CHARACTERISTICS OF PATIENTS TRANSPORTED BY A PARAMEDIC-STAFFED HELICOPTER EMERGENCY MEDICAL SERVICE IN VICTORIA, AUSTRALIA

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### How to make this presentation interesting?

<table>
<thead>
<tr>
<th>Management, no (%)</th>
<th>Overall (n=825)</th>
<th>Adult (n=311)</th>
<th>Pediatric (n=16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic airway management</td>
<td>395 (48.1)</td>
<td>195 (63.1)</td>
<td>12 (66.7)</td>
</tr>
<tr>
<td>Intubation</td>
<td>177 (21.5)</td>
<td>98 (31.5)</td>
<td>9 (47.4)</td>
</tr>
<tr>
<td>Rapid Sequence Intubation</td>
<td>158 (19.2)</td>
<td>93 (29.9)</td>
<td>7 (36.8)</td>
</tr>
<tr>
<td>Intercostal catheter / Thoracostomy / Needle test</td>
<td>61 (7.4)</td>
<td>49 (15.8)</td>
<td>3 (15.8)</td>
</tr>
<tr>
<td>Gastric tube</td>
<td>136 (16.5)</td>
<td>77 (24.9)</td>
<td>7 (38.9)</td>
</tr>
<tr>
<td>Arterial line insertion</td>
<td>34 (4.1)</td>
<td>16 (5.1)</td>
<td>-</td>
</tr>
<tr>
<td>Spinal immobilisation</td>
<td>458 (55.7)</td>
<td>221 (71.5)</td>
<td>41 (48.8)</td>
</tr>
<tr>
<td>Splint</td>
<td>212 (25.8)</td>
<td>116 (37.5)</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medication, no (%)</th>
<th>Adult (n=99)</th>
<th>Pediatric (n=84)</th>
<th>Non-trauma (n=19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analgesic</td>
<td>712 (86.6)</td>
<td>249 (84.1)</td>
<td>68 (81.0)</td>
</tr>
<tr>
<td>Morphine</td>
<td>706 (85.9)</td>
<td>248 (83.8)</td>
<td>67 (79.8)</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>118 (14.3)</td>
<td>29 (9.8)</td>
<td>11 (13.1)</td>
</tr>
<tr>
<td>Ketamine</td>
<td>136 (16.5)</td>
<td>39 (13.2)</td>
<td>2 (2.4)</td>
</tr>
<tr>
<td>Parecoxib Sodium</td>
<td>27 (3.3)</td>
<td>9 (2.9)</td>
<td>-</td>
</tr>
<tr>
<td>Antiemetic</td>
<td>408 (49.6)</td>
<td>172 (58.1)</td>
<td>36 (42.9)</td>
</tr>
<tr>
<td>Ondansteron</td>
<td>142 (17.2)</td>
<td>54 (18.2)</td>
<td>32 (38.1)</td>
</tr>
</tbody>
</table>

‡: p<0.01; †: p<0.05
State Overview

- 4.6 Million People
- 5 Helicopters
- 4 Fixed Wing
- 24 hour Flight Co-ordination
- 70 Operational Air Ambulance Staff

227,416 square kilometres
We sought to explore the characteristics of patients transported by HEMS in Victoria, and describe paramedic utilization of their skill set in the pre-hospital environment.
Method

- Retrospective data review of patients transported between 1 July 2012 and 30 June 2013
- Data was sourced from the Ambulance Victoria data warehouse
- Victorian State Trauma Registry
- Inter-hospital transfers were excluded
Data Sources

• Electronic patient care record.
• All trauma and non-trauma cases
• Major trauma eligibility criteria include:
  - Injury Severity Score (ISS) greater than 12
  - Intensive care unit admission with mechanical ventilation for more than 24 hours
  - Urgent surgery or in-hospital death
Strengths & Limitations

Comprehensive electronic data
Single HEMS system
Consistent education, operational and clinical practice

Retrospective
Low paediatric sample size
Inability to report on Hospital outcomes for non-major trauma or non-trauma patients
Results

HEMS attended 1,519 cases during the study period
Results

A total of 825 primary transport cases were included in analyses
Most patients were male (69.5%) and the majority of cases involved trauma (86.1%)
Results

Ketamine was administered to 18.5% of all trauma patients, Morphine 93.9% for all adult major trauma and Fentanyl 18.3%
Results

The proportion of patients with a severe pain score (≥7) decreased from 33.8% to 3.2% (p<0.001) between initial and final paramedic assessments.
A clinically significant pain reduction of ≥2 points was achieved in 87.0% (95% CI 82.9 – 90.4%) of adult trauma patients who had an initial pain score >2 points and a valid final pain score.
Results

Rapid sequence intubation (RSI) was performed in 29.9% of adult major trauma patients, with a procedural success rate of 80.6% first attempt to 100% upon second attempt.
Results

In-hospital mortality following major-trauma was 7.6% (95% CI 5.0 – 11.0%)
ICFP Requirements:

- At least 2 years as ICP
- Medical assessment
- Physical assessment
- Psychological assessment
- Theoretical assessment
- Clinical assessment
- Post graduate certificate
- 9 months of education
- Winching
- Remote area
- Additional skillset to road
Results

Other major trauma findings:

• 63.9% Weekdays
• 33% Summer
• 22.4% Trapped
• 54 mins Median time on scene
• 99.7% Transported to a metropolitan hospital
Results

Major trauma clinical management:
• 31.5% ETT
• 22.9% RSI
• 15.8% Chest decompression
• 24.9% Gastric tube
• 5.1% Arterial line
Results

The procedural success rate for the first attempt of pediatric RSI was 76.9% (95% CI 46.2-95.0%), and this increased to 100% by the second attempt.
Paediatric procedural success rate data is limited by small sample size, 19 major trauma, 84 non-major trauma & 16 non-trauma
Mechanism of traumatic injury

- Road traffic accident
- Other vehicle/machinery
- Fall
- Assault
- Thermal/environmental
- Sporting injury
- Struck by object
- Animal related injury

Legend:
- Adult Major trauma
- Adult Non-major trauma
- Pediatric Major trauma
- Pediatric Non-major trauma

Ambulance Victoria
Discussion Points

- This study highlights the ability of ICFPs to successfully perform intubation in the field as well as provide effective pain relief for conscious patients following significant trauma.

- Thoracic decompression and provision of adequate pain relief are also important components of pre-hospital care.

- Prolonged on-scene durations were observed, though this did not appear to influence mortality following major trauma.

- Our results suggest that with extensive work experience, regular exposure to high acuity patients, and appropriate training, complex management can be performed with confidence and a high degree of precision.
Conclusion

- Our results demonstrate that extensive training, education and exposure to high acuity patients allows ICFPs to successfully perform complex procedures in the pre-hospital setting, as well as improve patient vital signs and pain scores.

- Further studies should examine larger populations of patients attended by HEMS, particularly pediatric patients.

- Patient outcomes should be compared to physician-staffed HEMS to confirm that this staffing level is appropriate.
Thankyou

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