Educational Session: Farm-Related Injuries

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Introduction

Farm-related injuries are common.

Farmers:
- 2% of the US workforce
- 13% of occupational deaths

Farm Related injuries are different.
- Trauma + infections + chemicals
- Blunt: crush and asphyxiation
- Mangled extremities and amputations

Mangled Extremities/Amputations

Common causes
- Power Take Off (PTO) shafts
- Augers
- Hay balers
- Harvesting equipment

Types of injury
- Partial vs. Complete Amputation
- Guillotine
- Blunt/crushing
- Avulsion

Success Rates
- 70-90%
- Success = tissue survival
- Improved with good pre-op (i.e. Emergency Department) management
Candidates for replantation

Favorable:
- Young patient
- Otherwise stable
- Sharp Guillotine injury
- Upper extremity

Unfavorable:
- Associated severe injury
- Severe crush injury
- Avulsion
- Underlying medical conditions
- Prolonged warm ischemia
- Gross contamination
- Multi-level amputation
- Lower extremity

Initial assessment
- ABCs first
- Control bleeding with direct pressure
- Never clamp or suture
- Photograph
- Irrigate with saline
- Saline moistened dressings
- Splint and elevate
- Td
- Antimicrobials

Antimicrobials for agricultural wounds

Farm injuries are different.
- High-energy
- Contamination

Compared to factory wounds:
- 89% vs. 63% positive initial wound cx
- 3.8 vs. 0.9 bacterial species
- 81% vs. 7% wounds with GNRs
Antibiotics are reasonable for severe wounds.
- Staphylococci
- Anaerobes
- Gram-negative rods
  - A 1st generation cephalosporin alone is probably inadequate.

Consider fungal causes of infected wounds.

**Management of the amputated part**
- Moist saline dressing (DO NOT IMMERSE)
- Waterproof bag
- Place on ice (DO NOT ALLOW TISSUE TO FREEZE)

**Traumatic Asphyxia**

**Clinical Triad**
- Facial cyanosis and edema
- Subconjunctival hemorrhage
- Petechiae – face and upper chest

Mortality related to weight and duration of compression.

*Most who survive to hospital will do well despite dramatic appearance.*
  - Generally good neurologic outcomes

**Associated injuries**
- Pulmonary most common
- Vision loss
**Crush Syndrome**

**Systemic consequences of crushed muscle tissue**
- Hypovolemia
- Rhabdomyolysis
- Acidosis
- Hyperkalemia
- Dysrhythmias/rescue death

**Management**
- Aggressive hydration
- Bicarb
- Cardiac monitoring
- Careful attention to electrolytes

**Anhydrous Ammonia**

**Background**
- Nitrogen fertilizer
- Industrial uses also
- Stored as liquid, released as a gas
- *Meth labs*

**Common cause of SEVERE burns**
- Thermal burn
- Alkali chemical burn

**Respiratory tract**
- Rapidly dissolves into upper airway tissues
- **Marked laryngeal edema**
  - *Airway management is critical*
- Massive exposures may result in acute lung injury
Skin
- Less severe: soft and gray-yellow
- More severe: black and leathery
- Copious irrigation

Eye
- Mild: conjunctivitis
- Severe: corneal ulceration and destruction
- Copious irrigation

Manure Pits

Toxic Gases
- CO₂
- Methane
- Ammonia
- Hydrogen sulfide (H₂S)

Hydrogen Sulfide
- A “knock-down” agent
- Inhibits cytochrome oxidase,
  - Oxidative phosphorylation
  - Similar to cyanide
  - Lactic acidosis
- Direct neurotoxicity
  - Olfactory nerve paralysis
  - Loss of respiratory drive

Hydrogen Sulfide – Diagnosis
- Suggestive history
  - Sudden collapse
  - Manure pit
  - Rotten-egg odor
- Lactic acidosis

Hydrogen Sulfide – Treatment
- Oxygen
- Supportive care
- HBO?
- Sodium and/or amyl nitrite?
Selected References

The amputated or mangled extremity


Crush injuries and traumatic asphyxia


### Anhydrous Ammonia


Animal Confinement Gases – Manure Pits


