‘It’s good to talk’
Above Cuff Vocalisation for trache patients

Sarah Wallace
SLT Clinical Lead, Wythenshawe Hospital, Manchester

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Introduction

• What is Above Cuff Vocalisation (ACV)?

• Why critical care patients experience voice loss

• Impact

• Suitability for ACV, procedure

• Efficacy, benefits

• Safety and best practice
What is ACV?

- Method to enable vocalisation in cuff-inflated tracheostomised ventilated patients

- SGS tubes allow secretion removal from above cuff, help to reduce VAP \((\text{Frost} \ 2013)\)

- Separate retrograde gas flow via subglottic port restores laryngeal airflow

- No disruption to ventilation

\((\text{Pandian} \ 2014, \ \text{McGrath} \ 2015, \ \text{Kothari} \ 2017, \ \text{McGrath} \ 2018)\)
Why do critical care patients experience voice loss?

1. **Cuff inflation**
   - Airflow bypasses larynx
   - Desensitisation
   - Downregulation of swallow

   Loss of voice has a detrimental impact on recovery
How many patients does this affect?

10-15% all UK ICU patients are tracheostomised

ICU pts (180,000)
Adult Trachy (14,000)
Children (1200)

5,000 UK surgical trachys / year

Surgical trachy
Laryngectomy

Reasons for trachy

- Ventilation: 70%
- Airway problem / airway surgery: 22%
- Aspiration: 5%
- Secretions: 4%

(Veenith 2008, Shah 2012)
Other causes of voice loss

1. Critical illness myopathy, sedatives, ↓ reserve
   Laryngeal weakness, vocal cord atrophy

2. Vocal cord palsy
   RLN injury, ETT cuff pressure
   CT / H&N surgery
   Bulbar impairment

3. Laryngeal injury
   Intubation, reflux
Laryngeal injury from intubation

• Up to 83% of ICU patients post extubation (Brodsky 2018)
• Throat pain, hoarseness, dysphagia
• Factors: Reintubation, age, duration, tube size, difficulty
• Vocal cord palsy, oedema, granuloma, stenosis
• Leads to silent aspiration, failed decannulation/wean
A hidden complication

- Vocal cord palsy or oedema detected in 29/42 (69%) dysphagic ICU pts by SLT FEES
- Suspected pre FEES in 1 by medics and 11 pts by SLT
- Negative impact on communication, wean, swallow
Impact

“The worst thing about ICU was being unable to speak”

“So tired trying to communicate, I didn’t want to do anything”

“No ability to reach out or be reached”

“Dehumanising”
Losing your voice film

www.tracheostomy.org.uk
You are now reading this

in my voice
Inability to speak causes psychological harm

- Anxiety
- Fear
- Frustration
- Isolation
- Distress

\[\downarrow\] Participation in nursing care, physio, weaning and treatment decisions

Even short-term voice loss causes lasting trauma

(Lohmeier 2003, Khalaila 2011, Breckenridge 2014)
Voice loss creates barriers to recovery

- Difficulty optimising pain relief, gaining consent
- 3x more likely to suffer adverse medical event
- Staff stressed by failed interactions

- Restoring voice improves mood
- Helps differential dx of delirium, cognitive impairment, aphasia
Restoring voice: Early cuff deflation

- ‘Laryngeal wean’

- Timing is institution dependent

- Implementing an early cuff deflation guideline*
  - Trache duration (mean 38±30 vs 16±9, p=0.015)
  - Earlier decannulation
  - ICU LOS (mean 45±28 vs 28±11 days, p=0.028)

*J Callon, C Lamont, S Dyson, L Poole, I Welters, Royal Liverpool Hospital
Passy Muir Valve

- Redirects airflow, restores subglottic pressure
- May help lung recruitment \((Sutt \ 2016)\)
- Days to PMV reduced if SLT involved

End Expiratory Lung Volumes

<table>
<thead>
<tr>
<th></th>
<th>With PMV</th>
<th>Without PMV</th>
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<tbody>
<tr>
<td>Health Foundation SHINE report 2015</td>
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Barriers: access to a valve, staff training, pt tolerance
Restoring voice: ACV

Suitability

• SGS tube in situ, cuff inflated

• No upper airway obstruction / abnormality

• Healthy trache stoma, >48-72hrs post insertion

• Early cuff deflation ruled out OR transitioning to cuff ↓
Procedure

1. Subglottic suction
2. Connect oxygen, slowly turn to 2-5L flow rate
3. Yankeuer suction secretions blown up to oral cavity
4. Encourage voice
5. 10-15 mins hourly
6. Supervise closely, document trials

(ACV Protocol, Wythenshawe Hospital)
ACV film – NTSP

www.tracheostomy.org.uk
Evidence

• Pros/cons of ‘talking trache’ tubes (Pandian 2014)

• Case series described clinical benefits, MDT & SLT role

Above cuff vocalisation: A novel technique for communication in the ventilator-dependent tracheostomy patient

Brendan McGrath¹, James Lynch¹, Mark Wilson², Leanne Nicholson² and Sarah Wallace²

Abstract

A significant proportion of patients admitted to intensive care units require tracheostomies for a variety of indications. Continual cuff inflation to facilitate mechanical ventilatory support may mean patients find themselves awake, cooperative and attempting to communicate but unable to do so effectively. Resulting frustration and anxiety can negatively impact upon care. Through participation in the Global Tracheostomy Collaborative, our unit rapidly implemented novel techniques facilitating communication in such patients. In carefully selected and controlled situations, the subglottic suction port of routinely available tracheostomy tubes can be used to deliver a retrograde flow of gas above the cuff to exit via
Richmond Agitation Sedation Scale
RASS pre & post ACV

Post ACV pts communicated more easily, were less agitated, had more prolonged periods of natural sleep.
Evidence

Subglottic airflow (ACV) benefits low arousal brain injured patients (Kothari 2016)

• Swallow frequency increased (0.6-2.1 swallows per 5 mins)

• Subglottic secretion volume reduced (3.1-0.31 mls)
Safety and feasibility of above cuff vocalisation for ventilator-dependant patients with tracheostomies

Brendan A McGrath¹, Sarah Wallace², Mark Wilson², Leanne Nicholson², Tim Felton¹, Christine Bowyer¹ and Andrew M Bentley¹

<table>
<thead>
<tr>
<th>Patient asked to remove</th>
<th>1</th>
<th>1.1</th>
</tr>
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<tbody>
<tr>
<td>Total</td>
<td>91</td>
<td>100.0</td>
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</table>

ACV: above cuff vocalisation.
Table 3. Scores assigned following FEES at first assessment, without and then with ACV.\textsuperscript{a}

<table>
<thead>
<tr>
<th>Scale</th>
<th>Paired comparisons made</th>
<th>Median values</th>
<th>Number of patients</th>
<th>Wilcoxon signed rank p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Without ACV</td>
<td>With ACV</td>
<td>Improved with ACV</td>
</tr>
<tr>
<td>SSRS (0 normal − 3 worse)</td>
<td>10</td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>APS (1 worse − 5 better)</td>
<td>8</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Pen-Asp (1 better − 8 worse)</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>TOMS (0 worse − 5 better)</td>
<td>10</td>
<td>0</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>ICU FCS (1 worse − 4 better)</td>
<td>10</td>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Unstimulated dry swallow frequency (per minute)</td>
<td>10</td>
<td>0</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Unstimulated cough frequency (per minute)</td>
<td>10</td>
<td>0</td>
<td>0.5</td>
<td>5</td>
</tr>
</tbody>
</table>

ACV: above cuff vocalisation; APS: Airway Protection Scale; FCS: Functional Communication Scale; ICU: intensive care unit; Pen-Asp: Penetration-Aspiration Scale; SSRS: Secretion Severity Rating Scale; TOMS: Therapy Outcome Measure for Voice Impairment.

\textsuperscript{a}Observed cough and swallow frequency (per minute) are also presented.

\textsuperscript{b}Significant results are indicated by.
Benefits of ACV

• Speak earlier, less distress, enables delirium and communication ax
• Bridge to cuff deflation
• Timely SLT input, MDT collaboration

• ‘Kick start’ a dormant swallow

*Translaryngeal airflow stimulates afferent nerves, evokes vocal cord adduction, swallowing and secretion management*
RISKS of ACV

Dry, cold airflow
Neck, facial emphysema
Vocal cord hyperadduction
Lack of MDT

Limit duration
Minimum airflow
Supervise
FEES ax laryngeal integrity
Do I need an SLT to trial ACV?
YES because if ACV doesn’t work...

A Continuing might be unsafe

B SLT can assess why it failed
3 good reasons....

1. SLT can assess laryngeal function, detect injury, assess effect of ACV on secretions, swallow, voice

2. SLTs should see ALL trache patients as soon as they are awake (GPICS, NCEPOD)

2. More effective and safer ACV trials
Final points

• Laryngeal impairment has serious consequences

• ACV is a safe and effective option for vocalisation if done properly as a team

• SLT should be involved in initial ‘assessment’ trial

• Consider training, protocol

• More research
Thank you

National Tracheostomy Safety Project  www.tracheostomy.org.uk

sarah.wallace@mft.nhs.uk  @sarahwallaceslt
References


References


References

• MB Brodsky, M Huang, C Shanholz, PA Mendez-Tellez, JB Palmer, E Colantuoni, DM Needham 2017 Recovery for Dysphagia symptoms after oral endotracheal intubation in acute respiratory distress syndrome survivors A 5 year longitudinal study Annals ATS March Vol 14 (3);376-383
