The Journal of Laryngology & Otology
September 2000, Vol. **114,** pp. 690–693

Panendoscopy and bronchial washings: role and efficacy in detection of simultaneous primary head and neck cancers

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Abstract

The phenomenon of multicentricity in head and neck squamous cell carcinoma affects survival rates. We evaluated the use of panendoscopy/triple endoscopy and, in particular, the place of bronchial washings in the initial staging assessment of head and neck tumours. In a prospective panendoscopic study, a second primary rate of 4.8 per cent was discovered. All four bronchial tumours – both index and simultaneous primary cases – were obvious on bronchoscopy and chest X-ray, despite 50 per cent of them being clinically silent. A self-limiting complication rate of 2.4 per cent was encountered. The issue of bronchial washings was debated and our sensitivity (50 per cent) and specificity (97 per cent) results assessed. We advocate the inclusion of bronchoscopy as part of a panendoscopic work-up of head and neck tumours. The rationale for this is discussed. Bronchial washings, although cheap and easy to process, did not change the management of any patient in the study group and contamination could complicate assessment. Overall, panendoscopy is a safe worthwhile procedure.

Key words: Head and Neck Neoplasms; Carcinoma, Squamous Cell; Bronchoscopy; Bronchoalveolar Lavage Fluid; Neoplasms, Second Primary

Introduction

Head and neck squamous cell cancer represents approximately five per cent of all reported cancer cases. World-wide, more than 500 000 new cases are projected annually.[1,2] This represents a significant clinical commitment and health care burden.

Surgery, radiotherapy and chemotherapy have contributed to improvements in local control rates of head and neck cancer, yet survival has not improved significantly over the last two decades.[3–5] It is well recognized that patients who develop malignant epithelial tumours of the upper aerodigestive tract are at a higher risk of additional cancers, i.e. multiple primary neoplasms.[6] This incidence has consistently been reported at between 2.5 and 16 per cent.[7–18] Undoubtedly, this fact contributes to the overal failure to improve cure rates.

The concept of field cancerization, introduced by Slaughter,[19] accounts for this clustering of multiple primary tumours in the head and neck region. Effectively, certain initiators/promoters, e.g. alcohol and tobacco, produce an epithelial contact carcinogenic effect. An increased susceptibility to multifocal disease results.

An effective programme of screening for second primary tumours and metastases is essential to facilitate early diagnosis and treatment. The obvious screening mechanism is to identify at risk groups and assess them. Head and neck squamous cell cancer patients represent such a group. Most institutes treating head and neck cancer will screen at initial diagnosis for simultaneous/synchronous tumours. There is no consensus as to the degree and exact means of screening.[20] The predominant controversies involve the comparable diagnostic efficacies between endoscopic procedures and radiological studies.

Against this back-drop, a prospective sequential panendoscopic/triple endoscopic study was formulated to: (a) determine the ability of panendoscopy to detect simultaneous/synchronous tumours; (b) determine the complications associated with panendoscopy; and (c) evaluate the role of bronchial washings as a screening method for bronchogenic neoplasms.

Methods

Consecutive patients evaluated in the Department of Otolaryngology/Head and Neck Surgery of St James

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Accepted for publication: 15 April 2000

https://doi.org/10.1258/0022215001906714 Published online by Cambridge University Press

Hospital and the Royal Victoria Eye and Ear Hospital, with newly diagnosed primary squamous cell carcinoma of the head and neck, comprised the study group. This group was composed of referrals from primary care, inpatient referrals from medical/surgical services and tertiary referrals from other otolaryngology institutes. The study was conducted between June 1993 and September 1995. Patients with skin, salivary gland, thyroid or lip tumours were excluded.

After initial assessment, prospective cases, based on history, examination or a combination of both, were listed for panendoscopy for the purpose of staging the tumour and searching for simultaneous/synchronous primary tumours. Pre-operative chest X-ray was taken of all prospective study patients. All endoscopies were performed by either the senior author (C.T.) or the resident senior registrar.

Following induction, bronchoscopy was performed with a rigid Storz bronchoscope in all cases. Each mainstem bronchus was irrigated with 10 ml of normal saline and aspirated for cytology in separate containers.

After intubation with a small-lumen (5 mm) cuffed endotracheal tube, laryngoscopy was performed with a wide-lumen laryngoscope. Full-length oesophagoscopy was undertaken with a rigid oesophagoscope. Assessment was completed with digital examination of the oral cavity, oropharynx and the post-nasal space.

All patients were followed for at least six months to determine the second primary rate. Information essential to the study was collected on standardized forms. This facilitated data interpretation and patient follow-up. Criteria for diagnosing a second primary cancer were those established by Warren and Gates.[21] Head and neck tumours were categorized according to anatomical sites.

Results

Over this 27-month period, a total of 95 patients with head and neck squamous cell carcinoma, were assessed. The primary index tumour sites, after initial outpatient assessment, are shown in Table I. The two bronchial index tumours were referred for review because of cervical lymphadenopathy.

In 15 cases, the patient presented with cervical lymphadenopathy and fine-needle aspiration cytology suggested a diagnosis of metastatic squamous cell carcinoma, although the primary tumour site was not obvious after initial assessment. Following panendoscopy, three of 15 cases had a primary site found – two were hypopharyngeal tumours and one was an oesophageal tumour. The other 12 cases were excluded, leaving 83 cases for further analysis.

TABLE I
PRIMARY INDEX TUMOUR SITES AFTER OPD ASSESSMENT

Site	*n*
Oral cavity	15
Oropharynx	17
Nasopharynx	1
Hypopharynx	10
Supraglottis/glottis/subglottis	25
Bronchus	2
Cervical oesophagus	10
Primary of unknown origin	15

TABLE II
SIMULTANEOUS PRIMARY SQUAMOUS CELL CARCINOMAS

Primary	Second primary
Cervical oesophagus	Bronchus
Left tonsil	Left pyriform fossa
Right pyriform fossa	Right bronchus
Soft palate	Nasopharynx

Sixty-three patients were male and 20 were female. Ages ranged from 39 to 84 years, with a mean age of 63 years. Four simultaneous primary squamous cell carcinomas were identified at panendoscopy (Table II). None of these patients' symptoms were related to the second primary tumour. Both bronchial tumours, in this subset, were evident on chest X-ray. Further follow-up for six months revealed no further synchronous tumours, yielding an overall second primary rate of 4.8 per cent.

Two patients (2.4 per cent of the study group) developed complications as a result of panendoscopy. One, diagnosed with supraglottic carcinoma, desaturated between bronchoscopy and subsequent endotracheal intubation, but suffered no ill effect. Another patient bled from the site of bronchogenic biopsy but settled with conservative treatment. There were no major complications amongst the 83 patients.

Bronchial washings were obtained on 89 of the initial 95 patients. In four patients, tracheostomies were fashioned because of airway compromise and washings were not taken, and in a further two cases there was no record of bronchial specimens. The findings are shown in Table III. Overall, four bronchial tumours were detected – two index tumours and two simultaneous tumours. All four tumours were obvious on bronchoscopy and chest X-ray. Two of these tumours yielded positive bronchial washings. In one of the index cases, the positive washings and the side of the tumour correlated. The other index bronchial case gave a negative result. One of the simultaneous bronchial tumours yielded positive washings from both sides. Of the 89 washings, we had two false-positive results. The fact that these washings were positive from both sides was in keeping with contamination.

All five cases of bronchogenic metastases yielded negative results for bronchial washings. One chest X-ray in this subset was reported as negative.

TABLE III
BRONCHIAL WASHINGS

True positives	2
True negatives	83
False positives	2
False negatives	2
Sensitivity	50%
Specificity	97%

https://doi.org/10.1258/0022215001906714 Published online by Cambridge University Press

Although computerized tomography (CT) of thorax was selectively performed, it was positive in all cases of primary and secondary bronchial tumours.

Discussion

The mucous membrane of the upper aerodigestive tract has been described as a 'communal spawning ground' for multi-focal squamous cell carcinoma.[22] On excluding metachronous tumours, the incidence of simultaneous/synchronous tumours has been quoted at a more conservative one-three per cent[8–10] Our study figures of 4.8 per cent are in agreement. This paper, to our knowledge, represents the first prospective study in Ireland, to estimate the second primary rate of head and neck cancer. The majority of papers on this topic have been published by American institutes.

Significantly, upper aerodigestive tract cancer patients experience a 10.7 times higher risk of additional related cancers than the general population.[6] It has been calculated that new cancers occur at an excess rate of 150–250 per cent in patients with head and neck squamous cell carcinoma.[18] Ultimately, the presence of a second primary tumour is a poor prognostic indicator. In Shons' study[23] of 50 patients with multiple primaries who died, 34 died of their second primary, only three died of the index tumour. The intuitive notion of searching for second primary tumours would appear to be justified on this evidence. Earlier detection is necessary to improve survival rates and prognosis.

What remains more contentious than its justification, however, is the diagnostic efficacy and relative benefits of panendoscopy versus radiological investigations. The debate surrounding bronchoscopy, chest X-ray and bronchial washings is a case in point.

Panendoscopy of high risk groups meets the criteria for screening, as established by Wilson and Jungner[24] Bronchoscopy is highly sensitive and specific, is well tolerated by patients, has a low complication rate and is economical as a day-case procedure. Studies have suggested that bronchoscopy can fail to detect up to 16 per cent of lesions apparent on chest X-ray.[11] This has not been our experience. Although all four primary bronchial tumours were obvious on chest X-ray and bronchoscopy, 50 per cent were clinically silent. This emphasizes that symptom-directed endoscopy may miss primary tumours. Notably, flexible endoscopy visualizes more lesions than rigid bronchoscopy, especially at peripheral sites.[25]

Benninger[26] only advocates bronchoscopy when (a) symptoms suggest a bronchogenic tumour, (b) the chest X-ray is abnormal and (c) there is a large laryngeal tumour. We feel that this over emphasizes the importance of chest X-ray and underplays the link between laryngeal and bronchial tumours. Levine[20] has highlighted the fact that a bronchial malignancy must be greater than 1 cm in diameter for it to be detected on chest X-ray. For detection within the main stem bronchus or hilar shadows, the tumour may have to be in excess of 2 cm. Consequently, the chest X-ray is not an absolute indicator of the presence of second primary lesions in the lung, and CT scanning would appear to be superior in the detection of bronchogenic involvement. Our experience is in agreement with recent reports.[27]

The negative aspects of panendoscopy include both surgical complications and cost. Since panendoscopy includes several airway manipulations, there is an inherent risk of airway compromise, with patients undergoing laryngeal biopsy having the highest risk. We encountered no major complication, and a self-limiting minor complication rate of 2.4 per cent is satisfactory. There are few publications on complication rates. A re-intubation rate of 1.25 per cent is quoted in one large retrospective study of patients undergoing direct laryngoscopy.[28] We did not have to re-intubate any patient in this series.

In an era of cost-containment and fiscal rectitude, the yield and cost-effectiveness of panendoscopy is continually questioned. McGuirt[15] argues that panendoscopy adds little cost or effect to direct laryngoscopy. Despite relatively low overall yield in this study, panendoscopy allowed full staging of the tumours and may be ultimately cost-effective if an additional tumour is found at initial assessment.

The issue of bronchial washings and their diagnostic accuracy remains debatable. It has been suggested that tumour cells can shed into the bronchi when the bronchoscope is passed over a squamous cell carcinoma.[29] Such contamination could certainly complicate patient assessment. Although the shedding of tumour cells is possible, based on our low false-positive rate, it would appear improbable. Johnson's series of 100 patients yielded only one false-positive result for bronchial washings.[30] Our findings warn against the over-emphasis on washings results but highlight the possible significance of a positive result. In this study, washing results failed to change the management of any patient.

In conclusion, we advocate the use of panendoscopy in the assessment of head and neck cancers and recommend the inclusion of bronchoscopy in panendoscopy. We feel that bronchial washings offer little extra information but are quick and simple to obtain. We were impressed with the overall safety, pick-up rate and economical considerations for panendoscopy.

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Professor C. Timon takes responsibility for the integrity of the content of the paper.
Competing interests: None declared

https://doi.org/10.1258/0022215001906714 Published online by Cambridge University Press