Prevalence, pathophysiology and treatment of dysphagia in cardiac surgical intensive care patients following tracheostomy and / or prolonged intubation: A case series.

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Introduction

The prevalence of dysphagia in patients who require prolonged intubation (>48 hr) after cardiac surgery is reported at 51-67%[1-3] in retrospective studies. Limited prospective evidence exists on prevalence, pathophysiology or treatment in this population. The aims of this study are:

1. To gather prospective data on the presence, severity and recovery of dysphagia according to duration of intubation in 40 patients.
2. To explore the pathophysiology of swallowing using objective assessment across a cohort of 10 patients within this group.
3. To audit acceptance and tolerance of 45 minute treatment sessions in 7 patients from the same cohort, as recommended by the Guidelines for the Provision of Intensive Care Services (2015) [4]

Prevalence of dysphagia – Study 1

Methods

A prospective bedside swallow evaluation was completed with 40 patients extubated in Cardiac ICU over 12 week period.
No exclusion criteria adopted in this study.
Patients grouped according to intubation duration: 5 groups defined.
Average waiting time for SLT Assessment = 10 hours post extubation.
Swallow severity rated using Functional Oral Intake Scale at initial (FOIS 1) and final bedside assessment (FOIS 2) [5].
Figures 1 displays average annual figures per surgery type.
Figure 2 displays surgery type for patients presenting with dysphagia in this study.

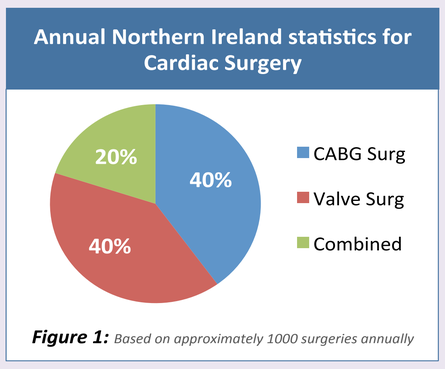

Figure 1: *Based on approximately 1000 surgeries annually*

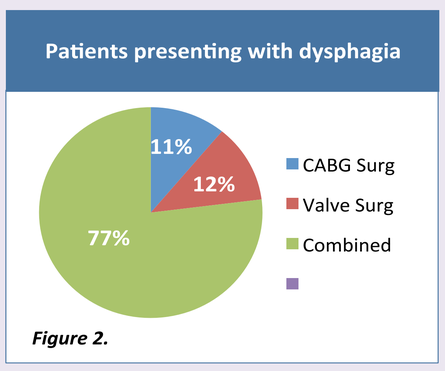

Figure 2.

Results

Table 1: Incidence and Severity of Dysphagia across Intubation Duration Groups

	Group 1	Group 2	Group 3	Group 4	Group 5
Intubation length	<12 hours	12-48 hrs	48-120 hrs	5-10 days	>10 days
No of pts	5	13	7	7	8
Dysphagia incidence	0%	9% (1)	43% (3)	80% (6)	100%
FOIS 1 Median	7	7	6	3	1
FOIS 2 Median	7	7	7	7	5

Table 2: Recovery and follow up by SLT Service

	Group 1	Group 2	Group 3	Group 4	Group 5
Aver. No. of SLT sessions	1	1.6	2.8	6	12
Aver ICU LOS (Days)	2	8*	4	15	31
Discharge status	Usual residence	Usual residence	28% (2) Hospital transfer	43%(3) Hospital transfer	50% (4) Hospital transfer
SLT follow up after hospital discharge	0	0	1/7	2/7	4/8

**Patient with dysphagia in this group diagnosed with acute stroke post operatively, thus impacting LOS.*

References

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Swallow pathophysiology via FEES – Study 2

Methods

- 10 patients assessed from groups 4&5.
- 8 patients had combined surgery: 2 had valve repair
- Average intubation length was 12 days
- FEES completed within 72 hours of bedside assessment
- FEES completed on average 15 days after surgery.
- All laryngeal abnormalities were diagnosed by ENT following review of FEES recordings.

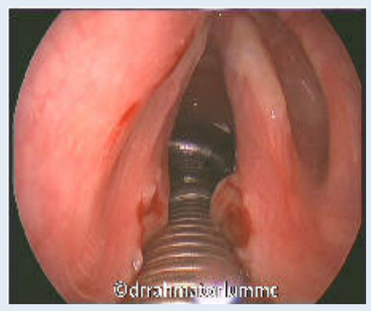

Figure3: *intubated patient*

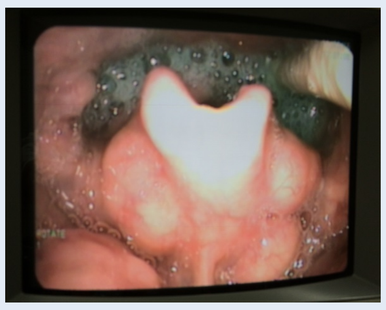

Figure 4: *secretions in pharynx and larynx*

Results:

Table 3: Pathophysiology findings for 10 patients in study 2.

Swallow and laryngeal abnormalities	Incidence
Delayed onset of pharyngeal swallow	80%
Food / Fluid residue in pharynx after swallow	100%
Unprotective cough	70%
Silent aspiration	50%
Abnormal laryngeal findings • Granulation tissue • Arytenoid oedema • Unilateral vocal cord palsy	60%

Figure 5: *silent aspiration of dyed thickened fluid.*

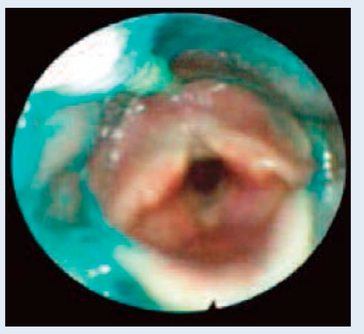

Figure 6: *dyed thin fluid residue in pharynx post swallow indicating weak pharyngeal pressures during swallow.*

Dysphagia Treatment in ICU – Study 3

Methods

- 7 patients from study 2 cohort participated in treatment.
- 12 x 45 minute treatment sessions offered over 3 week period.
- Five patients received combined muscle strengthening & stimulation therapy
- This involved Thermal Tactile Stimulation (TTS), Massako (M) and Effortful (E) Swallow exercises completed x 10 repetitions each per session.
- Two patients received trial of Expiratory Muscle Strength Training (EMST); 5 x 5 repetitions per session.

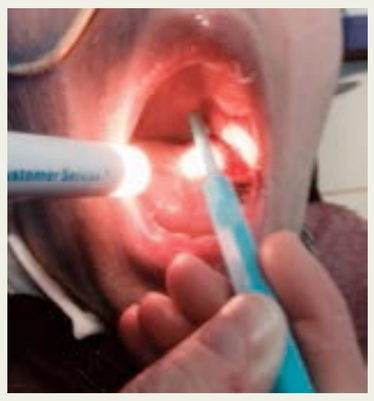

Figure 7. *Thermal Tactile Stimulation*

Figure 8: *Expiratory Muscle Strength Training*

Results:

Table 4: Treatment tolerance and outcomes for patient in study 3.

Patient details	Intubation length	Tracheostomy present	Baseline swallow Ax outcome	Treatment sessions offered	Treatment sessions completed	Post treatment outcome	Discharge destination & SLT follow up
41y:F	16 days	Yes	NG & Therapeutic trial thick fluids.	12x45 min x 3wk **TTS/M/E**	8 x 30 min x 2 wk	Normal diet / fluids	**Home No SLT f/up**
77y:M	13 days	Yes	NBM & NG	As above	8 x 20 min x 2.5 wk	Moist diet / thin fluids	**Hosp t/f SLT f/up**
63y:M	12 days	Yes	NBM & NG	As above	10 x 20 min x 3 wk	NBM &NG	**Hosp t/f SLT f/up**
80y:M	9 days	Yes	NBM & NG	As above	12 x 20 min x 3 wk	Moist diet / thin fluids	**Hosp t/f SLT f/up**
82y:M	13 days	Yes	NBM & NG	As above	10 x 30 minx 3 wk	NBM & NG	**Hosp t/f SLT f/up**
79y:M	14 days	No	NBM & NG	12 x 45 min x 3wk **EMST**	10 x 25 min x 3 wk	Moist diet/ syrup fluids	**Home SLT f/up**
75y:M	11 days	No	NBM & NG	As above	12 x 25 min x 3 wk	Normal diet /fluids	**Home No SLT f/up**

Conclusion from all 3 studies

Overall prevalence of dysphagia was 45% in this study. Prevalence and recovery period increased with longer intubation times. A high incidence of swallow pathophysiology and laryngeal abnormalities were detected in patients who had been intubated for an average of 12 days and had a tracheostomy. No patients in the treatment cohort tolerated 45 minutes of direct treatment per session as recommended by GPICS (2015). It is unclear from this project if treatment was effective. Further work is planned to develop and test an ICU swallowing intervention to improve patient outcomes following prolonged intubation in this setting.

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