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

- 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

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

- Auvi-Q ([http://www.auvi-q.com/auvi-q-demo](http://www.auvi-q.com/auvi-q-demo)) ($400 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 JACI 1998; 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)
BakSnap™ syringes can help insure protection for health care workers with 2 easy steps:

1. BACK
   Following injection, pull back
   plunger, drawing needle into barrel.

2. SNAP
   Snap off the syringe, leaving
   needle still inside the barrel.

BEFORE

AFTER
Should You?
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.
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, linoxolid
- 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?
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 to 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
<table>
<thead>
<tr>
<th>STUDY</th>
<th>Headache</th>
<th>Vomiting</th>
<th>Abnormal MS</th>
<th>Skull Fx</th>
<th>Other</th>
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<tr>
<td>S/SX</td>
<td>severe</td>
<td>any</td>
<td>any</td>
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<td>severe MOI</td>
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<td>Lancet</td>
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<td>&gt;65, coagulopathy</td>
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<td>basilar</td>
<td>multiple injuries</td>
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<tr>
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<tr>
<td>New Orleans</td>
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<td>any</td>
<td>amnesia, intoxication</td>
<td>&gt;60, sz, trauma above clavicles</td>
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<tr>
<td>Canada</td>
<td>&gt;1</td>
<td>abn GCS, amnesia</td>
<td>open/basilar</td>
<td>&gt;65. Dangerous MOI</td>
<td></td>
</tr>
</tbody>
</table>

All had impaired MS following trauma
Time of LOC, pupils not in any of them
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 pressure
- 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, et al. Journal Trauma 2004;

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


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)

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

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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