

Comparative study of flexible nasoendoscopic and rigid endoscopic examination for patients with upper aerodigestive tract symptoms

J C FLEMING, Y AL-RADHI, A KURIAN, D B MITCHELL

Department of Otolaryngology, William Harvey Hospital, Ashford, UK

Abstract

Introduction: The objective of the current study was to compare the outcomes of rigid endoscopic procedures with those of pre-operative flexible nasoendoscopy.

Methods: A total of 253 patients who had undergone rigid endoscopic examination under anaesthesia between 6 January 2010 and 31 August 2011 were identified. Their clinical, surgical and histological records were evaluated.

Results: A total of 213 patients had a flexible nasoendoscopic procedure performed and recorded pre-operatively, and 82 in this cohort had a specific lesion or area of concern identified. There were 21 confirmed malignant biopsy results, the majority of which were squamous cell carcinoma. No patient with a negative pre-operative endoscopy had a malignant lesion discovered on endoscopic biopsy. The sensitivity and specificity of pre-operative nasoendoscopy were 100 per cent and 66.3 per cent, respectively.

Conclusion: Diagnostic rigid endoscopic examination of the upper aerodigestive tract remains an important tool for excluding malignancy in high-risk patients, but is an unnecessary procedure in those low-risk patients with normal pre-operative findings.

Key words: Endoscopy; Head And Neck Neoplasms; Early Diagnosis; Preoperative Procedures

Introduction

Surveillance methods to detect head and neck cancers in the community have now been formalised through documented referral pathways to urgent cancer clinics. Despite adherence to these guidelines, when identified patients are investigated the detection rate for malignancies has been shown to be low.¹

Flexible nasoendoscopy has revolutionised the diagnosis of upper aerodigestive tract pathology in the out-patient clinic, and the technology continues to evolve. Trans-nasal oesophagoscopy has now been evaluated in large trials, and gives the clinician unparalleled views of the oesophagus,² within an out-patient setting. However, this equipment is not yet routinely available in many ENT clinics and there is still a paucity of evidence on the diagnostic accuracy of even the standard flexible nasoendoscope. The 'screening' examination under anaesthesia (EUA) procedure, using rigid pharyngoscopy, laryngoscopy and oesophagoscopy, is a common otolaryngological surgical procedure. Whilst frequently performed by head and neck surgeons to diagnose synchronous lesions in patients with confirmed primary malignancy, it is also performed to identify occult malignancies in

patients with features, on history-taking or examination, that suggest underlying pathology. This is often despite normal pre-operative flexible nasoendoscopy findings.

No formal guidelines exist on the management of patients with persistent head and neck symptoms who have normal examination findings in the out-patient department. This results in differing management strategies depending on the supervising consultant, based on clinical acumen and experience.

In our institution, operating theatre logbook numbers and senior clinical opinion indicated that there appeared to be an increasing proportion of patients listed for surgery despite normal pre-operative flexible nasoendoscopy findings, and that despite this, the detection rate for malignancy did not appear to be increasing. This case series review was therefore instigated to examine in detail the outcome measures for this cohort of patients listed for surgery, and to compare pre-operative and operative findings.

Materials and methods

We performed a case note review of all patients who had undergone a rigid endoscopic examination, or

one of its coding variants, between 6 January 2010 and 31 August 2011. A Microsoft Access database (Redmond, Washington, USA) was created and demographic, clinical and operative findings were collated using patient notes, clinic letters, operative notes and histology reports, for all patients.

Outcome contingency statistical analysis was performed using Prism 6 software (Graphpad; La Jolla, California, USA).

Results and analysis

In the 20-month review period, 253 patients underwent a surgical rigid endoscopic procedure in the operating theatre under a general anaesthetic. All patients had been referred to the out-patients clinic with upper aerodigestive tract symptoms or symptoms potentially secondary to a referred causality. The median patient age was 59 years (range, 5–90 years), and there were 135 males and 118 females. In the total patient population, there were 58 non-smokers (23 per cent), 68 smokers (27 per cent) and 44 ex-smokers (17 per cent) (the smoking status of 83 patients (33 per cent) was unrecorded). The distribution of presenting complaints is demonstrated in Figure 1. Due to multiple symptoms in some patients, the total frequency of symptoms exceeds the patient total.

In the out-patient clinic prior to surgery, 213 patients underwent flexible nasoendoscopy, while 40 patients had no record of receiving flexible nasoendoscopy. This latter group included patients who withheld consent or could not tolerate the procedure, plus those in whose notes no flexible nasoendoscopy findings were recorded. Of the 213 patients who did

successfully undergo pre-operative flexible nasoendoscopy, 82 (38 per cent) had a suspicious or abnormal lesion identified, while 131 (62 per cent) had normal findings. A patient outcome flowchart is shown in Figure 2. No patients underwent repeated procedures during this time period.

As can be seen from Figure 2, there were 21 confirmed malignant biopsy results. Eighteen of these were squamous cell carcinoma (SCC) (from surgical biopsies), two were lymphoma and one was carcinoma in situ (classed as a confirmed malignancy for the purposes of analysis). In the negative flexible nasoendoscopy findings group, there was also one positive SCC result, but this was obtained from a fine needle aspiration from a lymph node which was performed concurrently in the operating theatre, as opposed to identification from an endoscopic biopsy, and was therefore excluded from statistical analysis.

In the positive malignancy group, there were 2 non-smokers (10 per cent), 7 smokers (32 per cent) and 8 ex-smokers (36 per cent) (5 patients (23 per cent) had an unrecorded smoking status). The vast majority of procedures were performed as day cases (median length of stay, 1 day; range, 1–26 days). Six patients had longer than expected stays, all due either to concurrent medical problems exacerbated by the surgery or anaesthesia, airway concerns, or general morbidity issues related to the malignancy for which they were being investigated.

A contingency table for pre-operative flexible nasoendoscopy findings was created, based on those patients who had had investigation successfully performed and documented. From these data, the

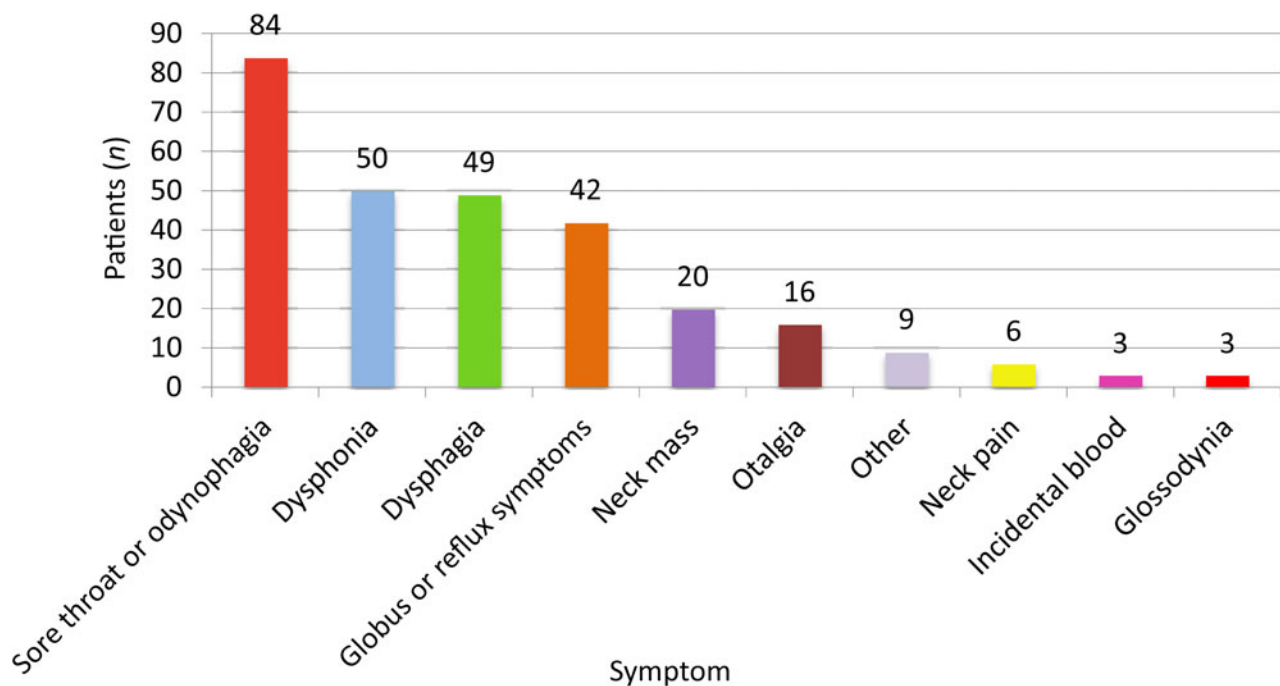


FIG. 1

Patients' presenting complaints at initial out-patient consultation.

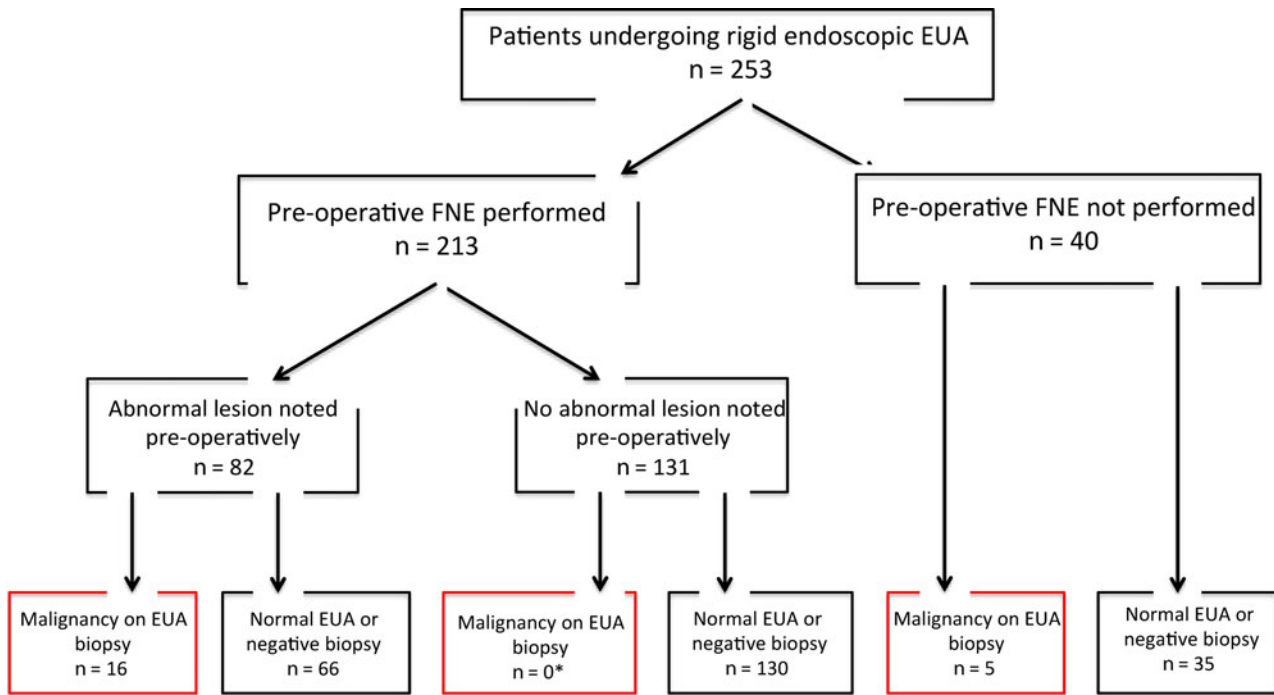


FIG. 2

Patient outcome flow chart. EUA = examination under anaesthesia; FNE = flexible nasoendoscopy

sensitivity, specificity, and positive and negative predictive values of pre-operative flexible nasoendoscopy were calculated (Figure 3).

Based on the results, we calculated a likelihood ratio for a positive pre-operative flexible nasoendoscopy finding of 2.97. Fisher’s exact test calculated a *p* value of less than 0.0001.

Discussion

The referral guidelines for suspected cancer published by the Department of Health in 2000,³ and subsequently updated by the National Institute for Clinical Excellence in 2005,⁴ were produced to facilitate appropriate and rapid referral of patients with suspected cancers, from the community to secondary care assessment services. ‘Red-flag’ symptoms for a wide spectrum of organ systems were drawn up by expert working groups; these symptom lists were intended to

significantly improve the access of high risk patients to assessment services, whilst diminishing unnecessary patient referrals and patient anxiety in those who were unlikely to have an underlying malignancy. However, audits of ‘fast track’ referrals in some large specialist centres continued to show diagnostic yields as low as 6 per cent in these clinics,¹ and use of the updated NICE guidelines was still far from common practice. Equally, there was a high level of patient anxiety in those referred by their general practitioner to these clinics. Little doubt persists about the need for rigid endoscopic examination in high-risk patients with suspected lesions or poorly visualised areas on flexible nasoendoscopy examination. However, the management of low-risk patients with persistent symptoms despite normal out-patient examination findings continues to cause controversy.

Our results demonstrate a 100 per cent sensitivity and negative predictive value of flexible nasoendoscopy, indicating its efficiency in excluding significant pathology. Specificity was lower, however, at 66.3 per cent. The likelihood ratio result indicates that a positive flexible nasoendoscopy finding would be almost three times as likely in someone with an upper aerodigestive tract malignancy compared with a disease-free patient. To our knowledge, this is the first large study correlating upper aerodigestive tract flexible nasoendoscopy findings with post-operative histology, and provides evidence-based data which can assist otolaryngologists to inform patients fully of the reasoning behind management decisions.

The medical literature demonstrates that this topic continues to be an area of clinical uncertainty for

		Malignancy status		
		Positive	Negative	
Pre-operative FNE	Positive	16	66	Positive predictive value 19.5% (11.6–29.7%)
	Negative	0	130	Negative predictive value 100% (97.2–100%)
		Sensitivity 100% (79.4–100%)	Specificity 66.3% (59.3–72.9%)	

FIG. 3

Diagram showing contingency table for pre-operative flexible nasoendoscopy (FNE) investigation, plus calculations for positive predictive value, negative predictive value, sensitivity and specificity, with 95% confidence intervals.

certain diagnoses. For example, a large postal survey of UK ENT consultants, conducted in 2000⁵ to investigate the management of globus, showed that 61 per cent would investigate with rigid endoscopy, while 17.5 per cent would investigate with both barium swallow and rigid endoscopy. Published studies and reviews on this topic focus predominantly on the investigation and management of globus, yet they continue to be divided in their conclusions, on the one hand adopting a 'reassurance' approach for normal out-patient examinations,⁶ while on the other hand dispensing warnings about potential occult oesophageal malignancy in such patients.⁷ A 2006 review⁸ of the benefits of rigid endoscopy in patients with globus, assessing a similar population number to our own study, concluded that rigid endoscopy may well be an inappropriate investigation for such patients.

- **Rigid endoscopy is often performed pre-operatively for head and neck symptoms with no visualised suspicious lesion**
- **Flexible nasoendoscopy is a common screening test, despite little evidence on efficacy**
- **In this study, flexible nasoendoscopy had a sensitivity and negative predictive value of 100 per cent**
- **If flexible nasoendoscopy is adequately tolerated and negative, and history is benign, rigid endoscopy is unnecessary**

Although the results of our study indicate a clear correlation between pre-operative and operative findings, limitations were present due to the nature of the study methods. No information on the indication for flexible nasoendoscopy pre-operatively is provided – there are no relevant guidelines, and the final decision relies on clinician preference. However, an informal audit of individual clinicians in our department, conducted by the present authors, indicated that flexible nasoendoscopy was performed on any patient presenting with upper aerodigestive tract symptoms or potentially referred symptoms, unless declined by the patient or not technically possible. The large group of patients in whom flexible nasoendoscopy was not performed or recorded was excluded from analysis. However, these patients' outcomes are illustrated in Figure 2, and the 12.5 per cent malignancy detection rate in this group emphasises the importance of proceeding to operative EUA in patients with suspected underlying pathology. It is worth noting that local demographic factors and patterns of presentation will affect management pathways. For example, the sensitivity and specificity of pre-operative flexible nasoendoscopy that we have described must be open to further interrogation in populations in which post-cricoid and upper oesophageal disease is more prevalent. The increasing use of nasoesophagoscopy is therefore to

be encouraged. However, one of the malignancies detected in our study was of the upper oesophagus and was successfully identified by flexible nasoendoscopy. The one patient with SCC diagnosed at the time of panendoscopy from lymph node fine needle aspiration was also excluded from contingency analysis as this was not an endoscopic biopsy result; however, this case emphasises the importance of a concurrent, thorough neck examination at the time of panendoscopy. We must also recognise that the patients included in analysis were those who proceeded to, and were identified by, an operative event in the form of rigid endoscopy. The omission from analysis of those patients who were discharged directly from the clinic is therefore likely to have underestimated the sensitivity and specificity of flexible nasoendoscopy.

Although we did not specifically investigate complication rates, the extended period of in-patient stay of a small number of patients in this study does indicate the importance of justifying operative investigation under general anaesthesia. An obvious confounding factor is the fact that those patients with more severe concurrent illnesses tend to be in the higher risk group for head and neck cancer; even so, the complications of the EUA procedure need to be considered, given the extremely safe alternative of flexible nasoendoscopy.

Conclusion

Flexible nasoendoscopy was found to be highly accurate for excluding significant upper aerodigestive tract pathology. Rigid endoscopic examination is a common ENT procedure and, for patients with normal examination results and a low suspicion of malignancy, often marks the end of the investigation and treatment pathway; however, in such patients there is little evidence of benefit. We propose that, given a reassuring history and negative flexible nasoendoscopy examination results, rigid endoscopic examination is unnecessary. However, individual clinicians' experience and expertise in patient investigation must always be valued, and rigid endoscopy remains an important diagnostic procedure in high-risk patients and those in whom pre-operative visualisation of the upper aerodigestive tract is sub-optimal.

References

- 1 Davey S, Dixon H, Gibbins N, Lew-Gor S, Weighill J, Harries ML. Fast track head and neck referrals audit. *Otolaryngol Head Neck Surg* 2012;**147**(suppl 2):158
- 2 Postma GN, Cohen JT, Belafsky PC, Halum SL, Gupta SK, Bach KK *et al.* Transnasal esophagoscopy: revisited (over 700 consecutive cases). *Laryngoscope* 2005;**115**:321–3
- 3 Department of Health: Referral guidelines for suspected cancer. In: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4008746 [24 September 2012]
- 4 NICE: CG27 Referral for suspected cancer: NICE guidelines. In: <http://guidance.nice.org.uk/CG27/NICEGuidance/pdf/English> [20 September 2012]
- 5 Webb CJ, Makura ZGG, Fenton JE, Jackson SR, McCormick MS, Jones AS. Globus pharyngeus: a postal questionnaire survey of ENT consultants. *Clin Otolaryngol* 2000;**25**:566–9

- 6 Nagano H, Yoshifuku K, Kurono Y. Association of a globus sensation with esophageal diseases. *Auris Nasus Larynx* 2010;**37**:195–8
- 7 Harar RP, Kumar S, Saeed MA, Gatland DJ. Management of globus pharyngeus: review of 699 cases. *J Laryngol Otol* 2004;**118**:522–7
- 8 Takwoingi YM, Kale US, Morgan DW. Rigid endoscopy in globus pharyngeus: how valuable is it? *J Laryngol Otol* 2006; **121**:42–6

Address for correspondence:
Mr J C Fleming,

ENT Dept,
William Harvey Hospital,
Kennington Rd, Willesborough, Ashford TN24 0LZ, UK

E-mail: JCFleming@doctors.net.uk

Mr J C Fleming takes responsibility for the integrity of
the content of the paper
Competing interests: None declared
