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Palpation compared with ultrasound in the assessment of malignant cervical lymph nodes

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Abstract

This prospective study compares the results of pre-operative clinical examination and simple ultrasound examination of the neck in 18 patients with proven head and neck primary tumours and palpable cervical lymphadenopathy, who then underwent 21 radical neck dissections. Neck palpation and ultrasound examination were compared with histological examination. Ultrasound did not add significantly to the information obtainable by simple neck palpation in this group of patients.

Key words: Lymph nodes, neck; Neoplasm, metastasis; Ultrasonic diagnosis; Palpation

Introduction

Accurate evaluation of metastases to the cervical lymph nodes is essential in patients with head and neck malignancies. The stage of the disease must be known if the most appropriate treatment is to be offered to the patient.

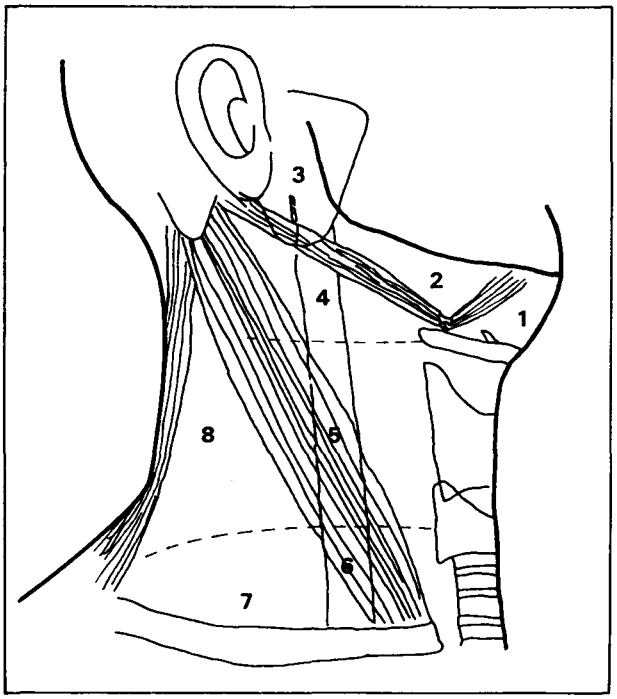

FIG. 1
Proforma used for recording the results of clinical examination.

In addition, accurate staging allows meaningful comparisons to be made between different types of treatment, and enables the most accurate assessment of prognosis to be made.

Ultrasound examination of the neck has the potential to detect lymph nodes which may be impalpable, and it allows accurate measurement of their size (Hajek *et al.*, 1986). This prospective study compares the results of pre-operative neck palpation, pre-operative ultrasound and histopathological examination of the neck specimen.

Method

Patients with proven head and neck tumours who had a palpable mass somewhere in the neck were assessed before planned radical neck dissection. Each patient was examined by four experienced clinicians within the 48 hour period preceding surgery. Each clinician recorded his findings independently on a standard proforma (Figure 1). These results were combined to give one result for neck palpation. Each patient also underwent ultrasound examination of the neck during the week preceding surgery.

TABLE I
THE SITE OF PRIMARY TUMOURS

Primary tumour site	No. of patients
Larynx	4
Oral	4
Nasopharynx	3
Hypopharynx	3
Tongue	2
Unknown	1
Thyroid	1

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TABLE II

OVERALL RESULTS COMPARING ULTRASOUND AND PALPATION, FOR THREE AREAS OF THE NECK CONSIDERED BOTH SEPARATELY AND IN COMBINATION, FOR BOTH POSITIVE AND NEGATIVE PATHOLOGY

Pathology positive

		Ultrasound	
		Positive	Negative
Palpation	Positive	A	B
	Negative	C	D

Pathology negative

		Ultrasound	
		Positive	Negative
Palpation	Positive	A	B
	Negative	C	D

	A	B	C	D	*p*-value
Pathology positive					
Upper neck	4	1	0	1	1.00
Mid-neck	17	1	1	0	1.00
Posterior triangle	3	1	2	2	1.00
Combined	24	3	3	3	1.00
Pathology negative					
Upper neck	3	0	2	10	Not available
Mid-neck	0	0	0	2	Not available
Posterior triangle	0	5	2	6	1.00
Combined	3	5	4	18	0.581
All combined	27	8	7	21	1.00
Upper neck (combined)	7	1	2	1	1.00
Mid-neck (combined)	17	1	1	2	1.00
Posterior triangle (combined)	3	6	4	8	0.754

Ultrasound examination was carried out using an Aloka 650 machine with either a 7.5 mHz linear or a 10 mHz sector probe and the findings were recorded on a similar proforma. Immediately after the operation the neck specimen was taken to the Pathology Department by one of the surgeons. The fresh, unfixed specimen was orientated by the surgeon, and was pinned on a cork board in its anatomical position. The number of malignant nodes was recorded by the pathologist, together with their site, on a proforma similar to that used pre-operatively.

The results of neck palpation and ultrasound examination were compared along with the 'gold standard' of the histopathological results. The M^{c}Nemar test described in *Statistical Methods in Cancer Research* (1980) and *Statistical Methods in Medical Research* (1987) for correlated proportions (the exact test, using binomial distributions) was employed.

Results

Eighteen patients were included in the study. Three patients underwent staged bilateral neck dissections, giving a total of 21 sets of clinical, ultrasound and histopathological results for comparison. The primary tumours are listed in Table I. All were squamous cell carcinomas of the aerodigestive tract, except for one carcinoma of the thyroid, one malignant melanoma of the oral cavity and one patient with an unknown squamous cell primary.

The overall results of clinical examination did not differ significantly from those of the ultrasound examination (M^{c}Nemar test for correlated proportions: $p = 1.00$, shown in Table II).

To evaluate whether one form of assessment was better than another in a given anatomical site, three areas of the neck were considered separately: the upper neck closely related to the mandible (areas 1, 2 and 3 on Figure 1), the mid-neck (areas 4 and 5) and the posterior triangle (areas 6, 7 and 8). Again the results of clinical examination did not differ significantly from those of ultrasound in any of these three sites (upper neck, $p = 1.00$; mid-neck, $p = 1.00$; posterior triangle, $p = 0.75$; shown in Table II).

The sensitivity (the ability of a test to detect disease when it is present), specificity (the ability of a test to identify the absence of disease) and overall accuracy (agreement between test and histopathological examination) of palpation and ultrasound in the detection of malignant cervical nodes in these three areas of the neck are shown in Table III. Surprisingly, in this relatively small group of patients both palpation and ultrasound scored 100 per cent for both sensitivity and specificity in the mid-neck area.

Discussion

In this study we have considered only patients with already proven head and neck malignancy who were about to undergo a radical neck dissection. We were thus able to obtain the 'true' histopathological answer, with which to compare the results of pre-operative neck palpation and ultrasound examination. All the patients had palpable lymphadenopathy somewhere in the neck, but ultrasound did not detect any further neck masses other than those already palpable.

The ultrasound examinations in this study were performed solely to identify lymph nodes. No attempt was made to use any ultrasonic criteria for the prediction of malignancy. Interpreting benign lymphadenopathy as secondary deposits reduces the specificity of ultrasound examination, and thus its overall accuracy. However, the ultrasonic criteria used to predict malignancy are still a subject of debate, and require further refinement. In a recent series (unpublished data) we found that the mean size of the metastatic squamous cell carcinoma, tuberculous and hyperplastic nodes was 1.7, 1.8 and 1.7 cm diameter respectively. Therefore, in keeping with other authors we place minimal emphasis on nodal size as a criterion for malignancy (Hajek *et al.*, 1986; Vassallo *et al.*, 1992). Other ultrasonic criteria that have been proposed as indicators of malignancy include a rounded outline rather

TABLE III

THE SENSITIVITY, SPECIFICITY AND OVERALL ACCURACY OF PALPATION AND ULTRASOUND EXAMINATION IN DETECTING MALIGNANT NECK NODES

		Test	
		Positive	Negative
Histology	Positive	A	B
	Negative	C	D

Sensitivity = A/(A + C)
Specificity = D/(C + D)
Accuracy = A + D/(A + B + C + D)

(All expressed as percentages)

	Sensitivity	Specificity	Accuracy
Upper neck			
Palpation	62%	80%	81%
Ultrasound	44%	67%	67%
Mid-neck			
Palpation	100%	100%	95%
Ultrasound	100%	100%	95%
Posterior triangle			
Palpation	38%	64%	57%
Ultrasound	60%	85%	67%

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than a fusiform or ovoid outline (Tohnosu *et al.*, 1989), and the presence of eccentric cortical hypertrophy (Vassallo *et al.*, 1992).

This study has not evaluated the place of ultrasound in the detection of abnormal nodes in the clinically normal neck nor in the detection of contralateral nodes in the patient with unilateral palpable nodes, as the definitive histopathological reference would not have been available. It is in these two groups of patients ultrasound may have the greatest impact on patient management. Hajek *et al.* (1986) describe the ultrasonic detection of 15 cases of malignant neck nodes in 32 clinically normal necks. Ultrasound may also be of value in the detection of recurrent tumour in a neck scarred by previous radical surgery (Westhofen, 1987). The addition of ultrasound-guided fine needle aspiration of suspicious neck nodes is known to improve the accuracy of ultrasound examination (Baatenburg de Jong *et al.*, 1989).

In this study, we have not been able to demonstrate that ultrasound detected any malignant neck masses which were impalpable.

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