Summer Injuries or Summer Bummers

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Summer BUMMER
Summer Major Bummer
Objectives

1. Describe common mechanisms of injury during the summer months.
2. Identify a hidden danger that may cause injury while boating.
3. Discuss key interventions for a variety of summer injuries.
Sample HCMC Summer Injuries

- MVC – Fell asleep
- Near drowning in pool
- Hit on L side of face with baseball
- Hit in face walking out of bar
- Horse spooked thrown off, pelvic fx
- Ladder fall and many other home falls
- Unhelmeted MCC, another MCC crash at high speed
- Motocross and went over handle bars, TBI
- Jumped through egress window – lacerations
- Sewer ball exploded – eye injury
- Bucked off bull at rodeo
- Unhelmeted bicyclist lost control – TBI, C-spine injury
- Struck by line drive softball to jaw
- Wakeboarding and collided with another wakeboarder
- Doing wheelie on motor dirt bike when it flipped over -
Summer Injuries

- ATVs
- Bikes
- Scooters
- Pedestrian struck
- Lawn Mower Injuries
- Sport – related
- Water related
  - Near Drowning
  - Diving
  - Skiing
  - PWC injuries
  - Boating Injuries
- Hyperthermia/Hypothermia
- Burns
  - Campfire
  - Fireworks
  - Lightning strikes
  - Tar Burns
- Falls
  - Out Windows
  - Playground equipment
  - Trees
  - Flips flops
A Leading cause of summer injury

BITES and STINGS

Over 13,742 in 2014 in MN

(MIDAS)
Tick Transmitted Diseases

- Lyme disease
- Human Anaplasmosis (HA)
- Babesiosis
- Rocky Mountain Spotted Fever
- Ehrlichiosis
- Bartonella
- POW Virus
- Southern Tick-Associated Rash Illness
- Tularemia
Tick Borne Illness Symptoms

- Joint pain
- Fatigue
- Malaise
- Fever & Chills
- Sweats
- Myalgias
- Arthralgias
- Headache
- Rash
- Lymphadenopathy
- Stiff Neck
- Confusion
- Cough, sore throat
- Emotional lability
- Depression
- Photophobia
- Conjunctival injection
- Mild splenomegaly or hepatomegaly
- Jaundice
- GI symptoms
Tick Treatment

Remove tick & treat –
Doxycycline

Wash your hands and bite area with
Alcohol
Iodine scrub
Soap & water

Rash – Antibiotic
Treatment for 2 weeks
# Antibiotics for Lyme Disease

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
</tr>
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<tbody>
<tr>
<td>amoxicillin</td>
<td>Claforan</td>
</tr>
<tr>
<td>cefotaxime</td>
<td>Rocephin</td>
</tr>
<tr>
<td>ceftriaxone</td>
<td>Ceftin</td>
</tr>
<tr>
<td>cefuroxime</td>
<td>Doryx, Vibramycin</td>
</tr>
<tr>
<td>doxycycline</td>
<td>Erythrocin, Ery-Tab</td>
</tr>
<tr>
<td>erythromycin</td>
<td></td>
</tr>
<tr>
<td>penicillin</td>
<td></td>
</tr>
<tr>
<td>tetracycline</td>
<td></td>
</tr>
</tbody>
</table>

Alternative Lyme Treatments

- Saunas
- Lemon Water
- Rife machine
- Acupuncture
- Exercise

http://www.hymbas.com/rifebcxultra.html
Lori’s Summer Bummer Story

- Body Aches all over
- Headache that was worsening
- Scratching a mosquito bite
- Day 2 – Headache intensifies & fever—goes to ED
- Day 3 – Nauseous, vomiting, can’t keep anything down—goes back to ED, fluids and sent home
- Day 4 – Wakes up, headache severe and can’t move the left side of her body
- Goes to ED and admitted, in coma for 2 weeks and then rehab for a month....
West Nile Virus

**Mild Infection Symptoms**

Most have no symptoms

- Back pain
- Body Aches
- Fatigue
- Fever
- Headache
- Occasionally:
  - Skin rash
  - Swollen lymph glands
  - Eye pain

Entm.purdue.edu
West Nile Virus

Serious Signs & Symptoms

- High fever
- Severe headache
- Stiff neck
- Disorientation or confusion
- Stupor or coma
- Tremors or muscle jerking
- Lack of coordination
- Convulsions
- Pain
- Partial Paralysis or sudden muscle weakness

www.MayoClinic.com
West Nile Virus Testing

- Lab Test
  - RNA (Positive Ribonucleic acid) is indicator of the virus

- Lumbar Puncture
  - Elevated white cell count shows fighting the infection and may find West Nile antibodies

- EEG – assesses brain activity

- MRI – detect brain swelling

www.mayoclinic.com
West Nile Virus
Treatment  Supportive Therapy

Mild
◉ Over the counter pain relievers to ease headaches and muscle aches

Serious
◉ No direct cure for encephalitis or meningitis
◉ IV fluid
◉ Prevent other infections
◉ Interferon therapy research – immune cell therapy for encephalitis caused by West Nile Virus

www.health.state.mn.us
WNV Treatment Trial #1: Interferon Background

- Interferon alpha-2b
  - Used to treat Hepatitis C (related virus)
- In vitro:
  - Interferon alpha-2b inhibited replication at relatively low concentrations
- Animal studies*:
  - Increased mean survival time of SCID-treated mice infected with related flavivirus
  - Reduced viral RNA in serum, brain and spleen
- Proposed Mechanism
  - Stimulates cellular antiviral activity, enhances body’s host defenses (anti-viral replication has also been proposed as mechanism of action)

*Antimicrobial Agents Chemother 2003;47:777
http://www.cdc.gov/westnile/symptoms/index.html
Mosquito Transmitted Diseases

Region:
- West Nile Virus
- LaCrosse Encephalitis – 4-5 cases/year
- Jamestown Canyon Virus
- Western Equine Encephalitis – no human identified
- St. Louis Encephalitis – last seen in the 1970’s

From other countries and regions:
- Zika
- Malaria
- Yellow Fever
- Dengue
- Chikungunya

www.health.state.mn.us/divs
Other Pests

- Head Lice
- Pubic Lice
- Bed Bugs
- Asian Lady Beetles
- Fleas
- Cockroaches
- Black Flies
- Deer/Horse Flies
- Spiders
- Scabies
- Bird Mites
- Delusional Parasitosis
- Swimmer’s Itch
Sunburn Treatment

- Stop the Burning process
- Get out of sun
- Apply moisture
  - Humectants
  - Help retain moisture
- Avoid Emollients
  - Oils & greases
- Vit A & E oils are good in moisturizers
- Noxema is still good to use!
- Bacitracin if blisters open
Tar Burns

- Boiling point is 140-232 degrees C
- Cools quickly to 93-104 degrees C
- Cool with NS or water at room temperature
- Picked, Peeled and debrided from tissue
- Petroleum or ointments to aid removal
- Mayo, butter, sunflower seed oil, baby oil can help

http://www.bing.com/images/search?q=tar+burns&id=08258349DBD469BE373D1465B88D43E03D272887&FORM=IQFRBA
Campfire Injuries
STOP...DROP.....& ROLL
Firework Injuries

Most Injured body parts

46% Hands & Fingers
17% Heads, faces, ears
17% Eyes
11% Legs
4% Arms

Type of Firework

17% Sparklers
14% Reloadable shells
13% Firecrackers
7% Roman Candles
6% Bottle Rockets
6% Novelties
2% Multiple Tubes
1% Fountains
3% Public Display
29% Unspecified

http://www.bing.com/images/search?q=firework+injuries
Firework Injuries by Age

Percent by years of age

- 7% - 0-4
- 9% - 5-9
- 10% - 10-14
- 10% - 15-19
- 9% - 20-24
- 40% - 25-44
- 14% - 45-64
- 1% - 65+
Lightning strikes are the second leading environmental cause of death (behind flash floods) in the United States, with an average of 50-300 deaths per year.
Lightning Injuries

**Vasomotor spasm**
Vasomotor spasm is the local response of the vasculature to electrical current from direct sympathetic stimulation. Vasoconstriction may be so prolonged and intense that it causes early and severe loss of pulses and mottled, cool extremities. This vasoconstriction is usually self-limited and resolves within hours.

- CPR, EKG
- Assist breathing
- Circulation – Aggressive IV fluids
- Foley to Monitor Urine Output
- Watch for dark urine
- Treat external burns

6 potential physical ways of Lightning strikes the body

- Direct Strike
- Contact voltage
- Side splash
- Step voltage
- Upward Streamer
- Blast injury
Lightning Strike Treatment

- Call 911
- Help person when safe
- CPR if needed
- Treat burns and shock
- Stop Burning process
- Transport for medical evaluation - internal and neurological injuries and burns
  - IV fluids to flush tissue breakdown
  - Cardiac monitor

Photo by Mick McGuire
Lawnmower Injuries

- All types of injuries occurred and all body parts are injured
- 7% of the injuries are amputations and avulsions.

- 31% HANDS & FINGERS
- 19% LEGS
- 18% FEET/TOES

Mean age – 9 years
Lawnmower precautions

- Long hair should be tied up
- Use proper eye protection
- Use proper hearing protection
- Wear non-skid closed toed shoes
- Operate the lawn mower
  - Only during daylight hours
  - Not in bad weather
  - In a location with no hazards such as slopes, ditches, fences, gravel, downed tree limbs, etc.

American Academy of Pediatrics –
https://healthychildren.org/English/safety-prevention/at-home/Pages/Lawnmower-Safety.aspx
Lawnmower Age Recommendations

- Most children and adolescents will not be able to operate:
  - A hand mower until at least 12 years of age
  - A walk-behind power mower until at least 12 years of age
  - A ride-on power mower until at least 16 years of age

Pedestrian Struck

5 year old walking and run over by vehicle

No pulse and chest compressions started enroute
Discharge Diagnosis

- Splenic laceration
- Liver laceration
- Bilateral pulmonary contusion
- Traumatic pneumothorax
- Aspiration pneumonia
- Altered level of consciousness
- Traumatic brain injury
- Cardiopulmonary arrest
- Motor vehicle collision with pedestrian
- Contusion of chest wall
- Contusion of pelvis
- Abrasions of multiple sites
- Acute hypokalemia
- Fracture of pubic ramus
- Cardiac contusion
- Elevated troponin level
- Fracture of elbow, condyle, right, closed
- Traumatic pneumothorax on right
- Traumatic pneumothorax on left
- Liver laceration, grade III, without open wound into cavity
- Laceration extending into parenchyma of spleen without open wound into abdominal cavity - Grade III
Baseball or Golf ball to Eye

Control bleeding
Minimize eye movement
Patch other eye
Don’t ultrasound a ruptured globe
Leave eye contents intact - if have fluid coming out of eyeball, don’t remove
Ice for swelling to eye brow area.
Cantholysis/Canthotomy

Illustration by Dr. Daniel Howes

http://www.cjem-online.ca/v4/n1/p49,
Illustration by Dr. Daniel Howes
Canthotomy

http://www.cjem-online.ca/v4/n1/p49
Illustration by Dr. Daniel Howe
## Types of Accidents on Water

<table>
<thead>
<tr>
<th>Accident Type</th>
<th># of Accidents</th>
<th># of Deaths</th>
<th># of Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collision with recreational vessel</td>
<td>937</td>
<td>40</td>
<td>652</td>
</tr>
<tr>
<td>Flooding/Swamping</td>
<td>463</td>
<td>70</td>
<td>139</td>
</tr>
<tr>
<td>Collision with fixed object</td>
<td>452</td>
<td>51</td>
<td>355</td>
</tr>
<tr>
<td>Grounding</td>
<td>359</td>
<td>13</td>
<td>235</td>
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<tr>
<td>Skier Mishap</td>
<td>292</td>
<td>8</td>
<td>305</td>
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US Coast Guard Recreational Boating Statistics, 2014, Executive Summary, page 7
Factors Contributing to Accidents*
ENA/US Coast Guard
Recreational Boating Injury Report 2014

<table>
<thead>
<tr>
<th>Contributing Factor</th>
<th># of Accidents</th>
<th># of Deaths</th>
<th># of Injuries</th>
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</thead>
<tbody>
<tr>
<td>Operator Inattention</td>
<td>563</td>
<td>38</td>
<td>370</td>
</tr>
<tr>
<td>Improper Lookout</td>
<td>431</td>
<td>26</td>
<td>321</td>
</tr>
<tr>
<td>Operator Inexperience</td>
<td>391</td>
<td>44</td>
<td>256</td>
</tr>
<tr>
<td>Excessive Speed</td>
<td>292</td>
<td>23</td>
<td>267</td>
</tr>
<tr>
<td>Alcohol use</td>
<td>277</td>
<td>108</td>
<td>248</td>
</tr>
</tbody>
</table>
Boating accident claims life
By Kerri Rempp
Record Editor
Aug 18, 2015

Pennington County Sheriff’s Office water rescue team searches Pactola Lake for woman thrown overboard when her PWC collided with a boat
Boating Rescue

- Wear your Life Jackets
- Use Buoyancy to help get into the boat
- Self, Reach, Throw, Row, Go
- Consider having a protocol on when to stop looking for a victim of a potential drowning
Sample Cases of Drowning 
HCMC Trauma Registry

- Swimming Laps in Apartment Pool, found at bottom
- Found at bottom of swimming pool
- Swept into Mississippi storm sewer tunnels
- Found unresponsive in bathtub x3,
  - one held under by father
- Swimming in hotel pool and found unresponsive
- Jumped into 8 foot of water, came to surface and sank- non-swimmer
- In car that rolled and was submerged in water
Drowning

Process resulting in primary respiratory impairment from submersion in a liquid medium

Liquid-air interface at the opening to a patient’s airway

- Time in Water
- Quantity of water aspirated
- Quality of water aspirated - fresh, salt, mud
- Co-morbidities
- Water Temperature
  - Cold drowning <20°C
  - Warm drowning >20°C
Interventions After Drowning

- Airway with C-spine immobilization
- CPR – start chest compressions
- Airway
  - Insertion of oral or nasal airway
- Breathing – augment with Bag Valve mask
  - CPAP
  - BiPap
  - Consider Intubation
  - Peep
  - Consider ECMO
Secondary Drowning
Indications for Intubation

- Altered LOC
- Can’t protect airway or handle secretions
- High alveolar needs
- O$_2$ sats of < 80%
- PaCO$_2$ > 45
- ABG’s are getting worse
Radiculopathy shoulder with brachial plexus injury
AC separation
Lumbar spine fracture x3
Foot, knee, and elbow abrasions
Grade IV liver laceration, pulmonary contusion, pulmonary effusion
L meniscal tear and knee strain
Arm & nose contusions
Degloved posterior gastrocnemius
Personal Water Craft (PWC) Case

- Patient on Personal Water Craft talking with friend. Another friend on another PWC tries to join in on the conversation. When loses steering when gliding in without power, patient guns it and goes over top of friend’s PWC, striking friend in head.
Hennepin County Medical Center

PWC Injuries

- Right rib fractures
- L1-5 transverse process fractures
- Splenic laceration
- Hematuria
- Subarachnoid hemorrhage
- Chest wall contusion
- Fractured facial bones, right tripod fractures of zygoma, facial lacerations
- Groin hematoma
- Rectal perforation
Authorities: CO poisoning that killed 7-year-old girl caused by hole in boat's exhaust pipe

- Animals probably chewed the hole, investigators say.
- Investigators said Friday that the 7-year-old girl who died from carbon monoxide poisoning on a Lake Minnetonka boat earlier this week had been resting in the boat’s cabin where there was a hole in the exhaust pipe.
- The Hennepin County Sheriff’s Office said Friday that the hole was underneath the mattress area in the lower cabin area and was likely caused by animals chewing through the pipe. Sophia Baechler, 7, of Edina had gone below deck to rest because she wasn’t feeling well, the Sheriff’s Office said, and was found “in distress” about 10 minutes later.
- Wayzata police responded to the family’s boat as it docked into Wayzata Bay on Sunday and found the boat occupants giving the girl CPR.
Unresponsive Boating Victims

- 5 year old on the back of the boat hanging onto the platform while “Teak Surfing”.

- 16 year old at the back of a boat lying on cushion near motor, listening to the radio and taking a nap before the fireworks.

- 18 year old at the back of the boat lying on cushion partying friends unable to wake her
CO Boating Victims

- Houseboat
- Personal Water Craft
- Cabin Cruiser
- Open Motor Boat – Teak Surfing
- Small Fishing Boat
- Boat Shower
- Walking in Channel
- Swimming in back of boat
Impaired Oxygen Delivery

- Hemoglobin likes CO 220 times better than O2 and binds to it readily.
- CO prevents hemoglobin from taking up oxygen and removing CO2, leading to tissue hypoxia.
- Organs with high blood flow and oxygen needs are most effected.
<table>
<thead>
<tr>
<th>CO in parts per million</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>Mild headache, fatigue, nausea, dizziness and confusion</td>
</tr>
<tr>
<td>800</td>
<td>Dizziness, nausea, convulsions - 45 min; Death - 2 hours</td>
</tr>
<tr>
<td>1,200</td>
<td>Immediately dangerous to life and health</td>
</tr>
<tr>
<td>6,400</td>
<td>Death in 10 to 15 minutes</td>
</tr>
<tr>
<td>12,000</td>
<td>Immediate death</td>
</tr>
</tbody>
</table>
In the “Death Zone”

**Fatality Examples**

50% to 70% COHb in 3 to 10 minutes of exposure

Generator only
30,000 ppm CO in the airspace

Propulsion engines only
60,000 to 88,000 ppm CO in the airspace

Oxygen Deficient – as low as 10%
Treatment for CO Poisoning

100% Oxygen

Via non-rebreather mask or other means as appropriate.
Monitoring and Labs

- COHb on arrival
- ABG’s
- Labs: glucose, CPK with isoenzymes, SCr, BUN, Etoh, U/A, Urine Tox Screen
- CXR
- CT or MRI if neurologic symptoms develop or persist
- EKG
- Consider HBO
Carbon Monoxide Kinetics

- On room air, the T½ is 5-6 hours

- With 100% O₂ by tight-fitting mask: T½ is 1-2 hours

- HBO at 2.5 atm – the T½ is ~20 minutes
HBO – Hyperbaric Oxygen Chamber
CO from Weed eaters and trimmers
Small powered engines
In honor of
Mother & Father’s DAY

Grilling
- Check hoses for cracking
- Brittleness
- Holes & Leaks
- Don’t let grease drip on them
- If smell gas – check for leaks – Open gas supply valve fully – Apply One part water & one part detergent with a brush at connections. If see bubbles, there is a leak.
Fish hook Removal

- Rip and Pull method
- String Pull method
- Pinch the Barb method
- Cut off the Barb method
Summer Safety Tips

Summary

- Put sunscreen on
- Wear repellent with DEET
- Check for Ticks
- Go inside strong structure if storming
- Wear your helmet while biking or on a motorcycle or ATV
- Protect your eyes while golfing or playing sports
- Don’t use accelerants on fires
- Don’t wear flip flops while mowing
- Watch for children running into the street when driving
- Don’t swim too close behind your boat
- Wear your life jacket
Karie Pearce
Trauma & Critical Care Services
Level I Adult & Pediatric Trauma Center
ACS & ABA Verified Burn Center
Hennepin County Medical Center
Minneapolis, MN

Contact:  karie.pearce@hcmed.org
612-873-3449
Hope you have a great summer! Have FUN!!!!
REFERENCES:

http://www.cdc.gov/westnile/index.html - Last Accessed 5/12/16 Last updated 1/7/14
http://www.cdc.gov/niosh/topics/coboating/default.html Last accessed 5/12/16 Last updated 8/16/13
References


www.doubleangel.org

www.boatsafe.com

www.dnr.state.mn.us/boating

www.ena.org