Thinking Laterally
Expanding the Scope of Paramedic Practice

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Let’s UGA - WAGA
$\#1T$ that we carry

- An average of 200lbs
- Phone - sometimes 2
- Radio
- 3 pagers
- Leatherman
- Defib
- BLS stuff
ALS Drug Box

- Resuscitative medications
- Anti-arrhythmic medication
- Respiratory medications
- Cardiac ischemia/malfunction medications
- Diabetic medications
Reality

• Introduction of new medications is rare and resisted

• Space constraints will cause a practice drift rather than expansion

• The only way to expand is to use what we have
The ALS Drug Box
The Route to Paramedics Owning Their Speciality
Epinephrine

• Actions

• Uses

• Cardiac arrests
  • Dose in adults/children -

• Anaphylaxis
  • Dose in adults/children -
Another Use

• Useful in respiratory distress, as a pressor and in allergic reactions with extended transport times

• Nebulized epi
  • Croup

• Asthma

• Pressor
Croup
Croup
Croup Score (Westley)

- LOC - Normal (0), disoriented (5)
- Cyanosis - None (0), with agitation (4), at rest (5)
- Stridor - None (0), with agitation (1), at rest (2)
- Air entry - Normal (0), decreased (1), severe (2)
- Retractions - None (0), mild (1), mod (2), severe (3)
Westley Score

- Mild <2
- Moderate 3-7
- Severe >7
Treatment of Croup

- Humidified Oxygen
- (Cold environment)
- Epinephrine nebs
- Steroids
Epi Neb

- You can use 1:1000 L-epinephrine at 0.5ml/kg up to 5mls
- Can also be used in other airway swelling problems
- Not a curative treatment but “delaying” progression
Epi Neb

- Asthma
- Anaphylaxis
- COPD
- Similar inhalational form found OTC
Steroids?

• Steroids have now been introduced into some NYS protocols for EMS
Magnesium

• Action – Smooth Muscle Relaxer

• Uses

  • Anti-eclamptic
  • Tocolytic
  • Asthma/COPD
  • Anti-arrhythmic and overdose management
  • Anti-hypothermic
Eclampsia

- One or more seizures and or coma in a setting of pre-eclampsia
- Any time from 2nd trimester onwards
- Common cause of maternal death
Eclampsia

• Occurs in 5/10,000 live births
• Increased incidence in
  • Nonwhite
  • Nulliparous
• Low socioeconomic class
• 50% before term, 33% at term, 17% post-term
Eclampsia

• Treatment – Deliver the baby
• Seizure management
• Magnesium has been shown to be better than benzodiazepines
• Pre-eclampsia is a “heads up” (5-8% of pregnancies)
What is this?
Magnesium

• Cardiac – Torsades
• Asthma/COPD
• Anti-arrhythmic
• Anti-hypothermic

• A whole load of controversy
Magnesium

- Safe, cheap, easy to dose.
- Dose is 1-2g IVP
Magnesium

- Now used in EMS in SVT/Atrial Rhythms
- Used in overdoses that cause wide QRS
- High dose use in hypothermia management
Magnesium

• In COPD and Asthma
  • It works the best in the worst patients
Sodium Bicarbonate

- Actions?

- Uses?
Sodium Bicarbonate

- Bicarbonate donator
  - Severe acidosis
  - “Pressor actions”
- Sodium donator
  - Tricyclic overdose
  - Low sodium seizures
Sodium Bicarbonate

- Theory (2008)
  - Low pH is bad
  - Bicarb increases pH
  - Improves cardiac health
  - Risk outweighs benefit
- Only benefit was shown in 1 study of VFib dogs. Not shown in humans.
Theory of Paradoxical Acidosis
TCA Use

• Commonly used from 1950s-1990s
• Now making a return
• Chronic pain, panic, OCD, enuresis
• Still an awesome antidepressant
• Absorption 2-6 hrs
• May delay gastric emptying
TCA OD

- Clinically
  - Hypotension
  - Arrhythmias
  - Anticholinergic
  - Confusion
  - Seizures
Cardiac Effects

- Increase in PR interval
- Widening of the QRS
- Sinus tachy is the first sign (Vagolytic)
- Refractory Hypotension
  - Decreased contractility
  - Peripheral vasodilation
Bicarbonate

- Change blood pH to allow more protein binding of TCA
- Sodium donator
Magnesium

- Used to shorten the QRS
Benzodiazepines

- TCA lower GABA

- Seizures are really bad sign

- Use BZD, but NOT phenytoin…why?
Glucagon

- Action
- Uses
Other Uses

- Food impaction
- Anaphylaxis
- Beta-blocker overdose
Beta-Blockers

• Uses – Drop BP, angina, heart failure, migraines and tremor

• Beta1 – Heart

• Beta2 – Smooth muscle

• Beta3 – Adipose tissue
The Beta-Blocker Problem

• Where does epi act?
• How?

• So what is the problem?
Beta Blocker OD

- How is it managed?
  - Fluids
  - Atropine
  - Glucagon
  - Calcium
- Will epi work?
Anaphylaxis

- How do we manage anaphylaxis?

- And in a beta-blocker patient?
Glucagon

- Using glucagon to bypass the beta blocker mechanism
Vasopressin

- Uses
- Dose
Vasopressin

- “That drug that you can use instead of epi......but is a PITA to draw up.......so I just use epi”
Vasopressin

- Acts at vasopressin receptors
- Similar action to Epi
- Animals in cardiac arrest with higher doses of endogenous vasopressin had higher rates of survival
In Hospital vs EMS

• What are the differences between in-hospital cardiac arrest and EMS cardiac arrest?
Is the key acidosis?

- Vasopressin found to be more effective in cardiac arrest where the presenting rhythm is asystole.
- Vasopressin is used in sepsis as a pressor.
New Uses

- Uses as the acidotic pressor
- Used in penetrating trauma to the abdomen
Vasopressin

• New actions
  • Acts as a pressor despite the acidity of the tissue
  • Diverts blood away from the abdomen and to the central circulation
Vasopressin

- Take 40 units - add to 1000cc
- Run at 1 cc/min
More to the Vasopressin Story?

• Given the acidosis is one of the major factors that stops epi working........

• High dose rapid bicarb is now returning
The Trauma Story

• Pressors generally not used in trauma because it was felt it was a volume issue.

• Last year - everyone was talking low volume resuscitation.

• This year - maybe suggesting vasopressin in certain circumstances.
Final Medication Story
How Do You Treat?

- Negate it
- Dilute it
- Push it into cells (move it)
- Remove it
What do you have?

- Calcium Chloride
- Bicarbonate
- Albuterol
- Normal Saline
Innovation and Change?

• Not just restricted to the realm of medications
NASCAR
But....
Nascar Airway

- Also known as a Trumpet Airway Device
Now - TAD+Endotrol