Tracheostomy Management in the Antipodes

Tanis Cameron, Director of TRAMS
Stephen Warrillow, Deputy Director of Intensive Care
How Many Australians Are There?

- Australian population
  23.5 million

- Highly urbanised to capital cities of six states and two territories
The Australian Landscape

- Universal Public Healthcare System and busy Private Healthcare Systems working in parallel
  - Many patients and most doctors engaged in both
  - Health insurance purchased by individuals with strong incentives provided by government ‘sticks and carrots’ through taxation system

- All intensive care units operate on a ‘closed’ model
  - Staffed by ‘board certified’ intensivists, advanced trainees and specialist nursing & allied health staff with extensive specialist post-graduate qualifications
Why Does Australia Need the GTC?

ICU Perspective – Steven Warrillow
  - Review of recent ICU literature on tracheostomy

Wards and Community Perspective – Tanis Cameron
  - Review of literature
  - TRAMS
Australian Acute Care

- Embedded culture of research and quality improvement
  - The ANZICS Adult Patient Database (APD) includes 1.3 million separations from all major ICUs (140 in total) collected every quarter for over 16 years
  - The ANZICS CTG has enrolled more patients for investigator initiated prospective critical care research than any other group in the world
    - (NICE, RENAL, SAFE, DECRA, ARISE, CHEST, ENTERIC, etc)
    - 26 prospective ICU studies currently underway
- Collaborative (and relatively non-hierarchical) engagement with colleagues across departments, clinical craft groups and disciplines
Tracheostomy Innovation Downunder!

PATIENT OF THE WEEK
THE STORIES BEHIND THE PATIENTS AT THE AUSTRALIA ZOO WILDLIFE HOSPITAL

Callista the Koala - 1st July 2013

Age: 6 years  Sex: Male  Weight: 7.85 kg

Found: A member of the public made the emergency call for assistance when Callista was attacked by a pet dog at Amity Point.

Transported to: The Australia Zoo Wildlife Hospital in Sunshine Coast Koala & Wildlife Rescue.

Veterinary Assessment: Dr Claude was on duty when Callista was admitted. His injuries were assessed. Physical examination revealed bruising to his limbs and mouth along with multiple puncture wounds. His nose was severely fractured and included skin loss to the eye and socket.

Treatments: He flushed Callista's facial wounds with an antibacterial solution to remove any debris and prevent infection. She then cauterized the left side of his nose and bottom eyelid. Callista also received a course of injections of anti-inflammatory and antibiotics. The inflammation to his nose and mouth became so severe overnight that his breathing was restricted. Dr Claude decided to perform a life-saving tracheostomy, which has never been attempted on a koala before.

Outcome: Callista has many weeks of rehabilitation ahead and like all mammals, his bones will take approximately 6 weeks to heal. He will need constant care from our staff to assist his recovery.

AZWH Fact: We can help prevent attacks like these by keeping our pets indoors or secured at night.

Patient of the Week Archive
Tracheostomy in Acute Care

- Common
- Inserted into a broad case-mix of patients
  - Medical/Surgical
  - Elective/Emergency
  - Adult/Paediatric
  - Permanent/Temporary
- Many disciplines involved
  - ENT, Thoracics, Respiratory Med, ICU, MaxFacs, Oncology etc
- Mixed models of care and clinical responsibility across centres
Tracheostomy At Austin Health

- Approx. 120 performed/year
- Another 80-100 admissions with a trach/year
- Approx. total of 200/year
Data from Victorian Adult ICU 1999-2012

- Victorian population 5.64 million (approx)
- 10,640 adult ICU patients received a tracheostomy
  - 9.4% of all MV ICU patients excluding cardiac surgical case mix
- Four fold variation between institutions
- Technique: Open 50.7% vs. Percutaneous 49.3%
- 140 patients (1.3%) transferred to sole weaning service for the state (VRSS)

A. Casamento and G. Duke 2013
<table>
<thead>
<tr>
<th></th>
<th>Tracheotomy</th>
<th>ETT</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number*</td>
<td>9,969</td>
<td>70,748</td>
<td></td>
</tr>
<tr>
<td>Age, years</td>
<td>63 (48-73)</td>
<td>63 (43-73)</td>
<td>0.22</td>
</tr>
<tr>
<td>MV days</td>
<td>13.2 (8.1-20.5)</td>
<td>1.2 (0.5 – 3.2)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>ICU days</td>
<td>17.1 (11.2-25.8)</td>
<td>2.8 (1.3-5.7)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Hospital days</td>
<td>34 (22 – 55)</td>
<td>9 (4 – 18)</td>
<td>&lt;0.001</td>
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<tr>
<td>Deaths (%)</td>
<td>2,331 (23.4)</td>
<td>18,237 (25.8)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Predicted¹ %</td>
<td>26.5%</td>
<td>25.2%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Comorbidity</td>
<td>1.89</td>
<td>1.77</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

1. Critical Care and Resuscitation 2008;10:35–41

Demographic features of study population with cardiac surgery subgroup excluded; median (IQR)
Data from Victorian Adult ICU

Tracheotomy rate per 1000 MV days

Open (dotted), percutaneous (dashed), and both (solid) insertion techniques; p<0.001 for all trends.
95% CI odds ratio (shaded-area) for hospital survival in all tracheotomy patients according to the duration of MV.

Arrow defines optimal MV time “window”
Major diagnosis group and risk-adjusted optimal MV time “window”

No significant benefit from tracheotomy was identified in haematological malignancies, drug ingestion, other neurological, and renal disease subgroups requiring MV.

<table>
<thead>
<tr>
<th>Diagnostic Group</th>
<th>MV n=</th>
<th>Trach n=</th>
<th>MV time window (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All MV (study) patients</td>
<td>112,756</td>
<td>10,640</td>
<td>2 - 32</td>
</tr>
<tr>
<td>Traumatic brain injury (TBI)</td>
<td>5,678</td>
<td>1,204</td>
<td>2 - 15</td>
</tr>
<tr>
<td>Neurosurgical (non-TBI)</td>
<td>5,479</td>
<td>1,422</td>
<td>3 - 19</td>
</tr>
<tr>
<td>GIT major surgical</td>
<td>8,179</td>
<td>898</td>
<td>5 - 17</td>
</tr>
<tr>
<td>Malignancy</td>
<td>5,245</td>
<td>479</td>
<td>6 - 12</td>
</tr>
<tr>
<td>Chronic respiratory failure</td>
<td>3,232</td>
<td>610</td>
<td>7 - 14</td>
</tr>
<tr>
<td>Multitrauma (except TBI)</td>
<td>5,181</td>
<td>999</td>
<td>7 - 16</td>
</tr>
<tr>
<td>Vascular surgery</td>
<td>1,761</td>
<td>197</td>
<td>8 - 21</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>3,251</td>
<td>720</td>
<td>9 - 16</td>
</tr>
<tr>
<td>Septicemia</td>
<td>4,652</td>
<td>881</td>
<td>10 - 18</td>
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<tr>
<td>Cardiac medical</td>
<td>10,837</td>
<td>773</td>
<td>10 - 20</td>
</tr>
<tr>
<td>Cardiac surgical</td>
<td>32,039</td>
<td>671</td>
<td>13 - 17</td>
</tr>
</tbody>
</table>
Tracheostomy on Wards and Community
Tanis Cameron, Director of TRAMS
Red Sox Fans in Melbourne!
David Hits it Home or YES We Won the World (Series)
Tracheostomy Outside of the ICU
2002-2014 Challenges

- Adverse events – the main driver
- Trache tubes stay in too long, hospital stays too long
- Patients placed where little expertise exists – scary!
- Few discharge options … bed blockages … readmissions
- Lack of coordination of services
- Scant interdisciplinary procedures or education
- Show me the data! ….
TRAMS Casemix

1380 patients seen by TRAMS

- 72% Decannulated
- 18% Permanent (248)
- 10% Deceased

- Austin Health has 2 state wide services impacting case mix
- Victorian Respiratory Support Service VRSS
- Victorian Spinal Cord Injury Service (VSCS)
  - High needs population
  - Young and homogeneous group
Distribution Across Clinical Areas

- Spinal Neurosciences
- Respiratory
- Specialist Surgery
- Medicine
- Cardiothoracics
- Head & Neck
- Oncology

No of patients

Pre-TRAMS
Post-TRAMS
TRAMS Model of Care

- Coordinates interdisciplinary care, education, policy procedure across 3 campuses and into the community

Funded EFT
- Respiratory Doctors: 3 sessions/week
- Clinical Nurse Consultant: 1.6 EFT
- Physiotherapists: 0.5 EFT
- Speech Pathologists: 0.5 EFT
- Administration: 0.3 EFT
Aims of TRAMS 2002 – 2014

- Improve quality and of care
- Reduce duration of cannulation
- Reduce acute length of stay
- Provide interdisciplinary education
  - Series of elearning package [www.tracheostomyteam.org](http://www.tracheostomyteam.org)
  - 555 staff trained last year – annual workshops, inservices
- Provide centre-wide, interdisciplinary procedures
  - 1 over arching policy, 13 procedures
Tracheostomy in the Community

TRAMS supports patients with tracheostomy in the community

VRSS supports ventilated patients

Discharge planning equipment, education, case management, tube changes

Very effective in preventing bed blockage and readmissions

Approx 50 patients in community at any time - 25 on each service
Tracheostomy Teams in Australia & New Zealand

- TRAMS (2002) an early adopter of interdisciplinary team model
- Tracheostomy teams exist in most major and some smaller centres – 20+ other teams implemented post TRAMS education
- NZ Christchurch and Auckland – strong teams
- There is now an emerging body of literature

**What do we know?**

- Teams seem to be the way to go
- Interprofessional protocols and decision making key to team effectiveness *Mitchell 2013*
- Multidisciplinary care for tracheostomy; a systematic review *Garrubba 2009*
Meta Analysis of Tracheostomy Teams

Tracheostomy teams reduce total tracheostomy time and increase speaking valve use: A systematic review and meta-analysis  Speed 2012

Aim: to assess effect of tracheostomy teams on patient outcomes

7 studies included – all pre/post design, low-moderate quality

Teams were associated with:

- Reduction in total tracheostomy time  $P < .01$ (4 studies)
- Length of stay reductions: mean reduction 14 days $P =0.23$ (3 studies)
- Reduction in ICU length of stay and increases in speaking valve use leading to improved QOL (2 studies)
Clinical Innovations

- Agency for Clinical Innovation New South Wales 2013
  - Care of Adult Patients in Acute Care Facilities with a Tracheostomy [ACI link]
  - Tracheostomy Virtual Community

- Best practice may not be, and should not always be, identical from setting to setting

- Model of care varies
- Members and composition of teams varies
- Leadership and funding varies
- Message is always the same…..
Best Model of Care?

- Care is patient centred, they are involved
- Care is structured and coordinated
- Communication occurs across disciplines and across the continuum
- Policy and procedures in place
- Continuous interdisciplinary education
- Commitment to improve, change required
- Data to be simple and slick to record, report on
- Teams learn from each other
Global Perspectives – Great News

The GTC – sensational news

ITS 2014 Oct 8-9, 2014

GTC Australasian Roll Out & Seminars

pre ANZICS/ACCCN ASM education

Save the date

Join us for a great week!
Australian Papers on Tracheostomy


Australian Papers on Tracheostomy Con’t


Pandit RA, Jacques TC. Audit of over 500 percutaneous dilational tracheostomies. *Critical Care and Resuscitation* 200


Speed L, Harding, K.E. Tracheostomy teams reduce total tracheostomy time and increase speaking valve use: A systematic review and meta-analysis *Journal of Critical Care* 2012.


Tobin AE, Santamaria JD. An intensivist led tracheostomy review team is associated with shorter decannulation time and length of stay; a prospective cohort study *Crit Care* 2008;12:R48.


Hannan LM, Howard ME. Non-ICU ventilation discontinuation and weaning units. *International Journal of Intensive Care; Summer 2013; 77-81.*