EARLY IMPACT BLS

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WHAT MAKES A DIFFERENCE IN EMS?

BECAUSE WE WANT TO SPEND TIME DOING THOSE THINGS AND NOT WASTE TIME ON DOING THE THINGS THAT WASTE TIME.

- THE MEDICATIONS THAT BLS USE
- MANAGEMENT OF TRAUMA - HEMOSTASIS/ PELVIC COMPRESSION/TRACTION
- ALS PROVIDERS
- LIGHTS/SIRENS/GOLDEN HOUR/EMD CODES/ FIRST RESPONSE

THE MEDICATIONS BLS USE

- GIVE ME A LIST

MEDICATION LIST

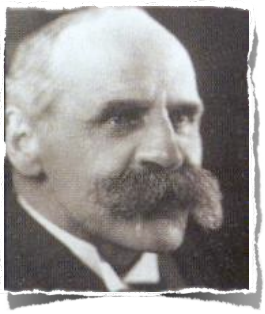
- OXYGEN
- ALBUTEROL
- EPI-PEN
- ASPIRIN

OXYGEN

- Does oxygen hurt the patient?

OXYGEN

- Discovered by a Scotsman - John Scott Haldane.
- Responsible for the first gas mask and first space suit.



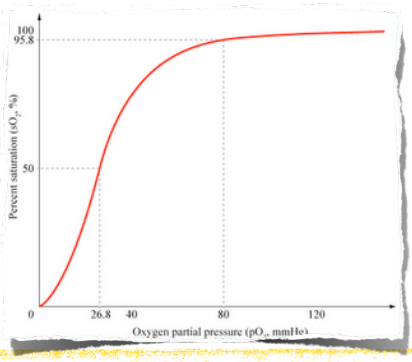
FIRST - DO NO HARM

OXYGEN

- YOU CAN'T PUT OXYGEN ON A COPD PATIENT OR THEY WILL STOP BREATHING!
- YOU HAVE TO PUT OXYGEN ON EVERYONE BECAUSE IT ALWAYS HELPS AND NEVER HURTS!
- GIVE SOME OXYGEN TO SOME PATIENTS AND NONE TO OTHERS!

COPD ISSUE

- Significant hypoxia for 4-6 minutes will cause cardiac arrest.
- The actual level of hypoxia is unclear but levels above 50mmHg appear to be sufficient. (Mnemonic 30 to 60, 60 to 90).



OXYGEN DISSOCIATION CURVE

COPD

- COPD patients live at lower oxygen levels
- Evidence is to keep the paO2>50 (Sat > 88%)
- The concern is that the COPD patient retains CO2 and becomes less responsive. This happens over a long time frame and is not a concern for EMS.

COPD

- There is some evidence that immediate high dose oxygen can cause a rapid rise in CO2 - however this is not a concern for EMS = hypoxia/COPD = oxygen good.

HIGH DOSE OXYGEN

- One other group - Neonates
- Again - not an EMS concern

OXYGEN

- Benefit from routine oxygen is mixed
  - In myocardial infarction studies
    - Maroko - Reduction in infarct size in non-hypoxic animals with LAD lesions
    - Madias - Showed improvement in ECG in humans with MI
    - Rawles - Failed to show benefit in MI patients

PRE-OXYGENATION

- Desaturations during intubation are linked to worse outcomes in EMS
  - 100% pre-oxygenation will stop ALS killing patients!

SUMMARY FOR OXYGEN

- Risk is minimal in EMS but there are some long term concerns for patient management
- Saturation probes have allowed a better management scheme to be developed
- Plan - Standard of care but consider nasal canula versus 100% NRB

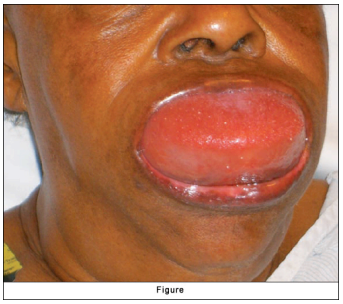
NASAL CANULA VS 100% NRB

- 100% for
  - Extreme SOB, preoxygenation prior to intubation
- Nasal canula for
  - Less sick, trying to keep the saturation above 90%

EPI-PENS

- For use in anaphylaxis
- NOT for allergic reactions!

ANAPHYLAXIS



Figure

ANAPHYLAXIS

- Severe allergic reaction
- Systemic symptoms

ANAPHYLAXIS

- Skin - Itch, hives, rash
- Mucous membranes - Swelling
- Breathing - Bronchospasm and wheezing
- Vital signs - "SHOCK". Dropping blood pressure.

ANAPHYLAXIS

- Caused by a massive release of histamine and other chemicals causing an extreme allergic response in a system that is primed to respond
- 1% of patients will die from it (1500 deaths/year in the USA)

ANAPHYLAXIS

- Can be triggered by multiple triggers and via multiple routes
- Common triggers are bee stings, drug (PCN) and peanuts

ANAPHYLAXIS

- BLS treatment is simple - Decon, epipen, oxygen, rapid transport
  - EPI-PEN
    - 2 types (child and adult)
    - Intramuscular injection
    - Onset in 5-15 minutes
    - Duration - Theoretically 1-4 hours

EPIPEN

- Teaching should always be that "this is just a holding measure until we can get you to hospital"
- Why?

EPIPEN

- The effect of the epipen may be overcome by the ongoing reaction - multiple doses may be needed and other medications will have to be given

EPI

- Used in cardiac arrest, anaphylaxis, croup and other emergency situations (has been used in asthma)
- Cannot be given orally
- Absorbed in muscle, sub-cutaneously, intravenously and over membranes

EPI

- What you will see when you give it
  - Tachycardia/elevated blood pressure
  - Anxiety
  - Tachypnea
  - Dilate pupils
  - "Fight part of the fight or flight response"

EPIPEN

- When they get to hospital
  - May get further epi
  - Anti-histamines
  - Steroids
  - Supportive manangement

THE PATIENT WILL BE DEAD IN THE NEXT 3-5 MINUTES

SO TREAT IT

ALBUTEROL

- "and Albuterol"
- Used in the treatment of bronchospasm (wheezing)
- Indicated in the treatment of asthma and allergy

ALBUTEROL

- Similar to epinephrine
  - Epi - Acts on alpha and beta receptors
  - Albuterol - Acts on beta 2 receptors

ALBUTEROL

- Typically given via nebulizer - getting it directly to the receptors that it wants to influence
- Dose 2.5mg (Can go 15mg/hr)
- The dose is somewhat unimportant because most of it goes into the air

ALBUTEROL

- Set the flow to allow misting and provide oxygenation to the patient
- Indicated in asthmatics with wheezing and shortness of breath
- It works - Its safe - Just do it

ALBUTEROL

- Set up the nebulizer and then switch on the oxygen (unless you want to taste it)

ASPIRIN

- Included in NYS BLS protocols
- Indicated in patients with chest pain of presumed cardiac origin
- Dose is 2-4 x 81mg (Baby aspirin)
- Cheap - But represents the biggest bang for the EMS buck!

ASPIRIN

- ISIS-2 Study - Mortality benefit if patients get ASA
  - Later study (Friemark) showed patients that received early aspirin in myocardial infarction had a reduced mortality (1.6 vs 3.5 hours, $p<0.001$, 1200 patients studied)
    - 7 days - 2.5% vs 6% ($p=0.01$)
    - 30 days - 3.3% vs 7.3% ($p=0.008$)
    - 1 year - 5% vs 10.6% ($p=0.002$)

ASPIRIN

- Contra-indications
  - Aspirin allergy
  - Children < 12
- You can give it if they are on coumadin, plavix or aspirin
- You should give it even if they say they think that they took one earlier

ASPIRIN

- Studies have shown that people say they have taken aspirin but when you go back and look they have taken tylenol, ibuprofen or other OTC medications

ASPIRIN

- Originally developed in the late 1800s by Bayer
- Became popular during the 1918 pandemic flu
- In the 1980s benefits for cardiovascular health were discovered
- Remains one of the best treatments for migraine (more effective than imitrex)

TRAUMA MANAGEMENT

"Squeeze it, compress it, pull it straight"

DOES BLS MANAGEMENT OF TRAUMA MAKE A DIFFERENCE?

HEMORHAGIC SHOCK

- What is shock?
- What happens when you bleed?

SHOCK

- Reduced tissue perfusion resulting in decreased delivery of oxygen and nutrients that are needed for cellular function
- Hypovolaemic shock is the most common

SHOCK

- The body responds to divert blood to the needed organs
- A decrease in volume causes the body to release.....

SHOCK

- .....epinephrine
  - Causes an increase in heart rate, peripheral vasoconstriction and a sympathetic squeeze to the central organs

SHOCK

- Many other things happen
  - Hormones released cause water retention and release of sugar from body stores

AGE

- Children - Smaller blood volume (they are hit harder), under 2 the kidneys do not conserve well, surface area is large causing heat loss
- Old people - Compensatory mechanisms are blunted and often their organs cannot take the decreased perfusion

HOW FAST?

- Cardiac stroke volume is 70-80cc
- Heart rate is 100 = 7 lts per minute
- Body has about 5 lts of blood

BLOOD OVER IV FLUIDS

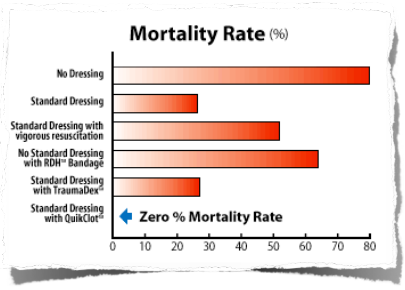
- IV fluids are aimed at restoring a volume to allow the heart to pump - restores pre-load
- No fluids do the job of blood. Not even blood!

MANAGEMENT

- If it is bleeding - You need to stop it
  - Compression
  - Traction of bones

QUIK CLOT

- Acts by absorbing all water from the blood
- Pour it on to wound and then dress
- Action is to dry out blood leaving the clotting factors

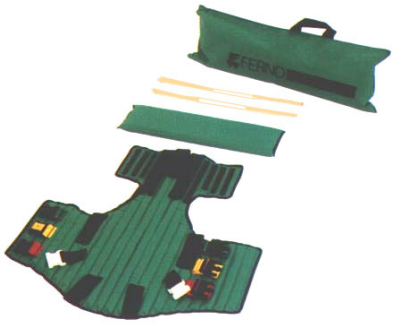


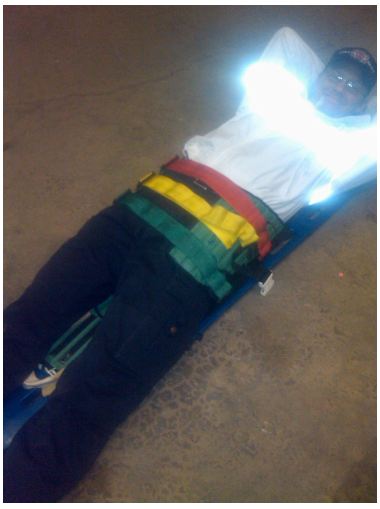
QUIK CLOT

ANOTHER COMPRESSION

PELVIC COMPRESSION

THE NEW EMS WAY!





FEMURS

BLOOD LOSS

- In a 1992 study - the average blood loss from a midshaft femur fracture was 1.276 L
- Fracture pattern and velocity of injury did not correlate to blood loss
- May be complicated with arterial bleeding also

TRACTION

- The insertion of the muscles predisposes to displacement - which makes more bleeding likely
- Traction overcomes the muscle pull and re-opposes the ends of the bones - reducing bleeding and building its own muscular bandage

LIGHTS AND SIRENS?

LIGHTS AND SIRENS

- NO
- On average 43.5 seconds faster - No clinical impact

GOLDEN HOUR

- The concept of getting a patient to definitive trauma care within one hour

GOLDEN HOUR

- No
  - Oregon 2010 - 3600 major trauma patient - Every minute of transport time had an OR of 1. Same for 10 minute blocks

AEDS

AEDS

- YES
- Multiple studies now show early defibrillation improves survival with survival rates improved anywhere from 2-20%

EMD CODING

EMD

- YES
- Shown to safely triage calls to lower acuity and now being used in refusal of service

ADVANCED LIFE SUPPORT

ALS

- NO (and YES)
- Studies out of Canada are showing that in general stay and play does not work
- Effective strategies have been brought to the BLS level
- Very few ALS interventions that make a difference

SURVIVING SEPSIS

BLS ROLE

SEPSIS

- Surviving sepsis is centered around recognition and proactive management
- BLS need to call ALS or inform the hospital PTA

VITALS

- If they have 2 of the following
  - HR>90
  - Temp >38.3C (100.9F) or <36C (96.8F)
  - RR>20
  - Altered mental status
  - Glucose > 120 (if non-diabetic)

SSI - SIGNS AND SYMPTOMS OF INFECTION

HISTORY

- Is the history suggestive of new infection?
  - Pneumonia
  - UTI
  - Abdominal pain / diarrhea
  - Meningitis
  - Cellulitis / septic arthritis / wound infection
  - Indwelling line

SEPSIS

THEN

- Are any of the following present or new to the patient?
  - SBP<90 or MAP<65
  - Sats<90%
  - No urine in >8 hours
  - Prolonged bleeding

IF YES - THEN GOAL DIRECTED SEPSIS

SEPSIS ALERT

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