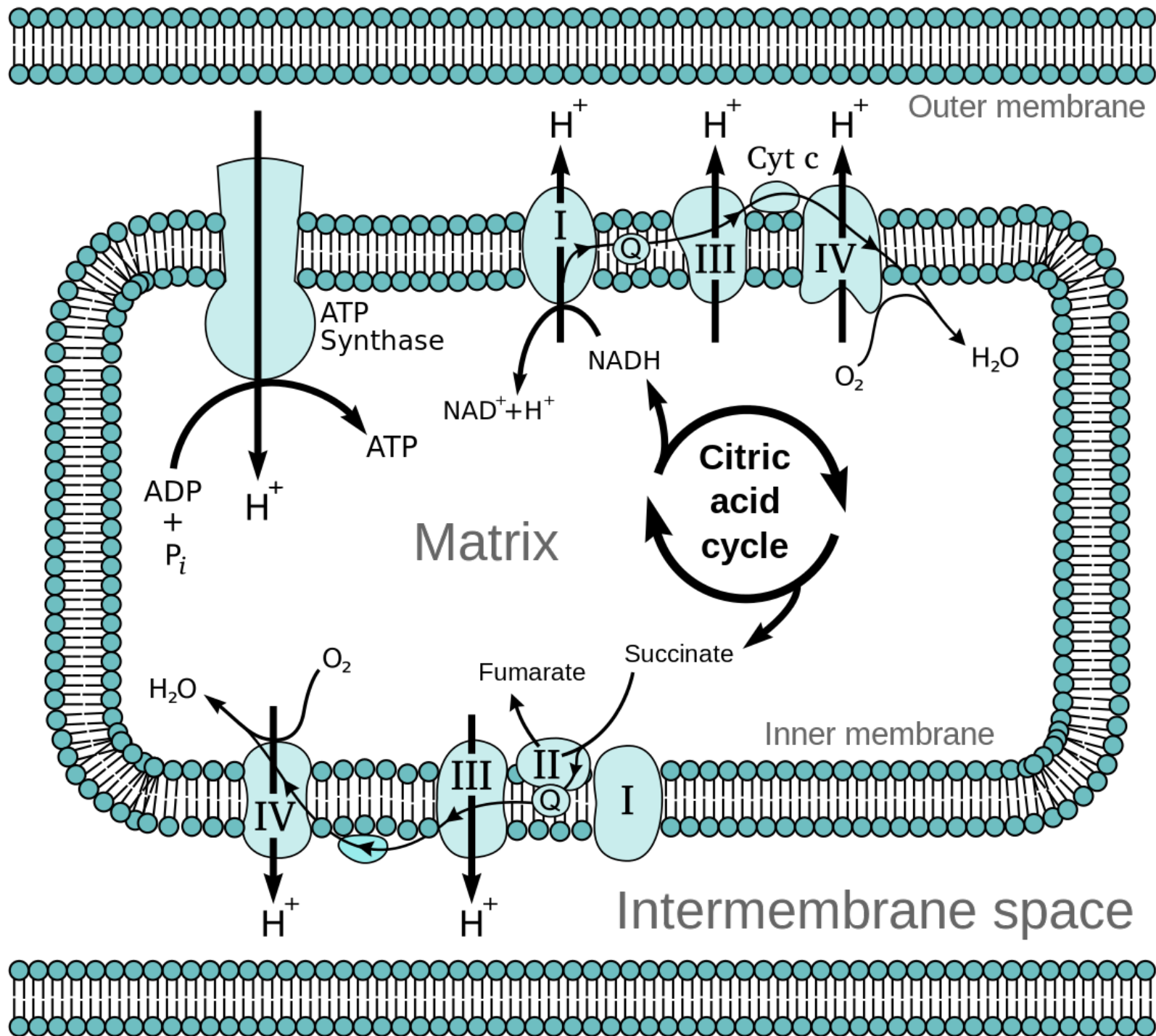


Altered Mental Status

Tinnitus



Hyperthermia, Lactic Acidosis



# Toxicity

- Respiratory Center Stimulation
- Chemoreceptor Trigger Zone Stimulation
- Uncoupling of Oxidative Phosphorylation

# Toxidrome

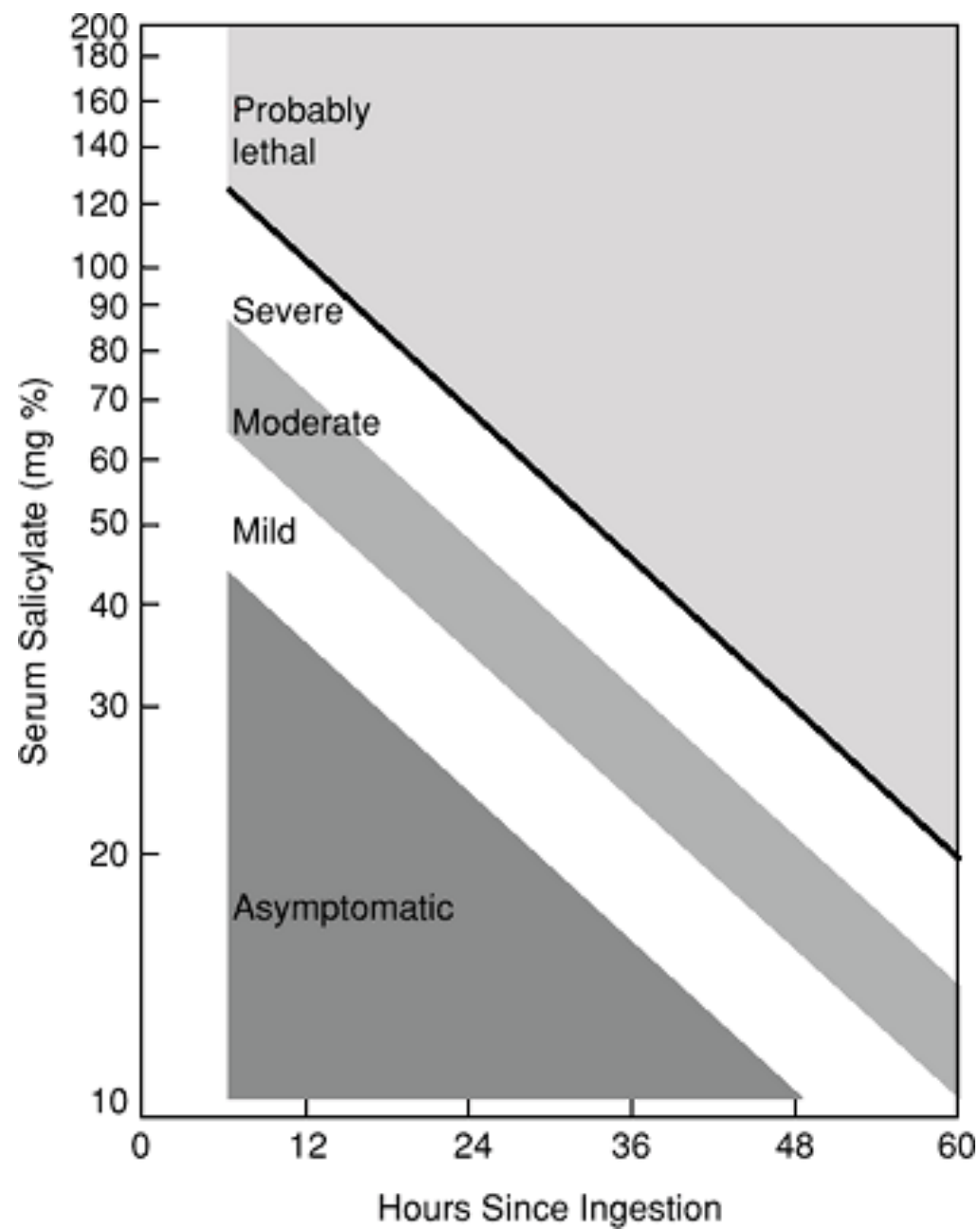
- Tachypnea, Hyperpnea, Respiratory Alkalosis
- Altered Mental Status
- Hyperthermia
- Lactic Acidosis



# Findings in our patient

- Awake, Alert, Oriented x 2
- Nauseated
- Tachypneic (RR 22/min)
- Hyperthermic (T 38.2 c)

How severe is our patient's poisoning?



# Toxic Doses

- $<150\text{mg/kg}$  = mild toxicity
- $150 - 300\text{mg/kg}$  = moderate toxicity
- $>300\text{ mg/kg}$  = severe toxicity

# Pharmacokinetics vs Toxokinetics

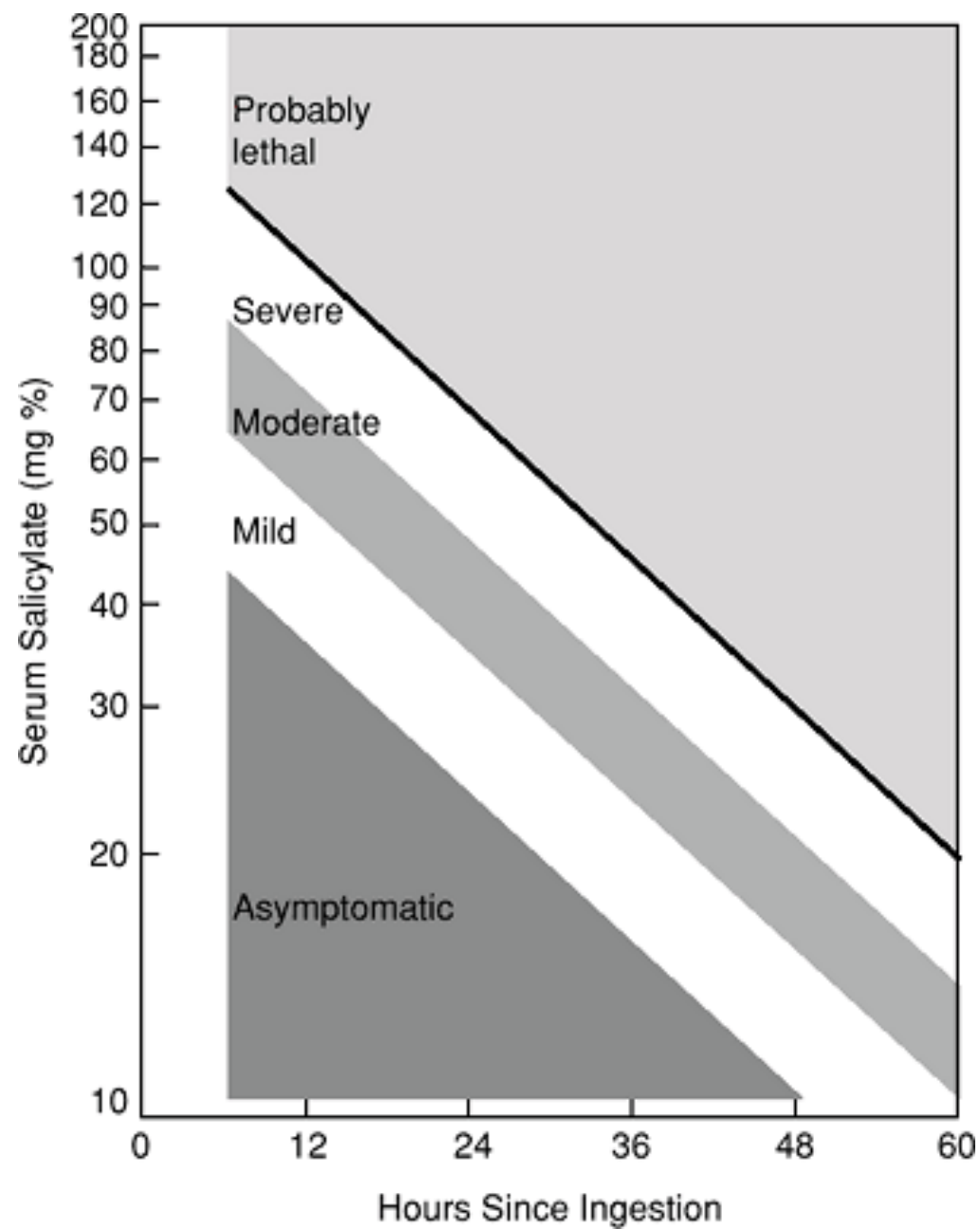
# Acute vs Chronic

What tests should we get?



# Test Results

- FS 120
- ABG
  - pH 7.41
  - pCO<sub>2</sub> 24
  - pO<sub>2</sub> 56
- ASA level 57.4



How should we treat our patient?

# ABCs

Airway

Breathing

Circulation

Decontamination

Elimination

Fingerstick

Airway

Minimize Apnea

Breathing

Hyperventilate

Circulation

Sodium Bicarbonate



Decontamination

Activated Charcoal



Elimination

Alkalinize Urine  
Hemodialysis

# Indications for HD

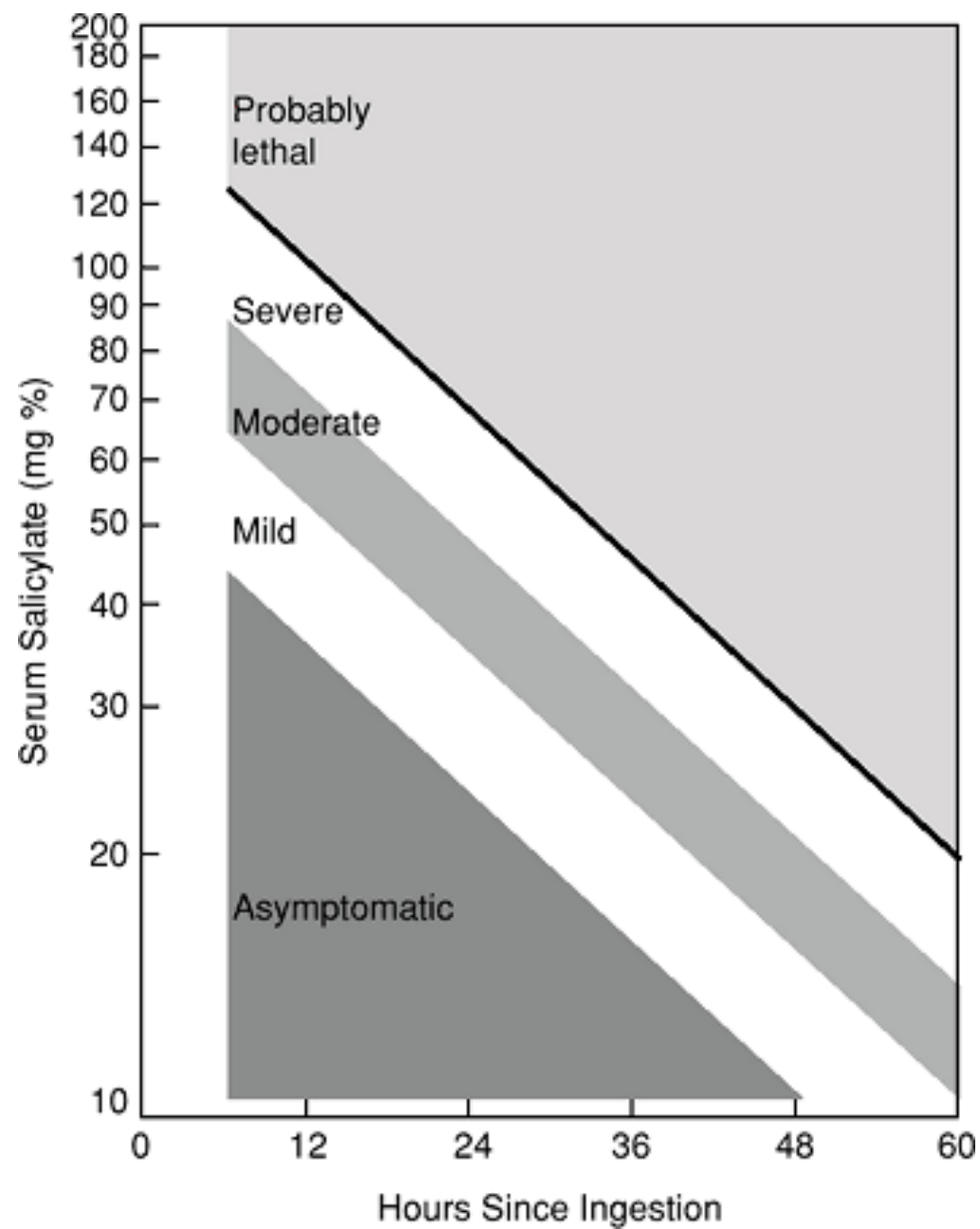
- Deterioration/Failure to improve
- Lack of success in alkalinization
- Renal failure
- Severe acid base disturbance
- Acute Lung Injury
- Mechanical ventilation
- Acute toxicity with ASA level  $>100$  mg/dL
- Chronic toxicity with ASA level  $>60$  mg/dL
- Altered Mental Status

# Fingerstick

Keep > 160 mg/dl (8.8 mmol/l)

# Case Outcome

- Dose of activated charcoal
- Bicarbonate infusion
- Progressive decline in mental status
- Rising ASA level
- Seizure
- Intubation
- Attempted dialysis
- Cardiac arrest



# Summary

- Have a high degree of suspicion.
- Ask about amount ingested.
- Ask about time ingested.
- Send an ASA and APAP level.
- Decontaminate.
- Mental status is key.
- Treat Blood Glucose  $<160$ .
- Sodium Bicarbonate and Dialysis if necessary.
- Call a Poison Center.



[www.poison.org](http://www.poison.org)  
+1-800-222-1222

# References

- Stork CM. Aspirin Poisoning. NYSPC Toxicology Letter. 2011(XVI)3; 1-7
- Lugassy DM. Goldfrank's Toxicologic Emergencies, 10<sup>th</sup> edition, Chapter 39: Salicylates.
- Levitan R, Lovecchio F. Tintinalli's Emergency Medicine, 8<sup>th</sup> edition, Chapter 189: Salicylates.