

Research Article

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*Corresponding Author

Jaimanti Bakshi, Prof. & Unit Head II, Dept. of Otolaryngology & HNS, PGIMER, Chandigarh, Pin: 160012, Tel: +91 172 2754912, E-mail: drjayabakshi@ymail.com

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Inconsistency Among Fna and Histopathology for Parotid Malignancies and Impact on Postoperative Facial Nerve Status -An Institutional Retrospective Analysis

Jaimanti Bakshi^{1*}, Archit Kapoor², Naresh K Panda³, Professor & HOD, Vikas Sharma⁴, Mayank Rampal⁵, Raghab Sedai⁶, Amanjeet Bal⁷, Professor Anil Dash⁸, Associate Professor, Deepak Saharan⁹, Ganesh agarwal¹⁰, Gautamjit RK¹¹

¹⁻⁶Department of Otolaryngology & Head and Neck Surgery, PGIMER, Chandigarh, India

⁷Department of Histopathology, PGIMER, Chandigarh, India

⁸⁻¹¹Department of Otolaryngology & Head and Neck Surgery, PGIMER, Chandigarh, India

Abstract

Introduction: Management of salivary gland tumours is much debated because of a large number of cytopathological types and commonest diagnostic modality used is FNAC which itself is subject of much debate in salivary gland tumours.

Aim: The aim of this article is to show the histological inconsistency between the preoperative FNA and the final histopathological diagnosis in suspicious and locally advanced parotid malignancies.

Methods: A retrospective study was conducted in patients with cytologically suspicious and proven malignancy of the parotid gland between the period of January, 2016 to January, 2020. 51 patients with cytologically suspicious or proven malignant parotid tumor preoperatively were considered for the analysis.

Results: Out of a total of 51 patients evaluated 29 were male and 22 were females with a mean age of 40.7 years. Out of the 51 patients 30(58.82%) patients had a different histopathological finding when compared with the FNA results. 21(70%) out of the 30 patients had a proven malignancy on FNA. 06(28.57%) out of the 21 had a benign diagnosis on final histopathological examination. 35(85.36%) out of the 41 preoperatively diagnosed cases of malignancy were histopathologically confirmed as being malignant. 5(50%) out of the 10 cytologically suspicious or benign swellings were diagnosed as malignancy on final histopathological evaluation.

Conclusion: The role of FNA in diagnosing malignancy cannot be underestimated but there may be a substantial change in the type of malignancy on final histopathological report. Use of grade to plan the extent of surgery is not feasible because of the low yield of grades of tumour preoperatively by FNA. The surgeon should maintain a low threshold for facial nerve sacrifice in order to achieve a negative margin which is of primary importance.

Keywords: Histopathology; Parotid Malignancies; Facial Nerve; Salivary Gland Tumours

Introduction

The management of advanced parotid malignancy is challenging and still not standardized because of the wide histopathological possibilities and the decision to safeguard the facial nerve which if sacrificed has a significant negative impact on the quality of life. The diagnostic role of FNAC has been a subject much debated about but its role in providing information of malignancy cannot be ruled out, hence is the first line of investigation [1-3]. Another point that needs consideration is the accuracy of FNAC, which is low for malignant tumors [4]. Zbaren et al reported that the grade and histology was correctly diagnosed on FNAC in 33% and 31% cases respectively of parotid carcinomas [5].

The other modalities for establishing the diagnosis like the frozen section have also been advocated. FS has a higher diagnostic accuracy than FNA and is preferred only when there is a disagreement between the FNA and clinico-radiological findings because its overall accuracy is still low [5-7].

There is a wide range in the reported rate of facial nerve weakness occurring following parotidectomy ranging from 14% to 64% for temporary weakness and 0% to 9% for permanent facial nerve palsy [8,9]. Factors that accounted for a higher rate included age, malignancy, tumor grade, stage, size of the tumor, revision surgery and the extent of the surgery [10-12].

Studies have documented that nodal spread and positive surgical margins predicts a poor outcome and hence achieving negative surgical margins should be the ultimate aim [13,14] as adjuvant radiotherapy is not very effective in cases of gross residual disease [15].

Due to these observations sometimes the facial nerve needs to be sacrificed to achieve a negative surgical margin. Some authors [7] emphasize the need to have a pre-operative diagnosis of histology and grade of the tumor to decide the extent of surgery but that seems too demanding and as locally advanced parotid malignancies will require a complete resection with neck dissection, a preoperative FNAC and appropriate radiological investigation are sufficient to plan the extent of surgery.

The aim of this article is to show the histological inconsistency between the preoperative FNA and the final histopathological diagnosis in suspicious and locally advanced parotid malignancies

and a need to have a low threshold to sacrifice the facial nerve in order to achieve a complete resection with negative margins.

Methods

A retrospective study was conducted in patients with cytologically suspicious and proven malignancy of the parotid gland between the period of January, 2016 to January, 2020 in the Department of Otorhinolaryngology and Head and neck surgery, Post Graduate Institute of Medical Education and research, Chandigarh, India. During this period a total of 78 patients were diagnosed with malignancy of the parotid gland in the final histopathological examination. 51 patients had cytologically suspicious or proven malignant tumour preoperatively and were considered for the analysis.

Patients

The inclusion criteria were cytologically suspicious, benign lesions (with facial weakness, skin involvement, duration >10 years and a recent history of rapid progression) and T3-T4a cytologically proven parotid malignancy with or without neck nodes but without distant metastasis, with age greater than 5 years with ECOG score ranging between 0-2. The procedures performed were partial superficial parotidectomy, superficial parotidectomy, total conservative parotidectomy, radical parotidectomy, extended radical parotidectomy and wide local excision (as shown in table 4).

The surgical wound was closed either primarily or a local reconstruction was done. All patients planned for surgery were asked a detailed account of their symptoms and an adequate clinical examination, haematological investigation, radiological investigation which included a contrast enhanced computed tomography or magnetic resonance imaging extending from base of skull to T4. Distant metastatic work up which included a chest x-ray and ultrasonography of the abdomen was done to rule out any distant metastasis. 46 patients were newly diagnosed and 5 were revision cases. Involvement of the pterygoid plates, skull base and carotid artery was a contraindication to surgery.

Treatment and Follow Up

All surgery was performed by senior surgeons. After adequate exposure, excision of the tumour was done followed by neck dissection in most of the patients however in patients with

diagnosis of only atypia, basaloid neoplasm, oncocytoma and benign nerve sheath tumour, the neck dissection was avoided. Modified neck dissection was done for a N+ neck (N1-N3a) and a selective neck dissection (I-III) was done for a N0 neck. Intra-operative nerve monitoring was utilized in revision and difficult cases, especially if preoperatively the nerve was intact. Facial nerve was sacrificed if it was involved pre-operatively or found encased by the tumour intraoperatively. In our series we tabulated the facial nerve weakness preoperatively and followed it up in the postoperative period as well. The facial nerve weakness was graded using House Brackmann score.

The patients were followed up the subsequent week after discharge with the post-operative histopathological report. The final histopathology was assessed. Features like tumour type, grade, peri-neural invasion, lymph node involvement (with or without extra-capsular extension), and margin status were assessed and accordingly the patient was advised adjuvant treatment.

The patients were then followed up every month for the first year and then 2 monthly subsequently. Recurrence was defined as histological/cytological evidence of disease at the primary site, the neck (irrespective of whether neck dissection was done or not) or distant metastasis.

Results

Demography

Out of a total of 51 patients evaluated 29 were male and 22 were females. The age range of patients was from 5 to 74 years. The mean age was 40.78 years and the median was 42 years.

Fine Needle Aspiration Findings

Out of the 46 (90.19%) patients undergoing surgery for the first time, 22(43.13%) patients were reported as mucoepidermoid cancer, 3(5.88%) were adenoid cystic carcinoma, 2(3.92%) were myoepithelial cancer, adenocarcinoma and benign nerve sheath tumour each. There was 1(1.96%) case each of salivary duct carcinoma, neoplasm, mucinous cyst, mammary analogue secretory carcinoma, acinar cell carcinoma, positive for malignancy, adenocarcinoma basal cell, pleomorphic adenoma with marked epithelial atypia, polymorphous low grade adenocarcinoma, basaloid neoplasm, epithelial-myoepithelial

carcinoma, spindle cell neoplasm, salivary neoplasm consistent with cellular pleomorphic adenoma, oncocytoma and carcinoma.

Out of the 5(9.81%) patients undergoing revision surgery, 2(3.92%) were mucoepidermoid carcinoma and malignant salivary gland neoplasm each. 1(1.96%) was basaloid neoplasm.

Tumour grades were known preoperatively for 7(29.16%) patients reported as mucoepidermoid carcinoma. 5 were reported as low grade and 2 were reported as high grade.

Histopathological Findings

Out of the 46(90.19%) patients undergoing surgery for the first time 17(33.33%) were reported as mucoepidermoid cancer, 4(7.8%) were adenoid cystic cancer, 3(5.88%) were basal cell adenoma, pleomorphic adenoma and warthins tumour each. 2(3.92%) were salivary duct carcinoma, mammary analogue secretory carcinoma, myoepithelial carcinoma and acinic cell carcinoma each. There was 1(1.96%) one case each of epithelial-myoepithelial carcinoma, invasive ductal carcinoma, nodular oncocytic hyperplasia, carcinoma ex pleomorphic adenoma, squamous cell carcinoma, schwannoma, ductal adenocarcinoma and oncocytic carcinoma.

Out of the 5(9.80%) patients undergoing revision surgery, 2(3.92%) were reported as adenoid cystic carcinoma, 1(1.96%) was secretory carcinoma, squamous cell carcinoma and not otherwise specified carcinoma (NOS ca) each.

Out of the 17 cases reported as mucoepidermoid carcinoma, 13(76.47%) were low grade and 2(11.76%) were intermediate grade and high grade respectively.

Facial Nerve Status

Preoperatively there was facial nerve weakness in 12 patients. On FNA 7(58.33%) out of the 12 were reported as mucoepidermoid carcinoma (2 were low grade and grade was not known for the other 5). The remaining 5(41.66%) were reported as salivary ductal carcinoma, adenocarcinoma, malignant salivary neoplasm, benign nerve sheath tumour and pleomorphic adenoma respectively.

Post operatively a total of 17 patients had facial weakness. 10 (58.82%) out of the 12 patients had persistent facial weakness. 7(17.07%) patients had a new onset of facial palsy. On FNA 4 patients were reported as mucoepidermoid carcinoma (final histopathological report was 2 were low grade mucoepidermoid carcinoma and 1 each was invasive ductal carcinoma and carcinoma ex pleomorphic adenoma) and 1 was reported as adenocarcinoma (final histopathological report was ductal adenocarcinoma), malignant salivary gland neoplasm (final histopathology was adenoid cystic carcinoma) and basal cell adenocarcinoma (final histopathology was epithelial myoepithelial carcinoma) respectively.

There was recovery in facial nerve function in 2 patients who had preoperative facial nerve weakness. Both of them were reported as mucoepidermoid carcinoma (one as low grade and grade was not known for the other) on FNA and the final histopathological diagnosis was suggestive of Warthin's tumor and low grade mucoepidermoid carcinoma. Both patients underwent a superficial parotidectomy.

A total of 3 patients had facial weakness postoperatively (1 was new onset and in 2 there was preoperative weakness) in the revision surgery group. The rate of facial nerve weakness was 17.07% in our series.

Extent of Surgery

Primary Site

Out of the 46(90.19%) patients undergoing surgery for the first time, 21(41.17%) patients underwent total conservative parotidectomy, 11(21.56%) underwent superficial parotidectomy, 6(11.76%) underwent extended radical parotidectomy, 6(11.76%) underwent radical parotidectomy and 2(3.92%) underwent partial superficial parotidectomy. 1(1.96%) each out of the 5(9.80%) patients undergoing revision surgery underwent superficial parotidectomy (previous records not known), total conservative parotidectomy (previously underwent superficial parotidectomy), radical parotidectomy (previous records not known), extended radical parotidectomy (previously underwent superficial parotidectomy) and wide local excision (previously underwent total conservative parotidectomy).

Neck

A total of 42(82.35%) patients underwent a neck dissection (38 patients were being operated for the first time and 4 in the revision cases). A total of 18(42.85%) patients underwent modified neck dissection and 24(57.14%) patients underwent selective neck dissection. No neck dissection was done for the patients with benign or suspicious FNA findings of basaloid neoplasm (2 patients), neoplasm (1 patient), pleomorphic adenoma with marked atypia (1 patient), spindle cell neoplasm (1 patient), pleomorphic adenoma (1 patient), oncocytoma (1 patient) and benign nerve sheath tumour (2 patients).

Correlation Between Fna and Histopathological Reports

Out of the 51 patients, 30 (58.82%) patients had different histopathological findings when compared with the FNA results. 21 (70%) out of the 30 patients had a proven malignancy on FNA. 6(28.57%) out of the 21 had a benign diagnosis on final histopathological examination (2 were reported as pleomorphic adenoma and warthins tumour each, 1 was reported as basal cell adenoma and nodular oncocytic hyperplasia each).

35(85.36%) out of the 41 preoperatively diagnosed cases of malignancy were histopathologically confirmed as being malignant. 5(50%) out of the 10 cytologically suspicious or benign swellings were diagnosed as malignancy on final histopathological evaluation.

Margin Status

Margins were reported as involved, close or free by the examining pathologist. In our cohort of patients, a total of 11(21.56%) patients had involved margins (1 case was reported as basal cell adenoma). 13(25.49%) patients were reported as close margins (1 case was reported as pleomorphic adenoma). 27(52.94%) patients were reported as having tumour free margins. Patients undergoing extended radical parotidectomy, total conservative parotidectomy, radical parotidectomy and superficial parotidectomy had 3, 1 patient, 5, 7 patients, 2, 2 patients and 1, 3 patients in the involved and close margin cohort respectively.

Discussion

In our case series 42(82.35%) out of 51 patients underwent a neck dissection. Patients with a cytologically suspicious and benign diagnosis on FNA were exempted from a neck dissection (except cyst mucinous as there was nodal metastasis confirmed on preoperative FNA). All cases diagnosed with malignancy on FNA underwent a neck dissection as there is 20-48% rate of occult metastasis in clinically N0 neck. As all the cases diagnosed with malignancy were advanced stage (T3 and above), which is an independent risk factor for nodal metastasis along with grade of the tumour, facial nerve involvement and extra-parotid extension; a neck dissection is justified in these situations. Patients not undergoing a neck dissection but with a malignant histopathological report were sent for irradiation as the local control is similar to surgery [16].

Mucoepidermoid carcinoma followed by adenoid cystic carcinoma was the most common preoperative diagnosis (47.05% and 5.88% respectively) and post-operative (33.33% and 11.76% respectively) diagnosis in our study. Preoperatively grade was known only in 13.72% of the patients (all were mucoepidermoid carcinoma) which is slightly lower when compared to 33%, as reported by other authors [5]. 85.36% of the cases in our study diagnosed as malignancy on FNA were confirmed as being malignant on final histopathology which is in agreement with two other studies that have shown that malignancy was correctly diagnosed on FNA in 72% [5] and 65% [7] cases. This result emphasises on the reliability of FNA for the diagnosis of malignancy but there may be variations in the final histopathological types as shown by our results and the expectation of a surgeon knowing the grade preoperatively should be low regarding planning of the extent of surgery.

One of the most dreaded complications in any parotid surgery is facial nerve palsy. The causes for it include tumour type , large size of the tumour , revision surgery , extent of the surgery [17] and local extension of the tumour deeper than the plane of facial nerve [8] .The preoperative facial nerve weakness in our study was found in 23.52 % patients which is comparable to the reported incidence ranging from 13.5% to 34.7% in parotid cancers and is a significant prognostic factor [18,19].

New onset post-operative facial nerve weakness was seen in 17.07% of the study population which primarily was in the patients who underwent radical or extended radical parotidectomies. It is widely accepted that facial nerve palsies are more common in revision surgeries [11], similarly in our study 3 out of 5 patients who underwent a revision surgery had post operative palsy.

The role of intraoperative facial nerve monitoring in prevention of facial nerve palsy especially in settings of revision surgery or high grade tumour where it is difficult to achieve a R0 resection needs elucidation through larger trials as the data on this topic is widely varied with some papers reporting the incidence reduction of a permanent facial weakness from 0.0% to 9% after parotidectomy [20] and one meta-analysis reporting no change in the rate of permanent facial nerve weakness using intra-operative facial nerve monitoring [21].

Tumour margins are reported as being positive or close in a high proportion of parotid tumours owing to its proximity to facial nerve, resection of which causes significant morbidity [22]. In this study the overall positive margin rate was 21.56% which is comparable to the reported rate of 31% by Elliot et al in a cohort of 5639 patients with salivary gland cancers treated primarily with surgery. Association of tumour positive margins is strongly associated with histological subtypes. It is higher for adenoidcystic carcinoma when compared to adenocarcinoma and low grade mucoepidermoid carcinoma [23].

Conclusion

The role of FNA in diagnosing malignancy cannot be underestimated but there may be a substantial change in the type of malignancy on final histopathological report. Use of grade to plan the extent of surgery is not feasible because of the low yield of grades of tumour preoperatively by FNA. The surgeon should maintain a low threshold for facial nerve sacrifice in order to achieve a negative margin which is of primary importance.

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