Farm, Ranch, & Rodeo Roundup

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Farm Injuries
Old McDonald’s Farm???

- Farming: one of the most dangerous occupations in the United States
- Risk of injury and death extends to children
- Over 100 children are killed per year and 27,000 injured on Farms
- Wisconsin: 39 children are killed between 1995 and 1999

The Industry of Agriculture

- Ranks: one of the most deadly and dangerous industries in the U.S
- Accidental farm-related death rate of 24/100,000 (compared to 4/100,000 for all other industry combined)
- Tractors: most commonly implicated and the most deadly
- Drowning, injury by cows and horses, other farm implements and machinery

Pursch, m Wisconsin State Medical Journal 1997
Risk of Injury

- Poor supervision
- Unreasonable expectations
- Financial difficulties
- Lack of Safety devices
- No separate day care settings
- Operator fatigue
- Dependence on children to help on farm
- Regulations on farms are impossible
Review of Literature

- Primarily descriptive studies
- Small samples
- Larger data bases still lack denominators
- Incidence rates cannot be calculated
- 80,000 to 170,000 disabled by injury
- Cost of $2.5 billion per year
- 1 out of 4 farm families have injury
- Permanent disabilities range from 2% to 4%
Other Factors

- Symbiotic relationship between workplace and home Not present elsewhere
- 1990 Congressional mandate to NIOSH turned attention to farms
- Economic depression

“It is not enough for a man to know how to ride; he must know how to fall”

Mexican Proverb
Farmyard Lacerations

- Highly bacterial contaminated environment
- Old dirty machinery
- Bacteria are present in soil
- Actinomycetes form the largest fraction of soil microbial population
- However millions of aerobic/anaerobic bacteria are present
- Get a good history focused on mechanism and timing
- Sterile saline w/ 5-8 lbs of pressure
- Debridement of wound
- Delayed primary closure
- Impaired wound healing due to pesticides

Farmyard animal bites

- Variety of pathogenic microorganisms have been isolated
- Horse bites: s.aureus, neisseria, pasteurella caballii
- Sheep bites: Actinobacillus
- Pig bites: Staphylococcus, strept., and pasteurella
- Explore all wounds, irrigate, debride
- Every bite should be allowed to close by secondary intention
- Antibiotics should be given unless bite is greater than 72 hours old and uninfected.
Primary care of amputations

- Immediate care of both the patient
- And the amputated part.
- Wash the wound with warm saline or clean water…
- Keep the tissue in plastic bag with ice and slush
- Moist dressings
- Compression or tourniquet

Despite Hazards on family farms

- Operations with ten or fewer employees (95% of farms) are exempt from OSHA regulations
- Child safety is largely up to parents
- Fair labor standards of 1938 there are no hazard restrictions for children working on parents farm
- Children age 12 and older may work on other farms!

DeRoo, L et.al Am J Prev med 2000:18 (4S)
Trauma Activation

- Air Flight from Northern Colorado Medical Center
- 37 y/o female was leaning over farming auger at approximately 12:15 p.m.
- Caught her hair in auger and was flown to Swedish Medical Center at 2:20 p.m.
- Initial blood pressure was 151/88 Hg. Initial pulse: 116 beats/min
- Two trauma surgeons meet in trauma room
Emergency Room Evaluation

- Blood pressure stable
- Dressings removed and evaluated
- Irrigated skull and replaced dressings
- Insertion of Central Line with fluid resuscitation
- Left Hand films were done and splint placed
- To OR at 1600
Completely Scalped

- The scalp was brought in large plastic bag with ice and normal saline
- Normal saline dressing over the skull
- All bleeding controlled
- Splinted left hand (4th metacarpal fx)
The Operating Room

Thirteen hours and 30 minutes (total)
5 Liters Crystalloids
6 Units Packed Red Cells
900 cc. Blood loss
Reimplantation of salvaged scalp
Patched with Alloderm
Reanastamosis of a single artery and vein
Post Operative Orders

- Nothing around neck
- Elevate Head of Bed
- Temperature in Room 99-100 degrees (F)
- Lovenox due to immobility
- Nutrition
- Electrolyte replacement
- Empiric Antibiotics
- Soak Alloderm with normal saline
Critical Care Management

- Monitor doppler pulses
- Monitor color
- Posterior scalp severely contused
- Keep hematocrit greater than 25gm/dl
- Plan for debridement and skin grafts
- Back to OR for debridement 5/11
- Wound vac / decreased fluid accumulation
Scalp Swelling

- Venous engorgement
- ? Thombosed venous flow
- Patient extubated
- Culture Allo Derm: Klebsiella
  Enterococcus
  Staph Aureus
  Candida
  Bacillus

Infectious Disease Consult for appropriate coverage
Leeches Arrive by Federal Express

Unasyn/Flagyl are discontinued
- Zyvox and Levaquin with Diflucan are given
- Patient was turned to left for 20 minutes due to nausea
- Scalp turns blue 10 p.m.
- Thrombectomy of vein and artery at 0400
- Unable to reestablish venous flow
Leeches

- Hematocrit and Hemoglobin every 6 hours
- Transfuse packed cells to keep Hct at 30
- Increase from 2 leeches to 4 leeches every 3 hours!
- Stool positive for C. Difficile
- Now transfusing to keep HCT within acceptable range
- Total 37 units of blood in 3 weeks
- Procrit/Iron given since admission
Temperature

- Now reduced to 93 degrees
- Target Hematocrit is greater than 25 gm/dl
Scalp Improving

- Moderate edema and venous congestion
- 5/18 ORDERS are:
- Continue leeches, RBC’s, and H & H
- Eventually transferred to another regional Center because of their ability to provide Hyperbaric Oxygen

Completed HBO and discharged home
For every farm and ranch fatality

- There are estimated 100 disabilities
- 1200 serious injuries
- 3600 minor injuries
- 15% of all deaths on ranches in Texas results from firearms
Animal Accidents

- Horses and cattle have been a threat to ranchers
- Riders are bitten and thrown with regularity
- Riders are kicked, crushed against fixed objects, trampled, and dragged
- Elderly ranchers are vulnerable to these injuries
Traumatic Injury due to Horseback Riding

- According to CDC there are ~30 million people who ride horses yearly
- Estimated 23 billion dollars spent
- Provides over 300,000 jobs
- Encompasses over 3 million horses!
- Only sport NOT developing better protective gear!
- Can travel 40 mph, weigh 1500 lbs, and delivers 1000 kg (ton) of force w/ one kick
Tractors

- Early tractors were unstable, three-wheeled that were dangerous and overturned on low-grade slopes.
- Modern tractors are gigantic and have numerous safety features.
- Tractor accidents involve older models.
- Even with new safety features there has been no improvement in tractor deaths.

**Major Causes of Farm Deaths (2000 - 2009)**

- Tractors / Machinery / Vehicles: 49% (80)
- Drowning / Gas: 14% (22)
- Falls: 10% (16)
- Livestock Related: 15% (24)
- Fire: 1% (1)
- Electrocution: 2% (4)
- Wood Related: 4% (6)
- Collapse of Buildings / Falling Objects: 5% (9)
Trauma Activation

- 76 year old rancher who was flown to Swedish Medical Center
- Patient was hit and run over by large cow
- Arrived in ED with hypotension and tachycardia
- ED time 1 hour and 15 minutes
To OR with Ruptured Spleen

- Kidney laceration
- Splenectomy
- To CCU for Resuscitation
- Reexploration for continued bleeding
Taken back for bleeding

- After reexploration demonstrated very little surgical bleed
- To IR for embolization of his left kidney
- DIC/Cold/more non-surgical bleeding
- Acidosis
- Spiral that seems unretrievable

The Rodeo

“the grave yawns for the horseman”
Old arabian proverb
Rodeo

- 715 professional rodeos take place annually in the US and Canada
- Nearly 20 million spectators
- 49% of injuries occur in bull riding
- 23% in bareback riding
- 15% in bronc riding
- 8% in steer wrestling
- 2.7% in calf roping
- Remainder in team roping
With Increased Rodeo Popularity

- Thumb injuries are more common than appreciated
- A quarter of these occur with bull riding
- The remainder of the injuries occurred during team roping with both elements of avulsion and crush
- This affects the prognosis of reimplantation
- Thumbs up better than thumb down!!

Trauma Team Activation

- 17 year old who was in a rodeo clinic when the roping tangled in his hand
- He was riding bareback
- He fell off the horse and was dragged
- The horse then fell on the patient
- Initially lost consciousness, quickly awoke and was rushed to Swedish
Pulseless briefly

- Patient arrived in 3rd degree block
- Initial troponins were 43.5
- Audible systolic murmur
- Left sternal thrill
- Stat echocardiogram showed VSD with dyskinetic septum
- He fluctuates between junctional rhythm and 3rd degree block
Trauma Room

- Blood pressure 91/50
- Pulse 60, Respirations 18, T 96.5
- 100% saturations on non-rebreather
- GCS: 15
- Jaw pain, Left anterior chest asymmetry, Bradycardia, murmur
- Lactate 5.7, troponin 43.5
Injuries

- Right mandibular fracture
- Traumatic VSD
- Echocardiogram
- To CCU with normal blood pressure
- Bradycardia
- At midnight patient became tachycardic
- CPR, Pacemaker placed
Cardiothoracic Surgery

- Wait until VSD matures
- Swan placed
- Delay surgery
- Chest Tube inserted after intubation
- Aortic Balloon placed in OR
- Cardiac arrest
- Transfusion of 8 units Pcells, 11 units FFP, Cryo 2 units, platelets 7 units
- Hydrocortisone (low dose)

Shock

- Oliguria
- Creatinine elevates to 5.5 mg/dl
- CRRT
- Levophed, dopamine, vasopressin
- Right to Left Shunt
- Pulmonary Contusions
- ARDS
Ischemic leg

- From Aortic Balloon pump
- Pulmonary Contusions restricted fluids
- 59,650 U/L CPK
- Myoglobin 72,611 ng/ml
- Multiorgan failure: renal\hepatic\pulmonary\mental status
- Expired 4/26 removed life support