

practice. One previous study performed in the US⁹ and the UK¹⁰ does also demonstrate a cost saving but our paper is the most comprehensive cost analysis of this technique with particular relevance to the UK.

Keypoints

- Trans-nasal endoscopy (TNE) is a safe, well-tolerated and reliable tool for investigating benign upper gastro-intestinal symptoms.
- TNE is a well established technique in the US but has yet to achieve the same prominence in the UK.
- TNE offers substantial savings over established techniques for investigating upper aerodigestive tract disease.
- If a third of patients currently investigated with barium swallow or oesophago-duodenoscopy underwent TNE instead, cost savings would be over £100 000 in 2 years.
- The greater the proportion of patients undergoing TNE, the larger the saving with cost neutrality reached earlier.

Conflict of interest

None to declare.

References

- 1 Belafsky P.C., Postma G.N., Daniel E. *et al.* (2001) Transnasal esophagoscopy. *Otolaryngol. Head and Neck Surg.* **125**, 588–589
- 2 Curtis L., Netten A. (2005) Unit Cost of Health and Social Care. Personal Social Services Research Unit. The University of Kent, Canterbury
- 3 Amin M.R. & Postma G. (2004) Office evaluation of swallowing. *Ear Nose Throat J.* **83**(Suppl. 2), 13–16
- 4 Shaker R. (1994) Unsedated trans-nasal pharyngo-oesophago-gastro-duodenoscopy (T-EGD): Technique. *Gastrointest. Endosc.* **40**, 346–348
- 5 Johnson P.E., Belafsky P. & Postma G. (2003) Topical nasal anesthesia for transnasal fiberoptic laryngoscopy: A prospective, double-blind, cross-over study. *Otolaryngol. Head and Neck Surg.* **128**, 452–454
- 6 Postma G.N., Amin M.R., Simpson C.B. & Belafsky P.C. (2005) Office-based procedures for the larynx, trachea and oesophagus. *Ear Nose Throat J.* **83**(7), Suppl 2.
- 7 Postma G., Bach K.K., Belafsky P.C. *et al.* (2002) The role of Transnasal Esophagoscopy in Head and Neck Oncology. *Laryngoscope* **112**, 2242–2243
- 8 Belafsky P.C., Allen K., Castro-Del Rosario L. *et al.* (2004) Wireless pH testing as an adjunct to unsedated transnasal esophagoscopy: the safety and efficacy of transnasal telematery capsule placement. *Otolaryngol. Head and Neck Surg.* **131**, 26–28
- 9 Hepburn I., Watts T., Postma G. *et al.* (2008) Cost savings of transnasal endoscopy versus standard endoscopy. *Am. J. Gastroenterol.* **103**, S406
- 10 McPartlin D.W., Nouraei S.A., Tatla T. *et al.* (2005s) How we do it: transnasal fiberoptic oesophagoscopy. *Clin. Otol.* **31**, 234–235

Management of laryngeal dysplasia in the United Kingdom: a web-based questionnaire survey of current practice

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Introduction

The clinical importance of laryngeal dysplasia (LD; also known as laryngeal intraepithelial neoplasia) lies in its propensity to transform into invasive cancer. The diagnosis

of LD is beset with a number of inconsistencies. Clinically abnormal epithelial lesions do not always exhibit pathological evidence of LD and LD can be recognised in clinically normal appearing epithelium. Inter-rater agreement among histopathologists on grading of LIN AUTHOR: Please define 'LIN' is low.¹ Reported malignant transformation rates vary between 11% and 25%,²⁻⁴ but identifying which patients will transform is impossible. Therefore, management practices vary significantly.

The aim of this study was to identify varying philosophies and practices in the management of LD among the consultant community in Otolaryngology-Head and Neck Surgery in the United Kingdom.

Methods

A 20 item questionnaire was designed with input from all the authors and initially trialled on a group of 10 consultants. Minimal modifications were performed based on the feedback to improve clarity. The questionnaire was designed to elicit the views of only those who managed LD regularly.

To standardise the approach, all questions regarding treatment were focused on dysplasia of the glottis, of mild, moderate and severe grades. The terminology of laryngeal intraepithelial neoplasia was deliberately not chosen as this term is still not widely used. Questions were designed to assess current practice in the domains of pathology, risk factors and documentation of laryngeal lesions. Questions also assessed the factors that played a role in the decision making towards re-biopsy of a lesion compared to continued follow up. Questions on management focused on treatment of initial and persistent dysplastic lesions of the glottis with different histological grades. A free text field was also inserted to allow additional comments (Appendix S1).

The survey was confined to consultants in Otolaryngology-Head and Neck Surgery. Three strategies were used to identify the participants. E-mail addresses of active consultant members were obtained from ENT-UK (British Association of Otolaryngology-Head and Neck Surgery). We also obtained information from specialist-info.com, which lists the consultants and contact addresses by speciality. Where full data were unavailable from one source, names were cross-referenced to obtain one email address. Where possible, a work-based address was used in preference to a personal address. The third strategy was to email the link for the web-based questionnaire to all lead head and neck clinicians, with a request to forward the mail to all consultant Otolaryngologists in the team.

The questionnaire was built using ASP.NET, a web application framework developed by Microsoft. The questionnaire was uploaded to a website. An e-mail with a covering letter and a hyperlink to the website was sent to all the e-mail addresses and a reminder sent 2 weeks later. The data generated from the responses were stored on Microsoft SQL Server 2005. The responses were exported to a Microsoft Excel spreadsheet for analysis using SQL Server Reporting Services 2005.

Results

After removing duplicate entries, 731 consultant names were identified, but only 477 e-mail addresses were available from the sources mentioned above. E-mails were sent out to the full list of participants on 9th of April 2008. This generated 21 out of office replies; of these three were answered at a later date. Two respondents complained that the questionnaire did not load, of whom one went back and completed the questionnaire at a later date. There were 68 instances of mail delivery failure. All 'delivery failure' e-mail addresses were examined to ensure this was not due to typographical errors.

The first mailshot generated 120 responses: 71 respondents who answered the full questionnaire and 49 who stated that they did not manage dysplasia. The reminder was sent out on 21st of April 2008. The reminder generated a further 69 responses: 39 full responses and 30 from those who did not manage laryngeal dysplasia. This left 110 full responses from the United Kingdom to analyse and a response rate of 46.2%.

The server had a downtime of 36 h for 4 weeks after it went live and the questionnaire had to be migrated to an alternative server.

The respondents and documentation

The survey indicated that the respondents had a wide range of clinical experience, ranging from 0 to 34 years with a mean experience of 12.3 (\pm 7.5 years). Over 79% of respondents described a significant amount of their clinical time as spent in the areas of head and neck and laryngology. Sixty-one per cent of respondents indicated that LD was exclusively managed by head and neck surgeons or laryngologists in their department. The frequency of respondents who managed <10 cases per year, 10–30 cases per year and more than 30 cases per year was 53.6%, 40.9% and 5.5% respectively. The majority (98.2%) work in centres that use the WHO grading system (mild/moderate/severe) to categorise dysplasia histologically.

Table S1 shows in detail the current practices in documenting clinical data that are relevant to the management of LD.

Initial management

Table S2 describes the distribution of responses for various *initial* management options following the diagnosis of glottic dysplasia. There is a clear tendency for patients to be managed expectantly (observation, open access to review) when dysplasia is mild. Those with moderate and severe dysplasia are more likely to undergo intervention (Table S2). This trend towards intervention was statistically significant (χ^2 98.72; $P < 0.0001$).

These interventions could be broadly categorised into cold steel (vocal cord strip, excision) and laser ablation or excision. When categorised thus, there was outstanding agreement among the respondents in their choice of management modalities for moderate and severe dysplasia (valid responses = 42; Cohen's kappa = 0.89; $P < 0.000$). Only two respondents who used cold steel for moderate dysplasia used the laser for severe dysplasia.

Management of persistent lesions

Table S3 shows the spread of responses for various management options for persistent LD. Once again, there is a clear tendency for patients to be managed expectantly when dysplasia is mild and for intervention as the grade worsens. This trend towards intervention was statistically significant (χ^2 75.14; $P < 0.0001$).

When categorised into groups using cold steel or laser as a treatment tool for managing moderate and severe dysplasia, there was moderate agreement in the respondents choice of management modalities (valid responses = 63; Cohen's kappa = 0.41; $P < 0.001$). Once again, this shows that the grade of dysplasia does not influence the choice of tool, but it would seem personal preference does.

Decision making for follow up and re-biopsy

Change in appearance, continued exposure to risk factors and the histological grade of the lesion were the major factors influencing the respondents' decision to continue following up patients with dysplasia (Table S4). The respondents place high importance on the clinical appearance of the lesion when deciding to re-biopsy, with 97.3% giving this item the highest score (Figures S1 and S2).

Follow up policy

It appears that just over 6% of respondents would not follow up mild dysplasia, and <2% would do the same for moderate and severe lesions (Tables S2 and S5).

Other responses

The free text box included to capture other management practices was useful in capturing some views strongly held by the respondents. Some general themes emerged:

Initial management. Many respondents considered size to be a deciding factor. 'Bigger' lesions were more likely to undergo intervention compared to smaller ones. One respondent believed that investigation to identify extra-oesophageal reflux and 'aggressive antireflux treatment' was warranted in all cases. Some respondents did not distinguish between severe dysplasia and carcinoma *in situ*. They emphasised the need to re-biopsy patients with severe dysplasia and had a low threshold for recommending radiation. A frequent response for severe dysplasia was to refer these patients to the multidisciplinary clinic.

Management of persistent lesions. The overarching theme for responses on the question of persistent lesions was referral of these patients to the multidisciplinary clinic. One respondent suggested changing the antireflux regime and adding acitretin.

Functional outcome measures

Only one-fifth of respondents used a functional measure to assess the outcome of treatment; 10.9% used the Vocal Health Inventory, 10% used the Voice Symptom Score and one respondent (0.9%) used the Vocal Performance Questionnaire.

Discussion

This is the first comprehensive survey to capture the varying management practices for LD in the UK.

Synopsis of key/new findings

This survey shows that over 50% of surgeons managing LD see <10 new patients annually. Only 60% of respondents indicated that LD was managed at their centre by colleagues with a special interest in head and

neck or laryngology. There appeared to be broad agreement on conservative management of mild LD ($\approx 70\%$ of respondents) and intervention for severe LD ($\approx 95\%$). However, a wide variety of procedures are being practised. The disparity of opinion is also surprising when considering that an equal number of respondents would irradiate or periodically sample persistent severe dysplasia. This is especially concerning given the lack of consensus in pathologic diagnosis. Only a small proportion of respondents used measures of functional outcome.

Strengths and limitations of the study

Web-based questionnaires have several advantages. Incomplete responses can be completely avoided by reminding the respondent about missing responses before submitting. Many respondents mentioned that they were encouraged to respond by the eye catching web design. A web-based survey is also environmentally friendly. We believe that the lessons learnt from the conduct of this survey are applicable to other clinical scenarios.

Despite an apparent low response rate, we believe that this is a robust sample as this has captured the views of the majority of ≈ 160 consultants involved in head and neck surgical practice in the country. It is highly unlikely that a higher response rate would show a greater homogeneity in practice of this condition.

The questionnaire and the clinical scenario were kept simple to aid completion and avoid controversies in interpretation. Thus, the responses are not applicable to all dysplastic lesions seen in clinical practice.

Clinical applicability of the study

The authors would like to highlight some elements identified in the survey that need to be addressed by a change in practice.

- Unless strong reasons exist, the authors believe that it is inappropriate to have a personal case load of <10 patients annually and there is clear need for rationalisation. This is especially relevant in the light of the results of this survey, which demonstrates variation in practices, and continued practice with low numbers can only serve to dilute experience and perpetuate such wide ranging opinions. Based on the results of this survey, we recom-

mend that the caseload in many departments be pooled and that LD should be managed by nominated members.

- It is also disappointing that $<50\%$ of respondents routinely photograph the larynx. The authors recommend that this should be embedded into routine practice. The written description and the diagram in the notes cannot capture several features of the lesion. Given that the respondents place considerable importance on the appearance of the lesion in planning management, this is paradoxical.

- Despite the high laryngeal intervention rate for moderate and severe LDs, and the need for repeated procedures, the survey suggests that only 20% use functional outcome measures. The authors recommend that such measures be integrated into routine practice and the impact of repeated interventions on the voice needs further research.

- Vocal cord stripping is a procedure that has no place in modern laryngological practice. The survey shows that this procedure is used in 5–10% of severe LD and 4–8% of moderate LD. Vocal cord stripping has long been recognised to cause scarring, even in the deeper layers of the vocal fold. Use of this procedure is not recognised in the phonosurgical literature for benign lesions.⁵ While this may apply to select cases of multifocal severe LD, the authors recommend that this procedure should not be used in the management of moderate LD.

Future steps

The over-riding reason for the disparity in practice is the lack of high level evidence. The diversity of practice needs addressing, especially in the management of severe dysplasia. In the first instance, a review of the evidence has commenced and a consensus development meeting is planned. There is a clear need for a multi-centre prospective audit of outcomes to further address the issue and to identify baseline epidemiological data regarding LD. This survey also identifies the need for further research and evidence synthesis on criteria for intervention. The appearance of the lesion is valued highly as a decision making element and research should focus on correlating appearance with histologic changes. Research to identify better techniques for prediction of progression in dysplastic lesions is needed, so that treatment can be personalised.

Keypoints

- There is a long recognised absence of consensus in the management of laryngeal dysplasia. A web-based survey of the consultant community in Otolaryngology-Head and Neck Surgery in the UK was performed to identify current practice.
- From the 409 invitation emails that were delivered, 189 responses were received, giving a response rate of 46.2%. It is highly unlikely that a higher response rate would show a greater homogeneity in practice of this condition.
- Approximately 70% of respondents chose to manage mild LD expectantly after diagnosis. For moderate and severe dysplasia, 60% and 97% respectively opted for intervention. However, there was considerable variation in the choice of interventional modality. For instance, an equal number of respondents would irradiate or periodically sample persistent severe dysplasia.
- Factors considered important in decision making for re-biopsy and follow up were the appearance of the lesion, grade of dysplasia and continued exposure to risk factors.
- Over half of the respondents managed <10 cases a year. Less than 20% use subjective outcome measures to assess function after intervention. Vocal cord stripping continues to be practised as an initial treatment modality. Although considerable importance is placed on the appearance of the lesion in planning management, than 50% of respondents routinely photograph the larynx.
- There is a clear need for a multi-centre prospective audit of outcomes. This survey also identifies the need for further research and evidence synthesis on criteria for intervention.

Conflict of interest

None to declare.

References

- 1 McLaren K.M., Burnett R.A., Goodlad J.R. *et al.* (2000) Consistency of histopathological reporting of laryngeal dysplasia. The Scottish Pathology Consistency Group. *Histopathology* **37**, 460–463
- 2 Gallo A., de Vincentiis M., Della Rocca C. *et al.* (2001) Evolution of precancerous laryngeal lesions: a clinicopathologic study with long-term follow-up on 259 patients. *Head Neck* **23**, 42–47

- 3 Sadri M., McMahon J. & Parker A. (2006) Management of laryngeal dysplasia: a review. *Eur. Arch. Otorhinolaryngol.* **263**, 843–852
- 4 Isenberg J.S., Crozier D.L. & Dailey S.H. (2008) Institutional and comprehensive review of laryngeal leukoplakia. *Ann. Otol. Rhinol. Laryngol.* **117**, 74–79
- 5 Friedrich G., Remacle M., Birchall M. *et al.* (2007) Defining phonosurgery: a proposal for classification and nomenclature by the Phonosurgery Committee of the European Laryngological Society (ELS). *Eur. Arch. Otorhinolaryngol.* **264**, 1191–1200

Supporting Information

Additional Supporting Information may be found in the online version of this article:

Figure S1. Importance ratings for factors affecting decision to re-biopsy patients with laryngeal dysplasia. The figures on the *y*-axis indicate percentages of respondents. The legend from 1 to 4 is the importance rating scale, with one being very important and four being least important.

Figure S2. Importance ratings for factors affecting decision to follow up patients with laryngeal dysplasia. The figures on the *y*-axis indicate percentages of respondents. The legend from 1 to 4 is the importance rating scale, with one being very important and four being least important.

Table S1. Clinical information documented by respondents (figures indicate percentage of respondents, rounded to nearest integer; *n* = 110).

Table S2. Initial management of glottic dysplasia of different pathological grades (figures indicate percentage of respondents, rounded to nearest integer; *n* = 110).

Table S3. Management of persistent glottic dysplasia of different pathological grades (figures indicate percentage of respondents, rounded to nearest integer; *n* = 110).

Table S4. Mean (\pm SD) for importance ratings for items that affect decision making to re-biopsy or follow up patients with laryngeal dysplasia. Low scores indicate greater importance.

Table S5. Follow up practice for glottic dysplasia of different pathological grades (figures indicate percentage of respondents, rounded to nearest integer; *n* = 110).

Appendix S1. Survey questionnaire.

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