Review Article

Management of the neck in malignant parotid neoplasm

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ABSTRACT

Parotid gland cancer (PGC) are rare and accounts for 3% of all head and neck malignancies.The classification of parotid tumour is complex and comprises both benign and malignant neoplasms of epithelial and non-epithelial origin.There is marked variation in the histological features of these tumours,therefore treatment options of parotid cancer is widely varied.Lymph node metastasis to the neck is one of the most important factors in therapy and prognosis for patients with parotid malignancy. This article reviews the literature regarding neck management of parotid cancer in cases of both clinically positive (cN+) and clinically negative (cN-) neck nodes. The literature search was performed using Google search engine, PUB Med to identify relevant articles on recommendations for neck management in patients with parotid cancer in cases of both clinically positive (cN+) and negative (cN-) neck nodes. Due to the rarity of parotid cancer and the wide histopathological varieties, the literature was hard to interpret. There is a consensus about managing clinically positive neck with therapeutic neck dissection. Most studies agree on elective neck dissection in certain indications which are high T stage, high grade histology, facial paralysis, age, extraglandular extension, peri-lymphatic invasion. Level II to IV appears to be at higher risk and can be done through the same parotidectomy incision. The role of irradiation in cN- necks is not clear but some studies recommend its usage for curative intent and argue that it adds less morbidity than the elective neck dissection. Although the management of the neck in cN+ patients is widely agreed, controversy still exists about the need for elective neck dissection in cN- patients and the levels which should be dissected.

Keywords: Neck nodes, Neck dissection, Parotid cancer

INTRODUCTION

Parotid gland cancer (PGC) accounts for 3% of all head and neck malignancies.[1] The 2005 World Health Organization (WHO) classification of malignant salivary gland tumours comprises 23 entities of epithelial origin. The most common malignant salivary gland tumours include mucoepidermoid carcinoma, adenoid cystic carcinoma, polymorphous low grade adenocarcinoma, carcinoma ex pleomorphic adenoma, acinic cell carcinoma, and adenocarcinoma not otherwise specified.[2,3] Malignant epithelial tumours range in aggressiveness from low to high grade and their behaviour depends on tumour histology, degree of invasiveness and the presence of regional metastasis.[4]

For malignant tumours, 5-year survival is 70% to 90% for low-grade and 20% to 30% for high-grade tumours.[5] Lymph node metastasis to the neck is one of the most important factors in therapy and prognosis for patients with PGC. According to the literature, occult metastases are detected in 12% to 48% of patients.[3] There is little dispute about patients with clinical evidence of cervical nodal metastasis cN+require treatment of the neck. However, controversy still exists on management of clinically negative (cN-) neck nodes for patients with parotid cancer,whether or not to treat them either with elective dissection or treatment.Indeed, this may be due to administration of planned postoperative radiotherapy to the primary tumour together with the regional lymph nodes obviating the need for neck dissection. The

decision to dissect the neck is mainly based on the risk of occult metastasis. In any circumstances, the concept of elective nodal dissection has not been embraced with the same enthusiasm for salivary cancer as it is for squamous carcinoma of the head and neck, predominantly because of the disparity in clearly defined risk criteria for occult metastasis between the two entities.[6]

METHODS

The literature search was performed using Google search engine, PUBMed to identify relevant articles on recommendations for neck management in patients with parotid cancer in cases of both clinically positive (cN+) and negative (cN-) neck nodes.

RESULTS

Due to the rarity of parotid cancer and the wide histopathological variations, the literature review for management of parotid cancer was difficult to interpret. There is a consensus about managing clinically positive neck nodes with therapeutic neck dissection. Most studies agree on elective neck dissection in certain indications such as patient's with high T stage, high grade histology, facial paralysis, extra glandular extension, peri-lymphatic invasion. Neck level II to IV appears to be at higher risk and can be done through the same parotidectomy incision and should be electively dissected. The role of irradiation in cN- necks is not clear but some studies recommend its usage for curative intent and argue that it adds less morbidity than the elective neck dissection.

DISCUSSION

Parotid carcinomas have a low incidence, a wide histological variability, and a high variety of treatment concepts. Therefore, the literature of parotid cancer surgery is difficult to interpret.

According to prevalence the most common pathology of PGC is mucoepidermoid carcinoma (33%), followed by carcinoma ex-pleomorphic adenoma (21%), acinic cell carcinoma (13%), adenocarcinoma (10%), and adenoid cystic carcinoma (7%).[7]

What are the indications of lymph node dissection in parotid cancer?

The treatment of cN+ neck nodes is widely agreed. In patients who present with clinically positive neck disease, there is no debate that TND (Therapeutic neck dissection) is warranted. In the study of Safina et al pathological positivity was confirmed in 87% patients who presented with a clinically positive neck disease.[7] Moreover, percentage of disease positivity was higher in level II to IV (77,73,53 respectively)in comparison with level I (51.6) and level V (40%).[7]

According to the literature, occult metastases are detected in 12–48% of patients with parotid cancer.[8,9] This range in occult metastases is a reflection of the histological variations that can occur in parotid gland carcinoma. For instance, tumours such as salivary duct carcinoma and adenocarcinoma have high rates of neck metastases compared to tumours such as adenoid cystic cancer and acinic cell cancer. However, it remains partially unclear why there is such a difference in reported incidences of occult metastases. Possible explanations are differences in patient populations and scrutiny of the pathologic examination of the neck dissection specimen.[10]

Before 1966, the main practice at MSKCC (Memorial Sloan-Kettering Cancer Center) was to carry out radical neck dissection in clinically disease-positive necks and observe patients with clinically disease-negative necks [8]. Since 1966, this practice changed because it was observed that some patients, notably patients with high Tumour (T) stage and high-grade histology, experienced neck recurrence.

Eneroth, Conley and Hanamaker were among the first to point out that there are definable clinical findings that increase the likelihood of regional disease.[11,12] In their study, patients with facial paralysis had 60% to 70% risk of occult cervical metastasis. Spiro et al found a higher incidence (40%) of occult nodes in epidermoid cancer and 16% incidence in mucoepidermoid carcinomas compared with an overall risk of 6% for occult cervical metastasis for their entire study.[9]

The study by Armstrong et al reported one of the largest series of 474 patients. In this study patients with high-grade tumours had a 49% risk of occult disease compared with a 7% risk in intermediate to low grade tumours. The risk of occult metastases is 20% if the size of tumours are 4 cm or more. END (elective neck dissection) was recommended in these patients. In addition, it was concluded that neck levels II to IV were mainly at risk and should be electively dissected.[13]

These recommendations were supported by the work of both Rice et al and McGuirt, whose findings were similar to that of Armstrong et al with respect to histological type and risk of occult cervical metastasis. McGuirt suggested that a conservative, structure-sparing nodal dissection may be performed for staging purposes through the same incision as used for parotidectomy excision. In the early 1980s, Krause and Johns advocated nodal sampling in the first-echelon lymph nodes (I and II) during primary resection with frozen-section analysis, the results of which would determine the need for a more comprehensive lymphadenectomy addressing nodal levels at risk. Both authors felt that this sampling could be performed through standard incisions used for parotidectomy as these nodal levels are exposed during the initial course of the procedures.[14-17]

In 1993, the main practice in M. D. Anderson Cancer Center was to do neck dissection in the treatment of parotid cancer on the basis of two indications which are clinically palpable lymph nodes and evidence of regional adenopathy on preoperative computed tomography or magnetic resonance imaging. Patients who have facial paralysis, a high-grade lesion, evidence of extra-parotid extension, or peri-lymphatic invasion are treated with postoperative irradiation that includes the regional lymphatics. Patients who are older than 50 years are more likely to have these risk factors, and will more often require elective regional treatment. Patients with T4 tumours are given radiation therapy because of 50% incidence of occult disease in tumours of that stage.[18]

Frankenthaler et al in M. D. Anderson Cancer Center studied 99 patients with a primary parotid malignant neoplasm with no previous treatment who underwent a neck dissection, along with the appropriate treatment for their primary malignancy. In this study, the univariate analysis found that three factors; nerve involvement, extraparotid extension, and perilymphatic invasion, independently defined a population at higher risk for regional disease. The most predictive factors for occult disease were extracapsular parotid extension, patient age greater than 54 years, and peri-lymphatic invasion. Accordingly, the study advocates performing a neck dissection only in cases of a clinically or radiologically determined presence of lymph node metastases. They support the view that radiation therapy, if it is given in adequate doses, is adequate for treating subclinical disease.[18]

Most authors advocated performing a neck dissection on the basis of the histology of the primary parotid carcinoma and the tumour grade as these characteristics mostly influence the risk of occult metastases in primary salivary carcinoma.[19,20] Medina summarized the indications for elective neck dissection as follows: high-grade tumours, T3 and T4 tumours, tumours > 3 cm, facial paralysis, age >54 years, extra-glandular extension, and peri-lymphatic invasion.[21]

Further, some authors advocated a routine END in all cases of primary parotid carcinoma. They justified this on 2 arguments. First, there is inaccuracy in the pre-operative diagnosis of cytological grade; for example, Kawata et al reported the rate at which the histological grade was accurately diagnosed pre-operatively was low, especially in those with low-grade malignancy.[22] Second, the rate of occult metastases was high, with nodal disease detected in

61% of patients with high-grade and 23% with intermediate- grade disease. Therefore, given the inaccuracy of pre-operative fine needle aspiration and the higher rate of occult metastases reported, it could be justified to carry out an END in all patients.[7]

What is the sensitivity and specificity of FNAC in parotid cancer?

As the combination of physical examination and radiological evaluation cannot distinguish reliably between benign and malignant lesions in most cases, FNAC is regarded by many authors as an easy,cost-effective, and useful diagnostic procedure. In the literature, at a major cancer referral center, the FNAC of parotid masses has a sensitivity of 82% and specificity of 86%. In addition, overall diagnostic accuracy of cytological evaluation was 84%. In other recent literature, the accuracy of FNAC has ranged from 84% to 97%, the sensitivity from 54% to 95%, and the specificity from 86% to 100% in detecting malignant tumours of the salivary glands.[9,23,24]

However, one literature showed that in about 55% of cases, neither the exact tumour type nor the grade was known by FNAC or FS at the time of surgery. Therefore, a routine elective neck dissection was suggested in all primary carcinoma of the parotid glands. The authors supported their suggestion by clarifying that the neck dissection can easily be incorporated into the surgical approach with practically no additional morbidity and only a slight increase in operative time. Furthermore, negative nodal findings will allow the postoperative radiation field to be limited to the primary site. Their proposal included that elective neck dissection should always incorporate levels II and III.[9]

Regis de Britas Santos et al performed a multivariate analysis to determine independent risk factors for occult metastases. Among 145 patients treated by END, histology was the single most-important variable in predicting nodal disease. Adenocarcinoma, undifferentiated carcinoma, high-grade mucoepidermoid carcinoma, squamous cell carcinoma, and salivary duct carcinoma had greater than a 50% risk of metastases to the neck nodes. Thus the risk of occult nodal disease is high enough to warrant elective node treatment.[3,25]

Stennert et al recommended neck dissection in major salivary gland cancers, because even the incidence rates of so-called low-risk tumours are observed at values of 22% to 47%.[26] One of the first studies observing the occasionally aggressive local growth and distant metastasis of tumours, which might even be considered benign by some pathologists, was undertaken by Spiro et al.[27]

Chen et al suggested ENI (Elective Nodal Irradiation) as an alternative to neck dissection, especially when postoperative radiotherapy is to be administered to the primary tumour.[28] The addition of ENI adds minimal additional morbidity and, if the patient undergoes an END and the neck is pN0, it is usually included in the postoperatively irradiated portals because of 5% to 7% risk of a regional failure after END alone in patients with

mucosal squamous cell carcinomas who are treated surgically.[29]

In a systematic review carried out by Valstar et al the pooling of available data from suitable articles showed that in 32 of 137 ENDs (weighted average, 23%; range, 20-30%), positive nodes were present. These figures indicate that a substantial number of occult metastases occur in patients, and that elective treatment by END or radiotherapy is recommended. After this kind of procedure, regional recurrences are reported in only 5% of patients, thereby stressing its effectiveness.[10]

At the University of Florida, Herman et al studied 59 previously untreated patients with cN0 high-grade salivary gland carcinomas were treated with curative intent using elective neck dissection (END; n=41), or elective neck irradiation (ENI; n=18). All patients underwent resection of the primary cancer followed by postoperative radiotherapy.The study recommended elective neck management for patients with high-grade histology or a T3/T4 primary salivary gland carcinoma. But argue that if postoperative RT is indicated pre-operatively, then END is likely not necessary.[30]

In 2014, Safina et al studied 232 patients with a clinically disease-negative neck and only 74 were selected to undergo END. These patients who were more than 60 years old had T3/T4 tumours and had high-grade histology. The findings on pathology of vascular invasion, perineural invasion, and positive margins correlated well with the preoperative impression of aggressive histology. In these patients, the occult rate of metastases was 35%.[7]

Does age matters in neck management in cases of parotid cancer?

Safina therefore suggested that in patients with cN0 disease, observation of the neck is safe in patients who are under 60 years of age with clinical T1 or T2 tumours and with disease with low-grade histology. END should be carried out in patients with cT3, T4 disease or high-grade histology. At a minimum, levels II to IV should be dissected, with dissection of levels I and V being done according to size and location of the primary tumour. In patients with cN+ disease, all levels of the neck are commonly involved and therefore comprehensive neck dissection of levels I to V is advocated. In patients who do not have an END but in whom subsequent analysis shows the primary tumour to have adverse features on pathological analysis, post operative radiotherapy to the upper neck is recommended in addition to the primary surgical bed.[7]

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