

The deep parotid lymph nodes: an anatomical and oncological study

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Abstract

In order to better define the anatomical and clinical importance of the deep parotid lymph nodes, the surgical specimens obtained from a series of 18 total parotidectomies were evaluated. In 10 cases primary parotid pathology was found, whereas in the remaining eight cases metastases to glandular lymph nodes were present.

One hundred and forty-nine lymph nodes, in all, were identified (range 3–14, average 8.2, mean 8), 118 located in the superficial parotid lobe (range 3–11, average 6.5, mean 7), and 31 in the deep lobe (range 0–5, average 1.7, mean 2).

In the group of patients with oncological pathology, of the total 64 lymph nodes examined, 21 were found to be sites of metastasis, 11 in the superficial lobe, and 10 in the deep lobe.

The above findings confirm the anatomical and oncological importance of the deep parotid lymph nodes, and highlight the necessity of a total parotidectomy in all cases in which intraglandular spread of lymph node metastases is certain or suspect.

Key words: Parotid gland; Lymph nodes; Neoplasm metastasis

Introduction

In the region of the parotid gland there are circa 15–20 lymph nodes. According to their position in relationship to the parotid gland, they are classified as extrafascial, paraglandular and intraglandular.

Draining into the cervical lymphatic network, these nodes collect lymph coming mainly from cutaneous areas and also from areas deep within the head and neck. Because of these anatomical and physiological characteristics, the parotid lymph nodes may become sites of metastasis in the presence of tumours localized in these areas (Conley and Arena, 1963; Ridenhour and Spratt, 1966; Batsakis, 1983; Laudadio *et al.*, 1984; Seifert *et al.*, 1986; Zanetti *et al.*, 1989; Batsakis and Bautina, 1990).

In various earlier case studies of surgical treatment of secondary growths in the parotid gland, there is no consensus about surgical treatment. While some authors (Graham, 1965; Taylor *et al.*, 1991) emphasize the need to perform a total parotidectomy, others (Storm *et al.*, 1977; Jackson and Ballantyne, 1981; Caldwell and Spiro, 1988; Ball and Thomas, 1990), prefer to carry out a superficial parotidectomy.

The latter claim clinical and methodological justification from the observation of some authors (Marks, 1984; McKean *et al.*, 1985) that there are few lymph nodes in the deep lobe of the parotid gland.

In our present study we examined the distribution of lymph nodes in the parotid gland using a series of pathological anatomical specimens obtained during previous surgery.

Materials and methods

Eighteen patients were included in our study, 12 males, six females, aged from 21 to 81 (average 57.2, mean 61). All patients underwent total parotidectomy at our ENT Clinic in Novara. The surgical specimens obtained were all analysed in our Institute of Pathology.

The cases studied could be subdivided into two distinct groups. In 10 cases, primary pathology was found in the superficial parotid lobe (seven pleomorphic adenomas, one myoepithelioma, one oncocytoma and one low malignancy mucoepidermoidal carcinoma). In eight cases metastatic spread to the parotid nodes from tumours originating in the head and neck was diagnosed. Four were cutaneous tumours, one conjunctival melanoma, one laryngeal carcinoma, one tumour of unknown origin and one primary intraparotid adenocarcinoma (Table I).

In all cases, besides the histological analysis of the pathologies found, an accurate count of the lymph nodes found in the superficial and deep lobes was made.

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TABLE I
SUMMARY OF CASES EXAMINED
LYMPH NODES WITH METASTASES ARE INDICATED IN BRACKETS

	Sex	Age	Histology	Sup. nodes	Deep nodes	Total
1	F	64	Pleomorphic adenoma	7	1	8
2	M	67	Pleomorphic adenoma	4	0	4
3	F	46	Pleomorphic adenoma	5	2	7
4	M	42	Myoepithelioma	8	2	10
5	M	63	Pleomorphic adenoma	5	1	6
6	F	62	Oncocytoma	6	1	7
7	F	38	Pleomorphic adenoma	7	1	8
8	M	21	Pleomorphic adenoma	11	3	14
9	M	41	Mucoepidermoidal carcinoma	9	3	12
10	M	61	Pleomorphic adenoma	7	2	9
11	M	72	Cutaneous adenocarcinoma	6 (2)	2 (1)	8
12	M	53	Conjunctival melanoma	9 (1)	3 (1)	12
13	M	48	Parotid adenocarcinoma	6 (-)	2 (2)	8
14	F	81	Cutaneous carcinoma	7 (1)	1 (-)	8
15	M	72	Unknown primary carcinoma	6 (-)	1 (1)	7
16	M	65	Laryngeal carcinoma	7 (3)	5 (5)	12
17	F	73	Cutaneous melanoma	3 (1)	0	3
18	M	61	Cutaneous melanoma	5 (3)	1 (-)	6

The anatomical limit considered was marked by the level of the intraglandular facial nerve.

Keeping to a widely accepted classification (McKean *et al.*, 1985), only groups of lymphocytes that were found with, or without germinal nuclei, surrounded by a capsular structure and associated with peripheral and central sinuses were counted as lymph nodes.

Results

The results are summarized in Table I. One hundred and forty-nine lymph nodes were identified (range 3–14, average 8.2, mean 8). One hundred and eighteen were located in the superficial parotid lobe (range 3–11, average 6.5, mean 7), and 31 in the deep lobe (range 0–5, average 1.7, mean 2).

In the group of patients with oncological pathology, 21 of the 64 lymph nodes examined, (11 in the superficial lobe and 10 in the deep lobe), were found to be sites of metastasis.

In all, five out of eight patients had developed a secondary site of metastasis at the level of the deep parotid lymph nodes.

In three cases (one cutaneous adenocarcinoma, one laryngeal carcinoma and one conjunctival melanoma), the metastatic spread to the deep parotid nodes was found in conjunction with an analogous involvement of the superficial lymph nodes.

In the case of the unknown primary carcinoma, only one metastatic lymph node was present and this was located in the deep lobe. The parotid adenocarcinoma developed metastases in two lymph nodes of the deep lobe as well as in four out of nineteen of the neck nodes. In all of the eight cases examined by us, there was an associated metastatic spread to the cervical lymph nodes.

Discussion

Our study was undertaken with the aim of evaluating: the presence of lymph nodes localized

in the deep parotid lobe; and the oncological importance of such nodes.

Of the 18 surgical specimens examined by us, it was not possible to identify lymph nodes located medial to the plane of the facial nerve in only two cases (10.1 per cent). In all the remaining cases, between one to five nodes were always found, the incidence of total lymph nodes being proportional to the number of deep nodes.

This result agrees with authors (Graham, 1965; Batsakis, 1983; Taylor *et al.*, 1991) who have indicated how the intraglandular parotid lymph nodes are topographically correlated with the course of the facial vein as opposed to the plane of the facial nerve.

Because of the variations in the anatomical relationship between the vein and the nerve, any dissection carried out superficially to the nerve would be not radical (Taylor *et al.*, 1991).

Several authors (Marks, 1984; McKean *et al.*, 1985) on the contrary, taking the plane of the facial nerve as their reference point, have stated that the presence of deep parotid nodes is not always verifiable. From this they therefore deduce their lesser importance in a clinical context.

The findings regarding the topographical distribution of the nodes in the parotid gland is of practical use in the planning of surgical treatment of parotid metastases. Is a superficial parotidectomy enough, or is it necessary to extend the dissection to the deep lobe in order to obtain a radical oncological result?

Previous studies of a significant number of cases refer to treatment of metastases originating from tumours of the head and neck. The majority of these (Storm *et al.*, 1977; Jackson and Ballantyne, 1981; Santini *et al.*, 1985; Caldwell and Spiro, 1988; Ball and Thomas, 1990) emphasize how in the absence of evident involvement of the deep lobe, a superficial parotidectomy provides a valid local control of the disease. However, the same authors admit that in a percentage of cases ranging from 25 per cent to 38 per cent, it was necessary to proceed to a total

parotidectomy (Conley and Arena, 1963; Jackson and Ballantyne, 1981).

Some authors (Batsakis, 1983; Marks, 1984; Batsakis and Bautina, 1990) agree in assigning to the deep intraparenchymal nodes the role of draining lymph from several areas of the head (conjunctiva, oropharynx, rhinopharynx, paranasal sinuses, middle ear...).

Out of the eight cases of parotid metastasis examined by us, five cases, equivalent to 62.5 per cent, showed secondary involvement of the deep lymph nodes, three of which were associated with metastasis in the superficial nodes. This finding seems to emphasize the role of direct and indirect lymphatic connections between the superficial and deep lymph nodes and also between the latter and the cervical lymphatic networks.

In three out of four, the intraparenchymal metastases were found to involve the superficial nodes exclusively in three out of the four cases of primary cutaneous disease (two melanomas, one carcinoma and one adenocarcinoma).

This finding confirms the special nature of the superficial intraglandular lymph nodes as a first drainage point of the temporal, frontal, zygomatic and auricular areas, but does not, however, allow us to exclude the possibility of a synchronous or metachronous involvement of the deep lymph nodes.

Conclusion

In conclusion, we can assert that the intraglandular parotid lymph nodes are distributed both on a superficial and a deep plane with respect to the facial nerve. Moreover between one to five nodes were found in the deep lobe in 90 per cent of the cases examined.

In an oncological context, the deep parotid lymph nodes, while collecting lymph from several areas of the head and neck, also show a close functional correlation to lymphatic networks of the extrafascial glandular areas as well as to those of the cervical area.

All these findings, in our opinion, confirm the absolute necessity of performing a total parotidectomy in all cases of confirmed or presumed metastatic spread to the parotid lymph nodes.

References

- Ball, A. B. S., Thomas, J. M. (1990) Management of parotid metastases from cutaneous melanoma of the head and neck. *Journal of Laryngology and Otology* **104**: 350–351.
- Batsakis, J. G. (1983) Parotid gland and its lymph nodes as metastatic sites. *Annals of Otology, Rhinology and Laryngology* **92**: 209–210.
- Batsakis, J. G., Bautina, E. (1990) Metastases to major salivary glands. *Annals of Otology, Rhinology and Laryngology* **99**: 501–503.
- Caldwell, C. B., Spiro, R. H. (1988) The role of parotidectomy in the treatment of cutaneous head and neck melanoma. *American Journal of Surgery* **156**: 318–322.
- Conley, J., Arena, S. (1963) Parotid gland as a focus of metastasis. *Archives of Surgery* **87**: 757–764.
- Graham, J. W. (1965) Metastatic cancer in the parotid lymph nodes. *Medical Journal of Australia* **2**: 8–12.
- Jackson, G. L., Ballantyne, A. J. (1981) Role of parotidectomy for skin cancer of the head and neck. *American Journal of Surgery* **142**: 464–469.
- Laudadio, P., Rinaldi Ceroni, A., Cerasoli, P. T. (1984) Metastatic malignant melanoma in the parotid gland. *ORL* **46**: 42–49.
- Marks, N. J. (1984) The anatomy of the lymph nodes of the parotid gland. *Clinical Otolaryngology* **9**: 271–275.
- McKean, M. E., Lee, K., McGregor, I. A. (1985) The distribution of lymph nodes in and around the parotid gland: an anatomical study. *British Journal of Plastic Surgery* **38**: 1–5.
- Pisani, P., Krenogli, M., Ramponi, A., Pia, F. (1993) Le metastasi parotidee: revisione della Letteratura e contributo casistico. *Acta Otorhinolaringologica italiana* **12 (suppl 37)**: 1–28.
- Ridenhour, C. E., Spratt, J. S. (1966) Epidermoid carcinoma of the skin involving the parotid gland. *American Journal of Surgery* **112**: 504–507.
- Santini, H., Byers, R. M., Wolf, P. F. (1985) Melanoma metastatic to cervical and parotid nodes from an unknown primary site. *American Journal of Surgery* **150**: 510–512.
- Seifert, G., Hennings, K., Caselitz, J. (1986) Metastatic tumors to the parotid gland and submandibular glands. Analysis and differential diagnosis of 108 cases. *Pathology Research and Practice* **181**: 684–692.
- Storm, F. K., Eilber, F. R., Sparks, F. C., Morton, D. L. (1977) A prospective study of parotid metastases from head and neck cancer. *American Journal of Surgery* **134**: 115–119.
- Taylor, B. W. Jr., Brant, T. A., Price Mendenhall, N., Mendenhall, W. M., Cassisi, N. J., Stringer, S. P., Million, R. R. (1991) Carcinoma of the skin metastatic to parotid area lymph nodes. *Head and Neck* **13**: 427–443.
- Zanetti, D., Renaldini, G., Peretti, G., Antonelli, A. R. (1989) Metastasi linfonodali intra-parotidee da neoplasie maligne cutanee della testa. *Acta Otorhinolaringologica italiana* **9**: 381–390.

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