WRMC 2013
MEDICAL TOPICS

Disclosure Statement

President, Medical Director and Owner of Wilderness Medical Associates International, Portland Maine

Outline

- Generic medical concerns
- Practice guidelines
- General topics
- Other
- Q and A

Medical Concerns

- Who is coming (screening: yes or no)?
- Training of staff (training: yes or no)
- Medications on trip
- Medical field practice
- Where are you going

Who is coming?

- Underlying conditions
- Medications
- Habits
- Prior conditioning

Important generic enquiries

Health issue

Activity level

Choice (e.g., – Length, activity)

Motivation

An eye toward safety that does not jeopardize the safe and experience of the other participants

GENERAL CONCERNS

*Diagnosis

Effects on daily activity

Side effects

Medication interaction

Environmental impacts

*Duration: start, discontinued; dose change

Consequences of abrupt withdrawal

Storage, duplicate supply, leftovers

*Neuroleptic use

Know Where You are Going

- Local resources
- Activity
- Expected or possible problems
  - Social
  - Medical
  - Legal
- Evacuation options

Important Directed Questions

How often/stability

What precipitates flare/symptoms

What does it look like

Treatment

Impact of the environment on medication

Level of activity-similar to the program

Impact of activity on condition

Follow-up

Suicide

Substance abuse

Eating disorders

Unstable medical problems

Change in medication (stop or add)

Unfamiliar medical or psychiatric condition

Information does not fit

Medical diagnoses of note

Chronic illnesses/conditions
-asthma, seizures, diabetes

Coronary artery disease

Musculoskeletal disorders

Substance abuse

Psychiatric problems

Pregnancy

Obesity

Musculoskeletal

Training

- Do you really need it?
- To what level?
- What should you do?
- What should someone else do?
- By whom?

Wilderness Medicine Standard

- Is there a standard?
- How much do providers/practitioners need to know?
- What is the evidence?

WFA Scope of Practice

Consensus – Educator/practitioners/outdoors leaders, some with >30 yrs experience

Challenges:

-What can a person learn and retain in 16 hrs?

-Should evidence be based on the condition or what can be learned and retained in 16 hrs?

-Most topics/subjects have only texts as references

-Striking a balance amongst the most common and our worst plausible fears

Medical Practice in the Field

- What can and should not be done?
- Online vs protocol, both or neither
- Medical advisor/medical control

Medications OnTrips

- Prescription
  - Company
  - Client's
- Over-the-counter

Epinephrine

- Can you?
- When/why?
- Delivery method
- Should you?

Can you?

- It depends:
  - Location
  - Training

Federal Legislation
S1884 – School Access to Emergency Epinephrine Act

- 11/17/2011 Referred to Senate committee. Status: Read twice and referred to the Committee on Health, Education, Labor, and Pensions.
- This bill was assigned to a congressional committee on September 12, 2013, which will consider it before possibly sending it on to the House or Senate as a whole.

2% *chance of getting past committee.*
1% *chance of being enacted.*

Only 11% of bills made it past committee and only about 3% were enacted in 2011–2013

Amended Version

- H.R. 2094
- Passed and signed into legislation 13 November 2013
- http://blogs.wsj.com/washwire/2013/11/13/obama-signs-bill-to-increase-epipen-availability-in-schools

  Provides incentives rather than requirements

  Details to be ironed out, some within states (e.g., liability, what is a school, etc)

State Legislation

- Variable
  - AK – with training may use autoinjectors and syringes. Prescription written to the provider.
  - Right of student to carry medication for emergency asthma treatment – 50 states; anaphylaxis - 49
  - Restriction – 1 state

www.aanma.org/advocacy/meds-at-school

When/for what?

- Anaphylaxis – definition
- Asthma
- Cardiac arrest (?)

Delivery

- Autoinjectors
- Prefilled syringes
- Vials (1mg/1ml = 1 from HJP and 30ml)
- Ampules

Autoinjectors

- Adrenaclick (http://adrenaclick.com/how_to_use_adrenaclick_epinephrine_injection_USP_auto_injector.php) ($185 USD - two with coupon)
- Auvi-Q (http://www.auvi-q.com/auvi-q-demo) ($400 USD – two)
- EpiPen (http://www.epipen.com/how-to-use-epipen) ($362 USD – two)
- Generic ($294 USD - two)

Prefilled

- A realistic idea
- Research
- Experience
- Downsides

IM - Needle Length?

- Science
  - IM>subcutaneous ; thigh>arm
  - Mean fat = 0.66 cm in men; 1.48 cm in women Song AAAI 2005
  - 30% of kids were greater than 1.43 cm Stecher Ped 2009

Therefore EpiPen needle may not be long enough

But…

Autoinjector>IM in the leg Simons JACI1998; 2001

Temperature

Can tolerate and hot and cold reasonably well for 3 - 4 months

We don't know about freeze/thaw cycles

Can withstand cold (5°C) or hot (70°C) temperatures. for 8-hour periods for up to 12 weeks with little degradation. *Grant AJEM 1994*

3 months at 38°C and low humidity and by 4 months after storage at 38°C and high humidity. Light had no significant effect. *Rawas-Qalaji AAAI 2009*

Epinephrine can tolerate temperature spikes of up to 125 degrees F (51.7 degrees C) for a cumulative time of 795 minutes (13.25 hours) without undergoing degradation *Gill 2004 (abstract)*

Should You?

BMJ

Adrenaline in the treatment of anaphylaxis: what is the evidence?

Andrew P C McLean-Tooke, Claire A Bethune, Ann C Fay and Gavin P Spickett

- A review
- Of 164 fatal reactions 1992-1998 in the UK, half were iatrogenic, quarter were related to venom (for example, wasp sting) and most of the remainder to food
- sc administration of epi associated with a difference in the time of maximum plasma concentrations (average time: intramuscular group, 8 minutes; subcutaneous group, 34 minutes)
- retrospective study of 27 patients with anaphylaxis, all those treated within 30 minutes recovered
  - 2 deaths in those in whom treatment was delayed by more than 45 minutes
- 50-75% of patients prescribed auto-injectors for self administration of adrenaline carry them around at all times
  - Of these, only 30-40% were able to correctly demonstrate how they would administer adrenaline to themselves.

McLean-Tooke APC, et al. Adrenaline in the treatment of anaphylaxis: What is the evidence. BMJ 2003; 327:1332-1335.

Patient

On day 3 of a weeklong backpacking trip one of your clients informs you that his tent mate (35 yo man) seems agitated, flushed and confused

What do you want to know?

Serotonin Syndrome

- Any of many serotonin medications (decrease breakdown or storage)
- Symptoms – fever, agitation/confusion/lethargy, tachycardia, elevated blood pressure, stiffness, seizures
- Onset can be delayed for up to weeks (e.g., fluoxetine)
- Looks like encephalitis, withdrawal, malignant neuroleptic syndrome, *strangle sign*
- NOT A FIELD FIX

Medications

- Sympathomimetics – e.g., methylphenidate, pseudoephedrine
- Antidepressants – e.g., SSRI, SNRI, MAOI, Li
- Analgesics – e.g.,tramadol, meperidine, fentanyl
- Antipsychotics – e.g., risperidone, olanzapine
- Migraine medication – e.g., triptans
- Antiemetic – e.g., metoclopramide, ondansetron
- Antibiotic – e.g., erythromycin, linozolid
- Other – e.g., cyclobenzaprine, valproate

Practice Guidelines

- WMS
- Boy Scouts
- American Heart Association
- Others

Published Guidelines

- Who are they focused at?
- Do they have a practical application for you?
- Do you have someone who can translate them and offer you something practical – e.g., if you cannot follow the suggestion?

Spine

- WMS (*WEM Quinn 2013)* and NAEMSP (7/13)
- Well researched
- Their conclusions are reasonable
  - An evaluation can be done in the field accurately
  - Not everyone needs to be
- Does an unclear spine always mandate an emergent evacuation?
- What is 7/10 pain; what is gained by flexion/extension and rotation component?

Exercise-Associated Hyponatremia

- What is the cause of a change in mental state/decline in performance?
  - Fatigue
  - Dehydration
  - Calorie deficit
  - Heat stroke
  - Hyponatremia
  - Other

Bennett BL, et.al. Practice Guidelines for Exercise Associated Hyponatremia. WEM 2103; 24:228

Fluids

- Take time to acclimate in the heat (or with any hard work)
- What you eat provides sufficient sodium
- There is no *one size fits all* formula
- DRINK TO THRIST

Submersion

AHA – CPR for 2 minutes and then call for help; nothing about stopping

It is concluded that if water temperature is warmer than 6 ◦C, survival/resuscitation is extremely unlikely if submerged longer than 30 min. If water temperature is 6 ◦C or below, survival/resuscitation is extremely unlikely if submerged longer than 90 min.

Tipton, et al. A proposed decision-making guide for the search, rescue and resuscitation of submersion (head under) victims based on expert opinion. Resuscitation 2011;82:819

Submersion

- Who is at risk?
- Is there a worry window?

HEAD INJURIES

Everyone with a blow do the head needs to be evaluated by a medical professional.

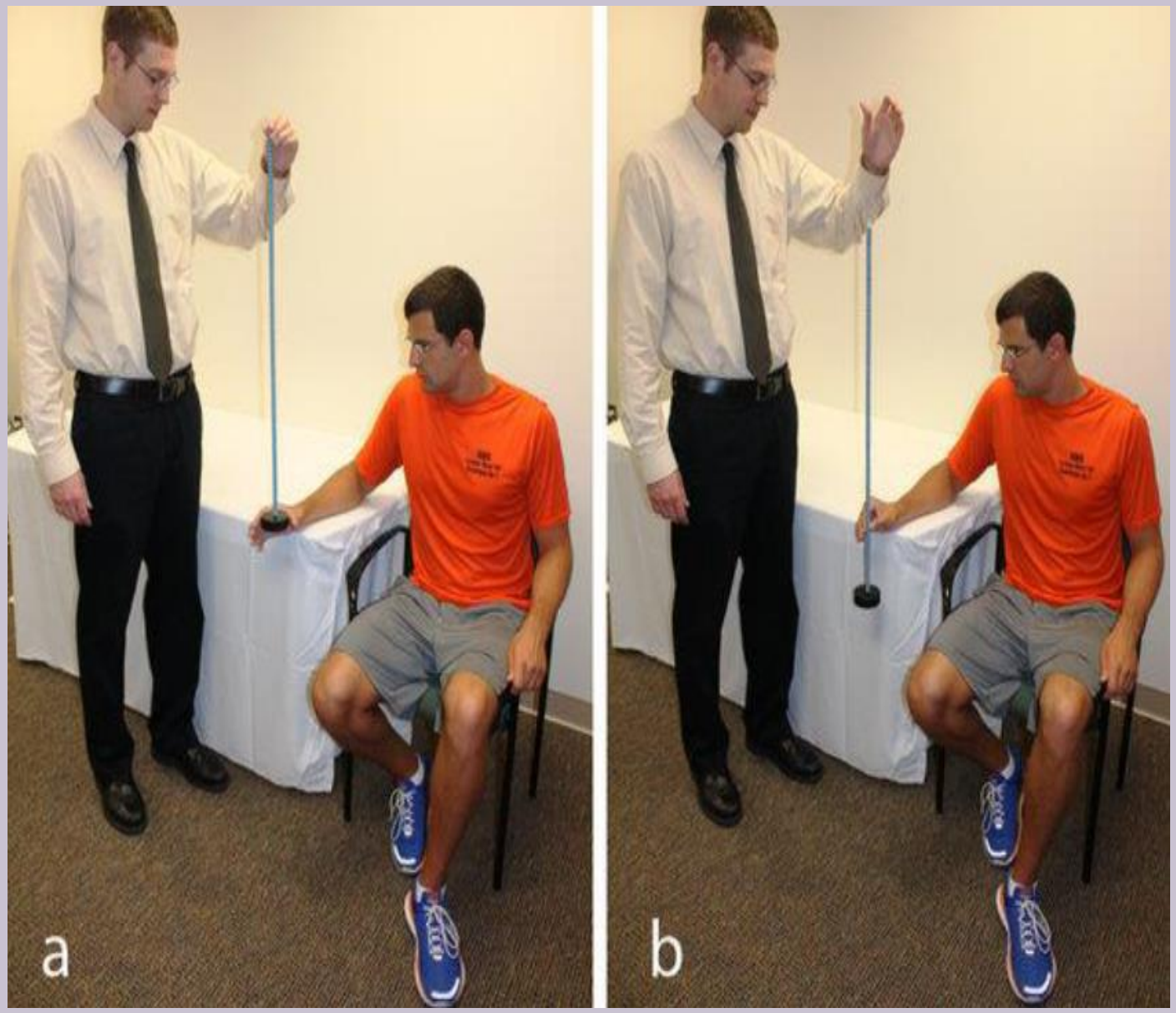
What does the research show?

Head Injury – Traumatic Brain Injury/Concussion/TBI

- Confusing nomenclature
- Recovery and long-term considerations
- Practical field considerations

	STUDY					
S/SX		Headache	Vomiting	Abnormal MS	Skull Fx	Other
	Lancet	severe	any	any	basilar	severe MOI
	Nexus		recurrent	any	any	>65, coagulopathy
	Sweden		recurrent	any	basilar	multple injuries
	New Orleans	any	any	amnesia, intoxication		>60, sz, trauma above clavicles
	Canada		>1	abn GCS, amnesia	open/ basilar	>65. Dangerous MOI

All had impaired MS following trauma
Time of LOC, pupils not in any of them



Eckner. BJSM 2013

CPR
2010 Updates

Simplified numbers – everyone is 30:2; 100+/min

Definition of arrest without AED – ineffective breathing and U; no pulse checks.

Chest compressions first

Breaths are an option

Specific depth by age/body size

CPR

What's not covered

- Respiratory arrest
- Trauma – especially bleeding
- When to stop because of futility

Hemostasis

- Well-aimed direct pressurre
- Compression wrap
- Tourniquets – clinically, stop bleeding effectively
- Other
  - Elevation – no
  - Pressure points – no
  - Clot enhancers - ?

Clot Enhancers?

Conclusion: The use of zeolite hemostatic agent (1% residual moisture, 3.5 oz) can control hemorrhage and **dramatically reduce mortality** Hasan, etal. Journal Trauma 2004;

Conclusion: WS was **superior to other hemostatic agents**. Ward, et al. Journal Trauma 2006; 63:276

Conclusions: **CX improved hemorrhage control and survival**. Kozen, et al. Academic Emergency Medicine 2008; 15:74–81.

Conclusion: WS granules caused endothelial injury and significant transmural **damage to the vessels that render them nonviable for primary surgical repair.** The **granules can enter systemic circulation** and cause distal thrombosis Kheirabadi, et al Journal Trauma 2010:68:269. .

Conclusions: Advanced **hemostatic dressings do not perform better than conventional gauze** in an injury and application model similar to a care underfire scenario. Watters, et al. Journal Trauma 2011;70:1413

HOT

Heat stroke

-dx – abnormal mental state

-rx – aggressive and immediate cooling

Hyponatremia

-causes

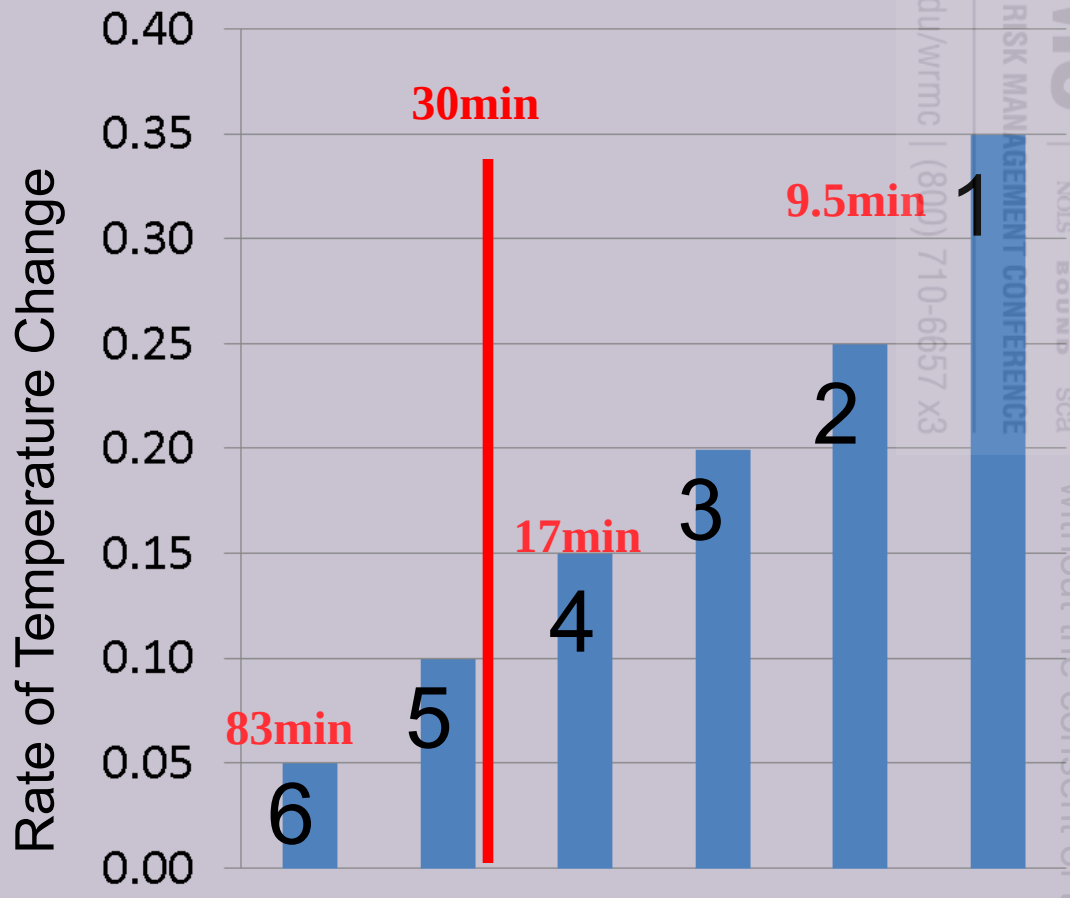
-symptoms

-not always related to a hot environment

-not always euvolemic or hyperhydrated

Cooling Rates from 42°C to 39°C

1. Ice water immersion 2°C
2. Cold water immersion
3. Half the body submersed at 1.3° C
4. Cold water immersion 14° C
5. Water, gauze sheet and fan
6. Fan with water



Hand cooling device (0.05) and ice to major arteries (0.03)

Data from Casa DJ, et al.Current Sports Medicine Reports 2005.4:309-317

Cooling Method

CA-MRSA

Common bacteria resistant to antibiotics previously routinely used for skin infection

Mistakenly diagnosed as a spider bite

What are the risks?

Is it more virulent?

Prevention

WEIRD STUFF

Balamuthia mandrillaris

Naegleria fowleri*

Acanthamoeba keratitis

Lion Fish

Pregnancy

First trimester: no restrictions if well

Second trimester: consult with woman's health care practitioner – avoid pressure on pelvis (e.g., harness, kayak cowling pressure); more lax ligaments

Third: case-by-case

Elevated blood pressure, limb swelling and/or headaches