DYSPHAGIA IS A PREVALENT AND UNDER RECOGNIZED COMPLICATION OF HEAD AND NECK RADIOTHERAPY

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Disclosures

Funding sources:
- Cancer Institute NSW,
- St George Hospital Dept of Radiation Oncology Research Fund,
- Brian and Pearl Bowles Fund,
- St George and Sutherland Medical Research Foundation.
dysphagia is a common side-effect\textsuperscript{1}

presentation to clinic – often late

literature to date focussed on short-term effects

may not be predictive of long term dysfunction\textsuperscript{2}

acute effects may confound long term results

1. Thames et al., 1990
2. Nguyen et al., 2004
Aspiration

- implications of dysphagia are serious
- carries a 12mth mortality of 45%³
- aspiration pneumonia 20% of non cancer-related deaths
- dysphagia – under-recognized and under-reported
  - 50% reported dysphagia in clinic⁴

Croghan et al., 1994³; Maclean et al. (unpublished)⁴
Aims and hypotheses

- to determine prevalence and severity of dysphagia as a long-term complication of head and neck radiotherapy

Hypotheses

- late swallowing dysfunction is a consequence of radiation exposure in a:
  - time
  - dose
  - site dependent manner
Patients

- observational cross-sectional study
- large consecutive series from cancer database

inclusion criteria
- H&N radiotherapy (excl. surgery)
- curative intent
- 1–8 years
- survivor (n = 115)
Sydney Swallow Questionnaire

- validated dysphagia severity measure
- simple 17 question inventory
- visual analogue scale

How much difficulty do you have swallowing **THIN liquids**? (eg: tea, soft drink, beer, coffee)

<table>
<thead>
<tr>
<th>NO DIFFICULTY AT ALL</th>
<th>UNABLE TO SWALLOW AT ALL</th>
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Dosimetry

**Left Tonsil**

Organ Volume (%)

Dose (Gy)

- Base of tongue
- Mid-Sup Constrictors
- Cricopharyngeus
CP Sagittal Diameters

Cricopharyngeus
Dysphagia Severity

- Initial SSQ response rate: 69%
- Phone follow-up improved the response rate to 71%
SSQ – individual question scores

VAS Score (0-100)

Question number
Tumour groups – dysphagia severity

SSQ Score

Larynx  Nasopharynx  Oral  Pharynx
Results

- No specific time correlation year post XRT and SSQ
- Non-linear relationship
- Bias – most severe dysfunction succumbed to dysphagia
Nasopharynx

Organ Volume (%)

Dose (Gy)

Base of tongue
Mid-Sup Constrictors
Cricopharyngeus
Constrictor dose and SSQ

\[ R^2 = 0.2218 \]

*\( p < 0.01 \)
Base of tongue and SSQ

- Scatter plot showing the relationship between mean dose (Gy) and SSQ with a linear regression line. The coefficient of determination, $R^2 = 0.2036$.

- Box plot comparing SSQ values for dose groups <40 Gy and $\geq$40 Gy, with a significant difference indicated by $p<0.001$. 

* p<0.001
Cricopharyngeus dose and SSQ

![Scatter plot showing the relationship between mean dose (Gy) and SSQ with R² = 0.0394.]

- Mean Dose (Gy): 0, 500, 1000, 1500, 2000
- SSQ: 0, 20, 40, 60, 80

![Box plot comparing SSQ for dose < 40 Gy and ≥ 40 Gy.]

- <40 Gy
- ≥40 Gy
CP Sagittal Diameters

![Graph showing the relationship between Bolus Volume (ml) and Diameter (mm) for Controls and Patients. The graph includes error bars and asterisks indicating statistical significance.]
Video Manometry – Base of Tongue
Manometry – Tonsil
Conclusions

- long-term dysphagia present – 64%
- dry and hard foods – most difficult
- significant association between SSQ score
  - mean dose to base of tongue
  - constrictors
- no significant association between SSQ & CP
- significant reduction in CP opening
Conclusions

- long-term dysphagia following radiotherapy
  - under-recognized
  - under-reported

- precise threshold dose to critical structures yet to be determined
Implications

- identify threshold doses to critical structures
- strategies to minimise dose to these structures
- predictors of long-term dysfunction
- patient education, surveillance