NON-ACCIDENTAL TRAUMA IN CHILDREN

RESULTS OF A SCREENING POLICY

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BACKGROUND

- TBI leading cause of disability and death in children and adolescents
  - Significant percentage from non-accidental trauma (NAT)
  - Can go unrecognized

- Mortality rates are high following NAT

- Survivors left with severe neurologic morbidity
BACKGROUND

• When to screen?
  • Symptoms are non-specific, hard to interpret
  • Findings on imaging can be mistaken for accidental trauma
  • Decision to forego can have serious consequences

• How to screen?
  • Skeletal Survey
  • Retinal Exam
  • Social Services Consult
STUDY PURPOSE

• Evaluate the implementation of a NAT screening policy for its impact on test utilization and the identification of victims of abuse
METHODS

- Santa Barbara Cottage Hospital
  - Level II Pediatric Trauma Center
- April 2010 to April 2014
- 2 years pre-policy (PR) and 2 years post-policy (PP)
- Patient selection
  - Inclusion criteria
    - Age 0-2
    - Admitted with skull fracture or ICH
- Data
  - Trauma Registry
  - Santa Barbara County Child Welfare Services (CWS) records
NAT SCREENING POLICY

1. Trauma team activation or consult
2. Complete primary and secondary survey
3. Obtain head CT if indicated

Abnormal head CT
1. Skull Fracture
2. Intracranial hemorrhage

Was the injury witnessed?

NO
- Obtain:
  1. Skeletal Survey
  2. Social Service Consult
  3. Ophthalmology Exam

YES
- Consider further evaluations as clinically indicated
ANALYSIS

- Patients compared pre (PR) and post (PP) implementation of the screening policy.

- Data on age, ethnicity, gender, insurance status, hospital LOS and exams performed

- Any positive assessment finding = Hospital suspected NAT

- Cross-referenced with CWS data on CWS referral and substantiated NAT
RESULTS

All Children 0-2 yrs old and admitted with skull fracture or intracranial haemorrhage
\( n = 84 \)

Admitted before policy change
(April 2010 – March 2012)
\( n = 48 \)

Admitted after policy change
(April 2012 – March 2014)
\( n = 36 \)

Witnessed
\( n = 3 \)

Unwitnessed
\( n = 33 \)
#### Table 2: Hospital and Protocol Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Before Policy (n = 46)</th>
<th>After Policy (n = 38)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital LOS (days)</td>
<td>2.7 (2.6)</td>
<td>3.9 (4.4)</td>
<td>0.126</td>
</tr>
<tr>
<td>Social Work Consult</td>
<td>36 (78.3%)</td>
<td>32 (84.2%)</td>
<td>0.487</td>
</tr>
<tr>
<td>Skeletal Survey</td>
<td>13 (28.3%)</td>
<td>26 (68.4%)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Ophthalmology Exam</td>
<td>7 (15.2%)</td>
<td>25 (65.8%)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Received All Policy Exams</td>
<td>7 (15.2%)</td>
<td>22 (57.9%)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>CWS Referral</td>
<td>12 (26.1%)</td>
<td>17 (44.7%)</td>
<td>0.106</td>
</tr>
<tr>
<td>Hospital Suspected NAT</td>
<td>8 (17.4%)</td>
<td>13 (34.2%)</td>
<td>0.128</td>
</tr>
<tr>
<td>CWS Substantiated NAT†</td>
<td>5 (10.9%)</td>
<td>6 (15.8%)</td>
<td>0.365</td>
</tr>
</tbody>
</table>

†Percentage out of hosp suspected NAT
NAT: Non-accidental Trauma
CWS: Child Welfare Services
RESULTS

Comparison of all patients pre-policy and unwitnessed post-policy

<table>
<thead>
<tr>
<th>Comparison of All Pre-Policy (PR) and Unwitnessed Events Post-Policy (PP)</th>
<th>Before Policy (n=46)</th>
<th>After Policy (n=35)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Received All Policy Exams</td>
<td>7 (15.2)</td>
<td>22 (62.9)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CWS Notified</td>
<td>9 (19.6)</td>
<td>13 (43.3)</td>
<td>0.026</td>
</tr>
<tr>
<td>Hospital Suspected NAT</td>
<td>8 (17.4)</td>
<td>13 (37.1)</td>
<td>0.045</td>
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</tbody>
</table>
## RESULTS

### Comparison by Insurance Status

<table>
<thead>
<tr>
<th></th>
<th>Private Insurance (n = 33)</th>
<th>Self-Pay/Medical (n = 51)</th>
<th>p-value</th>
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</thead>
<tbody>
<tr>
<td>Received All Policy Exams</td>
<td>8 (24.2)</td>
<td>21 (41.2)</td>
<td>0.106</td>
</tr>
<tr>
<td>Hospital LOS (days)</td>
<td>3.2 (3.1)</td>
<td>3.3 (3.9)</td>
<td>0.874</td>
</tr>
<tr>
<td>Hospital Suspected NAT</td>
<td><strong>4 (12.1)</strong></td>
<td><strong>17 (33.0)</strong></td>
<td>0.023</td>
</tr>
</tbody>
</table>
RESULTS

Comparison by Race

<table>
<thead>
<tr>
<th></th>
<th>Non-Hispanic (n = 63)</th>
<th>Hispanic (n = 21)</th>
<th>p-value</th>
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</thead>
<tbody>
<tr>
<td>Received All Policy Exams</td>
<td>22 (34.9)</td>
<td>7 (33.3)</td>
<td>0.894</td>
</tr>
<tr>
<td>Hospital LOS (days)</td>
<td>3.5 (4.1)</td>
<td>2.4 (0.9)</td>
<td>0.045</td>
</tr>
<tr>
<td>Hospital Suspected NAT</td>
<td>12 (19.0)</td>
<td>9 (42.9)</td>
<td>0.033</td>
</tr>
</tbody>
</table>
DISCUSSION

- Implementation of a screening policy increased utilization of diagnostic tools in patients aged 0-2.

- Other observations:
  - Rate of hospital suspected NAT doubled
  - CWS substantiated NAT increased
  - Did not reach statistical significance in comparing ALL patients PR and PP, however, did in comparing all PR to unwitnessed PP
CONCLUSION

- We believe a multi-center prospective study would best evaluate this important problem in the future.
THANK YOU

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