HORSE RIDING

WHAT ARE THE ODDS OF INJURY

Tim Baker
How risky is horse riding?

What kind of injuries occur?

Three clinical decisions
DANGER

- 450 - 550 kg horse
- 45 - 55 km per hour
- Head 3 m above ground
- 10 000 N kick

Pride of Westbury, The Age, May 2009
## RISK OF DEATH

<table>
<thead>
<tr>
<th>Activity</th>
<th>Deaths per 100,000,000 occasions (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rodeo</td>
<td>?</td>
</tr>
<tr>
<td>Cross-country equestrian</td>
<td>&gt; 20000*</td>
</tr>
<tr>
<td>Jumps races</td>
<td>1529</td>
</tr>
<tr>
<td>Flats races</td>
<td>1256</td>
</tr>
<tr>
<td>Horse riding</td>
<td>34</td>
</tr>
<tr>
<td>Mountaineering</td>
<td>&gt; 793</td>
</tr>
<tr>
<td>Air sports</td>
<td>&gt; 640</td>
</tr>
<tr>
<td>Motor sports</td>
<td>146</td>
</tr>
<tr>
<td>Fishing</td>
<td>37</td>
</tr>
<tr>
<td>Rugby</td>
<td>15</td>
</tr>
<tr>
<td>Boxing</td>
<td>5</td>
</tr>
<tr>
<td>Cricket</td>
<td>3</td>
</tr>
</tbody>
</table>

Deaths per 100,000,000 occasions (days)
MECHANISM

- Fall/thrown: 55%
- Kicked/struck: 24%
- Crush: 13%
- Other: 8%
INJURIES

Mounted

- Soft tissue: 37%
- Brain: 11%
- LL #: 9%
- UL #: 6%
- Laceration: 4%
- Other: 27%

Not Mounted

- Soft tissue: 45%
- Brain: 6%
- LL #: 7%
- UL #: 3%
- Laceration: 11%
- Other: 28%
In number, type and severity of injuries
CASE

- A 28 year old woman fell from her stationary horse onto a low fence when it was spooked by a camera flash. She was not wearing a helmet, and lost consciousness for a few seconds. Her left chest struck the fence and her ribs were sore.

- She initially went home, but was convinced by a friend to see her doctor because she had developed a mild head ache and a sore neck. Her ribs still hurt on inspiration.

- On examination she was haemodynamically stable. Her ribs were moderately tender and her neck mildly tender.
SPINAL INJURY

Is a c-spine collar needed?
WHY NOT X-RAY EVERYONE?

Hard collars are uncomfortable. Once a collar is applied, the patient must usually wait for an X-ray or CT scan.
no tenderness at the posterior mid-line of the cervical spine
no focal neurologic deficit
a normal level of alertness
no evidence of intoxication
no pain to distract the patient from the pain of a c-spine injury.
THE CANADIAN C-SPINE RULE VERSUS THE NEXUS LOW-RISK CRITERIA IN PATIENTS WITH TRAUMA
STIELL NEJM 2003; 349: 2510-18

- Excluded
  - age < 16 years
  - abnormal vital signs or GCS
- dangerous mechanism
  - fall > 3’ or 5 steps
  - axial load (diving)
  - high speed (> 100km/hr)
  - ejection or roll-over
  - bicycle accident
- simple rear-end collision excludes
  - trucks and buses
  - hit by high speed vehicle
  - roll over
  - pushed into oncoming traffic
HEAD INJURY

Is a CT needed?
### WHY NOT CT EVERYONE?

**Lifetime risk of cancer death**

<table>
<thead>
<tr>
<th>Lifetime</th>
<th>500 in 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brain CT in 1 year old</strong></td>
<td>2 per 2000</td>
</tr>
<tr>
<td><strong>Brain CT in 25 year old</strong></td>
<td>0.2 per 2000</td>
</tr>
<tr>
<td><strong>Brain CT in 40 year old</strong></td>
<td>0.1 per 2000</td>
</tr>
</tbody>
</table>
Patients who are 16 to 65 years old and have no post-concussive symptoms except mild headache, no external signs of injury or basilar skull fracture, and a normal neurologic examination, the frequency of intracranial clots that require neurosurgery is so low (<1%) that it is reasonable to forgo CT scanning.
POST-CONCUSSION SYNDROME

**Table 2. International Classification of Diseases, 10th Revision, Criteria for Postconcussion Syndrome (Code 310-2).**

<table>
<thead>
<tr>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval between head trauma with loss of consciousness and development of symptoms, ≤4 wk</td>
</tr>
<tr>
<td>Symptoms in at least three of the following categories:</td>
</tr>
<tr>
<td>- Headache, dizziness, fatigue, noise intolerance</td>
</tr>
<tr>
<td>- Irritability, depression, anxiety, emotional lability</td>
</tr>
<tr>
<td>- Subjective concentration, memory, or intellectual difficulties without</td>
</tr>
<tr>
<td>- Neuropsychological evidence of marked impairment</td>
</tr>
<tr>
<td>- Insomnia</td>
</tr>
<tr>
<td>- Reduced alcohol tolerance</td>
</tr>
<tr>
<td>- Preoccupation with above symptoms and fear of brain damage, with</td>
</tr>
<tr>
<td>- Hypochondriacal concern and adoption of sick role</td>
</tr>
</tbody>
</table>
## Table 3. Guidelines for the Management of Sport-Related Concussion.

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>First Concussion</th>
<th>Second Concussion</th>
</tr>
</thead>
</table>
| Grade 1: no loss of consciousness, transient confusion, resolution of symptoms and mental abnormalities in <15 min† | Remove from play  
Examine at 5-min intervals  
May return to play if symptoms disappear and results of mental-function examination return to normal within 15 min | Allow return to play after 1 wk if there are no symptoms at rest or with exertion |
| Grade 2: as above, but with mental symptoms for >15 min | Remove from play and disallow play for rest of day  
Examine for signs of intracranial lesion at sidelines and obtain further examination by a trained person on same day  
Allow return to play after 1 wk if neurologic examination is normal | Allow return to play after 2-wk period of no symptoms at rest or with exertion  
Remove from play for season if imaging shows abnormality |
| Grade 3: any loss of consciousness | Perform thorough neurologic examination in hospital and obtain imaging studies when indicated  
Assess neurologic status daily until postconcussive symptoms resolve or stabilize  
Remove from play for 1 wk if loss of consciousness lasts seconds; for 2 wk if it lasts minutes; must be asymptomatic at rest and with exertion to return to play | Withhold from play until symptoms have been absent for at least 1 mo |

* These guidelines reflect consensus opinion, are not evidence-based, and are under revision. Adapted from the American Academy of Neurology guidelines.†

† Testing includes orientation, repetition of digit strings, recall of word list at 0 and 5 minutes, recall of recent game events, recall of current events, pupillary symmetry, finger-to-nose and tandem-gait tests, Romberg’s test, and provocative testing for symptoms with a 4-‐yd (3.5-‐m) sprint, five push-‐ups, five sit-‐ups, and five knee bends.
SPLENIC INJURY

Is abdominal imaging required?

Australian Jockeys’ Memorial
## WHY NOT CT EVERYONE?

### Lifetime risk of cancer death

<table>
<thead>
<tr>
<th>Lifetime</th>
<th>500 in 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal CT in 1 year old</td>
<td>4 per 2000</td>
</tr>
<tr>
<td>Abdominal CT in 25 year old</td>
<td>1 per 2000</td>
</tr>
<tr>
<td>Abdominal CT in 40 year old</td>
<td>0.2 per 2000</td>
</tr>
</tbody>
</table>
WHY NOT ULTRASOUND EVERYONE?

- Excellent specificity (99 - 100 %)

  BUT

- Poor sensitivity (40 - 90 %)

- Operator and patient dependent

- SPPIN not a SNOUT
  - so SSpecific that a Positive result rules an injury IN,
    but not so SeNsitive that a Negative result rules an injury OUT
IF THE ABDOMINAL EXAM IS NORMAL.....

What is the risk of splenic injury?

<table>
<thead>
<tr>
<th>Condition</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unstable</td>
<td>unacceptable</td>
</tr>
<tr>
<td>Unconscious</td>
<td>unacceptable</td>
</tr>
<tr>
<td>Long bone fracture</td>
<td>unacceptable</td>
</tr>
<tr>
<td>Intoxicated</td>
<td>2%</td>
</tr>
<tr>
<td>Rib 7 - 12 pain or tenderness</td>
<td>7%</td>
</tr>
<tr>
<td>Rib 7 - 12 pain or tenderness only</td>
<td>3% (all pleuritic)</td>
</tr>
</tbody>
</table>
CASE

✧ Head CT
  ❖ LOC + mild headache

✧ C-spine x-ray
  ❖ How tender? How distracting? How dangerous?

✧ Abdominal CT
  ❖ Are the ribs fractured? Is the pain pleuritic?
REFERENCES


- Hoffman J. Validity of a Set of Clinical Criteria to Rule Out Injury to the Cervical Spine in Patients with Blunt Trauma. NEJM 2000;343:94-9

- Steill I. The Canadian c-spine rule versus the NEXUS low risk criteria in patients with trauma. NEJM 2003; 349: 2510-18


