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Is total nodal yield in neck dissections influenced by the method of specimen presentation to the pathologist?

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Abstract

Excision of the lymphatic structures in the neck is an integral part of the management of many head and neck cancers. Some surgeons dissect the specimens intraoperatively and send the groups of lymph nodes to the histopathologists in separate pots; others provide only a complete en bloc lymphadenectomy and rely on the pathologist to identify the anatomical areas. We aimed to find out whether the method by which specimens are presented to the histopathologist influenced the total nodal yield in neck dissections.

Eighty-seven consecutive neck dissections were compared and information collated as to how the specimens were presented to the histopathologist. The mean total yield was 33 (range 15–57). There was no significant difference in total nodal yield between specimens presented to the pathologist either en bloc or in individual groups ($p = 0.4$).

Although specimens of neck dissections divided intraoperatively and presenting in nodal groups to the histopathologist in separate pots most probably permits more accurate anatomical assessment, it does not influence the total yield.

Keywords: Neck dissection; Lymph nodes; Squamous cell carcinoma; Neoplasm metastasis

Introduction

The presence or absence of lymph node metastases is the most important prognostic factor in patients with squamous cell carcinoma (SCC) of the head and neck.[1] Disease recurs more commonly in patients with histopathologically invaded nodes.[2] Although the presence of either extracapsular spread or two or more involved nodes indicates a poor prognosis, there is growing evidence that the use of adjuvant treatments may obviate this effect, so if patients with lymph node metastases can be identified and offered additional treatment their overall survival may be improved.[3] The gradual move towards elective neck dissections in oropharyngeal SCC is a testament to this philosophy, with surgeons removing the groups in the neck most likely to be involved in the metastatic process.[4] In theory, therefore, the more lymph nodes that can be identified from an elective neck dissection, the greater the chance of identifying the subgroup of patients who would benefit from adjuvant treatment.

The Royal College of Pathologists has stated that "a radical neck dissection may yield an average of 20 nodes (range 10 to 30) in the absence of previous chemotherapy or neck dissection".[5] The yield of lymph nodes from a neck dissection depends not only on surgical technique but also on the skill and efforts of the histopathologist. Specimens may be presented in one of two ways. Traditionally surgeons have provided a total en bloc lymphadenectomy, often pinned out to aid processing. In some units, however, surgeons divide the specimen into separate groups at the time of operation and provide multiple samples.[6] To date there have been no studies

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to our knowledge that have compared the relative yields of lymph node from these two techniques. We have attempted to correct that deficiency.

Material and methods

Consecutive neck dissections by a single surgeon during a four-year period that ended in May 2008 were identified from the hospital's head and neck database. Patients who had had previous chemotherapy, radiotherapy, or cervical operations were excluded, as were those with occult primary tumours. In addition to personal data, information was collected about to how the neck dissection specimen was presented to the histopathology department. Where the specimen was not provided en bloc, the surgeon had divided the specimen intraoperatively and sent groups separately. Care was taken to palpate the specimen before division to minimise the risk of inadvertent spillage of tumour cells. Significance of difference in nodal yields between the two groups was assessed using the "between Student's t test".[7] The null hypothesis proposed was that there was no difference between specimens provided en bloc or those divided intraoperatively.

Results

Eight-seven neck dissections were identified in 80 patients. Eighty of these (90%) were selective (groups I–IV), the remainder being comprehensive. In seven patients simultaneous selective dissections were undertaken for midline tumours. The number of lymph nodes removed in selective neck dissections was comparable to that of the corresponding groups in comprehensive neck dissections as a result of strict adherence to surgical boundaries. The male:female ratio was 2:1, and the mean age of the patients was 64 years (range 34-91). All the primary tumours were squamous cell carcinomas of the head and neck. In no case was there inadvertent spillage of tumour during operation. The mean total yield of lymph nodes was 33 (range 15–57). The mean nodal yield/group ranged from 4 to 9 (Table 1). There was no apparent association between mean nodal yield and age or sex. There was no difference ($p = 0.4$) in total yield between specimens sent to the histopathologist either en bloc or in divided groups (Fig. 1). There were no recurrences in the neck during the study period in either group.

Table 1
Mean, median and mode of nodal yields for each level (group) of neck dissection.

	Level (group)					
	1	2a	2b	3	4	5
Mean	4.0	6.7	4.5	7.2	6.9	9.7
Median	3.0	5.0	4.0	7.0	5.0	9.0
Mode	4.0	4.0	4.0	7.0	9.0	4.0

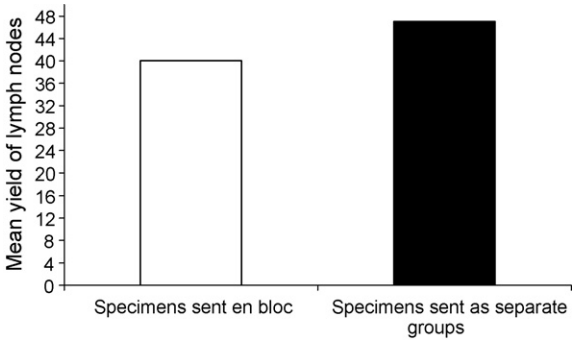

Fig. 1. Graph comparing mean nodal yields from neck dissection specimens presented either en bloc or as separate groups.

Discussion

Operations on the neck are an integral part of the management of many patients who present with malignant disease of the head and neck. The traditional approach to such operations was the radical neck dissection, a total en bloc lymphadenectomy in which associated non-lymphatic structures such as the internal jugular vein and sternocleidomastoid muscle were removed. Such specimens were commonly presented in their entirety, preserved in formalin, to the histopathology laboratory and labelled or pinned on to a cork orientation board. However, the boundaries of the groups of lymph nodes within the neck are anatomical, and cannot easily be delineated in a resected, preserved specimen. The considerable shrinkage that also occurs after excision may compound the process of accurately identifying groups of diseased nodes.

The increasing move towards function-preserving neck operations has reduced the need to remove structures such as the internal jugular vein and sternocleidomastoid muscle, which themselves were useful in orientating specimens after excision. The vagaries of processing such specimens mean that the accuracy of histopathological reports in assessing nodal groups is sometimes questionable. Correct and accurate analysis of lymph nodes in excised specimens is important, as it provides not only diagnostic but also prognostic information.[8,9] As an increasing number of, or more distant, groups are affected by disease, prognosis worsens. If there is an occult primary, the group of neck nodes involved may give a clue as to the site of the origin of disease.[10,11]

Upile et al discussed the erroneous assumption of the superiority of the macroscopic en bloc dissection over selective dissections between nodal groups without nodal rupture.[11] This was caused in part by the en bloc enthusiast's lack of appreciation of the true microscopic disease and the tendency of resections to reflect surgical ease or expediency despite their scope or duration. By answering this criticism of selective dissections themselves, they logically extended this rationale to histopathological sampling.

Dividing specimens into appropriate groups during operation aims not only to resolve the problem of perioperative

coregistration of histopathology with anatomy, but also reduces in vivo manipulation of the specimen and hence the risk of inadvertent spillage of tumour. It may also permit the histopathologist to identify more nodes and in turn the presence or absence of micrometastases or soft tissue deposits.[9] The presence of cervical node metastases in head and neck cancer, and the increasing numbers of groups involved, worsens the prognosis.[10] Nodal yields in excess of 20 have been shown to correspond with a higher likelihood of finding cervical metastases.[12] Finding out the degree of nodal spread is important not only for eradicating disease but also for making a decision about the use of adjuvant treatment such as radiotherapy. The assessment of nodal groups is particularly important since the development of more modern techniques such as intensity modulated radiotherapy in which a radical dose of treatment can be applied selectively to an involved group of nodes while sparing uninvolved ones and normal tissue.[13] Reproducible coregistration of disease and in situ groups of lymph nodes is imperative if surgically-directed brachytherapeutic treatment regimens are to be considered. Accurate staging also allows the changing patterns of disease to be monitored, and allows equitable comparison of patients in clinical trials and among surgical units.[8]

Accurate histological analysis of resected specimens is essential in managing patients with head and neck cancer. Although a number of labelling techniques for en bloc specimens have been described, inaccuracies can occur if histopathologists are allowed to interpret anatomical groups in fixed specimens.[14,15] If the dissection of the specimen takes place in the operating theatre, time is obviously saved in orientating and dissecting the specimen in the laboratory. The accuracy of the dissection is also improved, and each piece of tissue is presented in a more manageable size for processing and analysis. Although we have shown that the total nodal yield is not influenced by the method of presentation of the specimen, the importance of accurately assessing groups from prognostic and therapeutic points of view cannot be over-emphasised, and a technique of surgical dissection and preparation of the tissues to allow a more precise histological analysis must be commended.

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