Successes and Failures in Telehealth 2014

Telemedicine in Paediatric Critical Care Patient Transports – A Hypothesis Generation Study
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Aim
• Little formal evidence to support the use of telemedicine in paediatric acute care
• Need more research to determine clinical effectiveness and economics of using telemedicine in this subset of patients
• This study aimed to generate testable hypotheses which could later be used in the design of formal studies in paediatric acute care telemedicine

Methods
• Literature review
• Questionnaire
  - Standard pre-prepared questionnaires
  - 1st June 2013 – 31st August 2013
  - Members of retrieval team from Royal Children’s Hospital Brisbane
• Hypothesis generation
Results – Literature review

- What is known on use of telemedicine in paediatric acute care:
  - Physician and parents satisfaction is high\(^5\) - \(^8\)
  - Physician perceived quality of care improved\(^5\) - \(^8\)
  - Can be used to accurately assess and diagnose paediatric patients\(^9\) - \(^10\)

- Potential benefits described in literature:
  - Cost savings\(^11\)
  - Decreased need for transfer to tertiary hospital\(^11\)
  - Improved triage of patients\(^11\)
  - Changes in interventions provided at the peripheral site\(^12\)
  - Decreased medication errors\(^12\)

Results – Questionnaire

- 164 questionnaires completed from 65 retrievals
- Telemedicine was used in only 3 retrievals

### Interviewee

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultant</td>
<td>42</td>
<td>25</td>
</tr>
<tr>
<td>Fellow</td>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td>Registrar</td>
<td>37</td>
<td>23</td>
</tr>
<tr>
<td>Nursing staff</td>
<td>64</td>
<td>41</td>
</tr>
</tbody>
</table>

### Time from retrieval to completion of interview

<table>
<thead>
<tr>
<th>Time from retrieval to completion of interview</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;24 hours</td>
<td>19</td>
<td>25</td>
</tr>
<tr>
<td>24-28hrs</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>48-72hrs</td>
<td>22</td>
<td>31</td>
</tr>
<tr>
<td>1-2 weeks</td>
<td>26</td>
<td>35</td>
</tr>
<tr>
<td>&gt;2 weeks</td>
<td>7</td>
<td>9</td>
</tr>
</tbody>
</table>

54% of interviews completed in first 72hrs

### Distance of originating hospital from tertiary centre

<table>
<thead>
<tr>
<th>Distance of originating hospital from tertiary centre</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10km</td>
<td>13</td>
<td>20</td>
</tr>
<tr>
<td>10-50km</td>
<td>19</td>
<td>29</td>
</tr>
<tr>
<td>50-100km</td>
<td>14</td>
<td>22</td>
</tr>
<tr>
<td>100-200km</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>200-500km</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>&gt;500km</td>
<td>14</td>
<td>22</td>
</tr>
</tbody>
</table>

### Destination ward

<table>
<thead>
<tr>
<th>Destination ward</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCH acute care</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>RCH DEM</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>MCH DEM</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Results – Questionnaire

- Telemedicine used
  - Top four
    - neurological assessment of patient
    - preparation for transfer
    - advice on resuscitation
    - advice in regards to airway management
  - 14% felt the patients condition was as expected on arrival to transferring hospital
  - The destination ward did not change for any of the patients in this group

- Telemedicine not used
  - Top four
    - assessing neurological status
    - preparation for transfer
    - decision on whether the patient actually needed retrieval to a tertiary centre
  - 57% felt patient condition as expected
  - Destination ward changed in 8% of the patients

Hypothesis Generation

1. Using telemedicine will reduce the number of transports needed to be performed between peripheral hospitals and the tertiary centre, by allowing the transport team to visually assess the patient, and to provide reassurance and advice to the referring site based on that assessment.

2. Telemedicine allows the transport team to more accurately assess the patient’s neurological status, by providing visual cues for assessment.
Hypothesis Generation

1. Telemedicine allows the transport team to more accurately assess the patient’s respiratory status, by providing visual cues for assessment.
2. Telemedicine will ensure appropriate interventions are conducted at the peripheral site, and inappropriate interventions avoided, by providing real-time visual and audio feedback loop between the peripheral and tertiary sites.
3. Using telemedicine will assist in ensuring appropriate level of staff are sent on a retrieval for the patient’s individual needs, based on a more thorough assessment.

Discussion

- Limitations to our questionnaire study
  - Only completed retrievals included
  - Study completed over winter
  - Very small proportion used telemedicine
- Also interesting to note despite the use of telemedicine only 14% felt patient’s condition was as expected on arrival

Summary

- Hypothesis generation studies are very important to guide future research
- We used results from both a literature search and a questionnaire study to formulate 5 hypotheses that can be used in future research in this area

Acknowledgements

- Thank you to my co-authors for their assistance in preparation of both the paper and this talk

References