

Parotid lymphomas – clinical and computed tomographic imaging features

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Summary

Objective. To review the clinical presentation and computed tomography (CT) imaging characteristics of all parotid lymphomas diagnosed at the study institution over a 7-year period.

Design. Retrospective chart review of parotid lymphomas diagnosed between 1997 and 2004.

Subjects. A total of 121 patients with parotid lesions were identified. After retrospective chart review, a total of 10 patients with histologically proven parotid lymphoma were included in the study, 8 of whom had CT scans available for assessment.

Results. Ten patients with histologically proven lymphoma of the parotid gland were identified from among 121 patients with parotid neoplasms, an incidence in this series of 8.3%. All lymphomas were of non-Hodgkin's type. All patients presented with a painless unilateral parotid swelling. Most patients had a short history of less than 4 months' duration, of whom 3 presented with a rapidly evolving swelling of less than 1 month's duration. No patient had a background of Sjögren's disease or any other autoimmune disorders. The commonest finding noted on CT was of a unilateral, single mass of relative soft-tissue homogeneity with poorly defined, indistinct tumour margins. Associated loco-regional lymphadenopathy was identified in 2 cases, 1 clinically and another radiologically; multiple ipsilateral lesions were noted in 2 cases. No cases of contralateral disease were observed.

Conclusion. Lymphoma has a clinical presentation similar to other neoplasms arising within the parotid gland. A unilateral, non-tender swelling was a universal finding. A history of less than 4 months may suggest the possibility of lymphoma. CT scanning is a useful adjunctive investigation to determine the site and extent of the disease, loco-regional nodal status and contralateral gland and neck status. Multifocality and associated adenopathy are associated with, but not exclusive to, parotid lymphoma.

Although poor tumour boundary definition on CT imaging is a strong predictor of malignancy, no pathognomonic finding specific for lymphoma has been identified. The potential diagnosis of parotid lymphoma should be considered in all patients who present with a parotid mass.

Parotid lymphoma is a rare clinical entity. It accounts for 0.6 - 5% of tumours of the parotid gland and 12% of extranodal lymphomas presenting in the head and neck region.^{1,2}

A thorough history and physical examination can yield an accurate diagnosis in 85 - 90% of patients presenting with a mass in the parotid region.³⁻⁵ Many centres complement this approach with ancillary investigations including a variety of imaging modalities of which computed tomography (CT) is the most widely used.^{3,6} Improved immunocytopathology techniques have also aided diagnosis by fine-needle aspiration (FNA) biopsy. Notwithstanding this, parotid tumours are frequently subjected to superficial parotidectomy as a form of therapeutic biopsy and a definitive diagnosis is often only made at this time.⁶⁻⁸

Lymphomas are generally treated using chemotherapy or radiotherapy, alone or in combination.² Surgical intervention for lymphoma is limited to a purely diagnostic role.⁹ It is therefore desirable to diagnose parotid lymphomas without formal parotidectomy in order to avoid the risks associated with this procedure including facial nerve palsy and Frey's syndrome.

The aim of this study was to review the clinical presentation and CT imaging of patients with parotid lymphoma in order to identify features from the history, clinical examination and CT scans that may suggest this rare disease.

Materials and methods

A departmental database of head and neck tumours was reviewed. A total of 121 patients with parotid lesions were identified from 1997 to 2004. A retrospective chart analysis of

these patients was undertaken. In total, 10 patients were found to have proven parotid lymphoma. The demographic details, presenting history and clinical findings were recorded.

Nine patients had CT scans, of which 8 were available for review. All patients were scanned using a standard protocol on a 4-slice multislice CT scanner (GE Lightspeed. GE Medical Systems, Milwaukee, Wis.). One hundred millilitres of non-ionic intravenous contrast material (ioversol 300 mg iodine per ml, Optiray 300, Mallinckrodt Medical Inc., St Louis, Mo.) was injected at 3.0 ml per second using a mechanical injector. The total iodine dose was 30 g. The manufacturer's proprietary contrast-detecting software (Smartprep) was used. Studies were reviewed as hard-copy images and on a computer workstation running Advantage Windows 4.0 (GE Medical Systems, Milwaukee, Wis.).

Two authors (S.P.B. and N.P.S.) reviewed each case, reaching decision by consensus and completing a standard questionnaire for each. Specific note was made of the site, size, number of lesions, tumour margin, attenuation, invasion of adjacent structures, regional nodal status and contralateral parotid and neck appearance.

Results

A total of 10 patients with parotid lymphoma, confirmed by tissue biopsy, were identified and included in this study. Tissue diagnosis was achieved by a variety of techniques including FNA, incision biopsy and superficial parotidectomy. All cases were non-Hodgkin's lymphomas (NHL), of which 3 were classified as mucosa-associated lymphoid tissue (MALT) lymphoma. The remaining patients were reported as B-cell NHL of varying subtypes, of which 3 were high grade, 3 intermediate grade and 1 low histological grade. The average age of the patients was 51 years, range 31 - 83 years. Eight patients were male and 2 were female.

All patients presented with a unilateral painless swelling in the parotid region noticed between 1 and 24 months before presentation (Table I). Six patients gave a history of 4 months or less, of whom 3 had a history of 1 month or less. No patients had any significant antecedent medical history; specifically, there were no associated underlying autoimmune disorders. Clinical examination a unilateral parotid swelling in all cases. Skin fixity was noted in 2 patients, medial parapharyngeal extension in 1 and a House-Brackmann grade III facial nerve palsy in another. Regional adenopathy in the ipsilateral neck was noted in 1 patient.

In total, 8 patients had CT scans that were available for review. CT scans confirmed the presence of a lesion in the parotid gland in all 8 cases where scans were available for review (Table II). The average maximal diameter of lesions on

TABLE II. IMAGING FEATURES ON CT SCAN (N = 8)

CT findings	No. of cases
Superficial lobe only	5
Deep lobe only	0
Superficial and deep	3
Margin poorly defined	6
Margin well defined	2
Multiple ipsilateral lesions	2
Contralateral lesions	0
Regional adenopathy	2



Fig. 1. CT scan showing a single lesion in the right parotid gland. The anterior margin (arrow) is well defined but the posterior and medial margins are less distinct.

CT scan was 35 mm, ranging from 20 mm to 88 mm. Most were shown to be singleton tumours, such as seen in Fig. 1, but 2 patients had multiple lesions within the same gland as demonstrated in Fig. 2. Two tumours were noted to involve overlying skin while in 1 case there was gross involvement of local structures including the ipsilateral tonsil, soft palate and carotid space. Deep lobe involvement was seen in 3 cases, as in Fig. 3. Six of 8 tumours had poorly defined margins; the remaining 2 lesions were well circumscribed. With regard to attenuation, all except 1 lesion demonstrated soft-tissue homogeneity. No radiological evidence of subclinical contralateral neck or parotid disease was found.

TABLE I. CLINICAL FEATURES (N = 10)

Signs/symptoms	No. of patients (%)
Unilateral parotid swelling	10 (100)
Painless	10 (100)
Right-sided mass	7 (70)
Left-sided mass	3 (30)
Facial nerve palsy	1 (10)
Trismus	1 (10)
Rapid growth (< 4 months)	6 (60)

Discussion

Lymphomatous disorders can be broadly categorised as either Hodgkin's lymphoma (HL) or NHL. About 25% of NHL involves extranodal sites compared with HL which is extranodal in only 1% of cases.¹⁰ Although classified as extranodal, parotid lymphomas probably arise from lymphoid tissue within the parotid parenchyma.¹¹ The majority of lymphomas presenting in the parotid gland are NHL type. B-cell lymphomas are far more frequently reported than T-cell/NK cell lymphomas in the parotid gland, which are

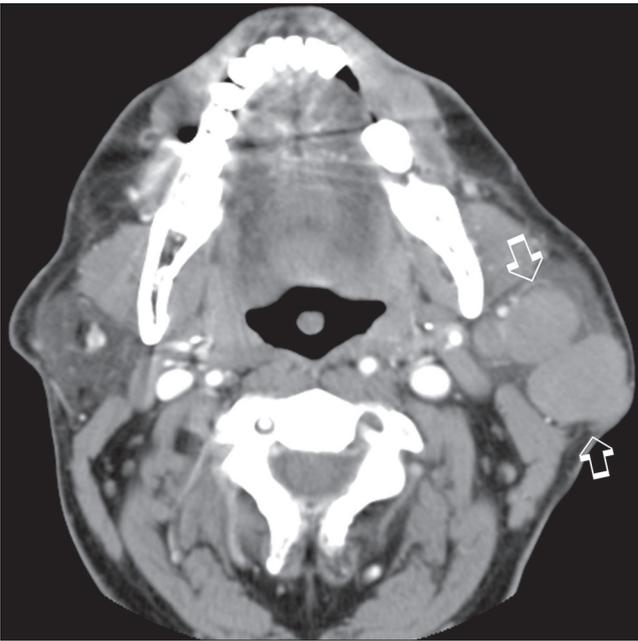


Fig. 2. Multiple ipsilateral masses in the left parotid gland of a 49-year-old man (arrows). Posterior arrow points to superficial skin infiltration.

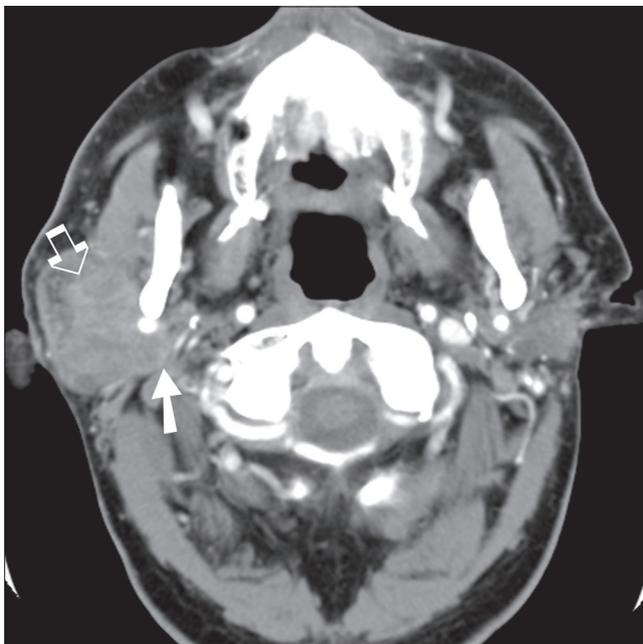


Fig. 3. Right parotid lymphoma in an 82-year-old man. Note the partly enhancing heterogeneous mass in the superficial right parotid gland (open arrow) with deep lobe extension (closed arrow).

exceedingly unusual.¹ All cases in our series were of B-cell origin, in keeping with previous reports.^{1,7}

The reported incidence of lymphoma in studies of patients subjected to parotidectomy appears to have risen over the last few decades. Several large series from the 1960s reported the incidence of parotid lymphomas to be between 0.7% and 2.4%.^{12,13} More recent publications report a higher incidence.^{7,14} In the current study the incidence of lymphoma in parotid tumours was 8.2%. This rise is probably partly due to improved immunohistochemical diagnostic techniques,

increased longevity and an increase in lymphoproliferative disease in general.²

The presentation of tumours arising in the parotid is often similar, regardless of histology.¹⁵ All parotid lymphoma patients in our series and the majority in other series presented with a unilateral progressively enlarging painless swelling.^{1,7} A rapid increase in size has been reported to be suggestive of lymphoma.¹⁶ Indeed, 6 of the patients in this series had histories of less than 4 months, of which 3 were of 1 month's duration. However a more prolonged clinical course does not exclude the diagnosis of lymphoma as 3 cases in this series had a history of a year or more, including 1 case of 2 years' duration. Although a well-documented risk factor for the development of lymphoma, no patient in the current series had an antecedent history of autoimmune disease such as Sjögren's syndrome.¹⁷ Infrequently reported signs and symptoms of parotid lymphomas include facial nerve dysfunction (seen in 1 patient in our group), trismus and pain.¹ The Ann-Arbor staging system for lymphomas includes the presence of weight loss, fever and night sweats, so-called 'B' symptoms.¹ These are believed to occur infrequently in extranodal lymphoma in the head and neck region and were present in only 1 patient in this study.² If lymphoma is suspected, the presence or absence of these symptoms should be specifically sought and recorded.

The role of diagnostic imaging for patients with a parotid mass is controversial.⁴ Many authors advocate the use of CT,^{7,18} others suggest that MRI is superior,³ while some use neither in the preoperative assessment of these patients.⁴ CT is the most frequently used imaging technique employed for parotid lesions.^{3,6} It provides valuable information regarding the site and extent of the tumour, the relationship to the parapharyngeal space and carotid vessels, and also the presence of subclinical multiple ipsilateral lesions, contralateral gland disease and neck nodal status.^{3,6,7,15} The diagnostic accuracy of 87 - 92% for CT imaging is comparable to FNA cytology in the ability to discern malignant from benign lesions.^{5,6} It is comparable to MRI with regard to the information it yields and has the benefits of being more widely available, less expensive and quicker to perform.¹⁸ The rarity of parotid lymphoma as a clinical entity is reflected in the paucity of studies in the literature addressing the imaging characteristics of this entity. Hamilton *et al.*¹⁵ reported on a series of 110 tumours occurring in the parotid tail, of which 14 were lymphomas. Fifty per cent of these patients were found to have multifocal and/or bilateral lesions, the most common cause of such findings in that particular series. Loggins and Urquhart⁷ assessed the radiological features of 17 parotid lymphomas and found that 5 were bilateral, 5 had unilateral multiple lesions within the gland and 12 had associated adenopathy. Regional adenopathy and multifocal disease were shown in 2 cases each in the current series and no cases of bilateral disease were identified. The observation that others have made regarding the frequency of multiple lesions and bilateral disease in parotid lymphoma should be tempered by the fact that Warthin's tumour is known to manifest in this way in 10 - 15% of patients and is a more common tumour than lymphoma. Poorly defined tumour margins on CT were observed in all but 1 of our patients. This feature on imaging has been noted by others to be a strong indicator of malignancy, not specific to lymphoma, although benign tumours can on occasion also have this appearance.^{3,6,15} Infiltration of

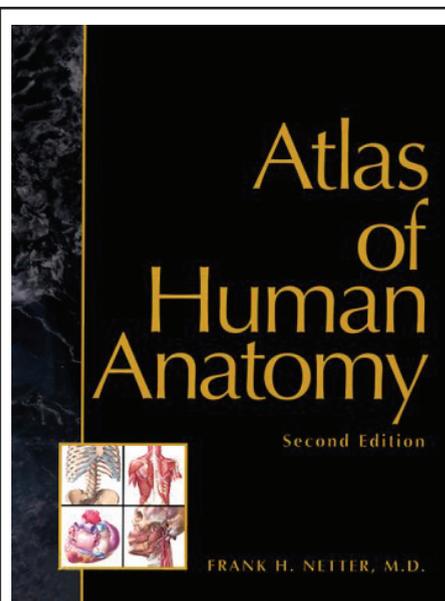
surrounding tissue is also suggestive of malignancy and was seen in 3 of our cases. While no pathognomic feature of lymphoma is observed on CT scanning, poor margin definition, infiltration and multifocality should alert the clinician to the possibility of lymphomatous disease. One case of regional adenopathy not elicited on clinical examination in our study group was identified after imaging. Associated adenopathy has been found useful as an indicator of possible lymphoma but may be missed on clinical assessment.^{6,7} When loco-regional lymphadenopathy is identified and the suspicion of lymphomatous disease exists, it may afford the surgeon the opportunity to obtain a tissue diagnosis without having to undertake a formal parotidectomy procedure.⁷ Likewise, where superficial skin involvement is identified, incision biopsy may be justified without violating sound oncological principles and without subjecting the patient to

formal parotidectomy.⁸ Tissue diagnosis may be made using FNA, but the accuracy of this can depend on the skill of the cytopathologist and the availability of cytopathological diagnostic techniques including flow cytometry.

Parotid lymphoma as a possible diagnosis should be considered in all patients with a unilateral parotid swelling. CT scans may be useful in confirming the site and extent of the tumour including surrounding soft-tissue infiltration, nodal involvement and status of the contralateral gland. No clinical or radiological feature pathognomic for lymphoma has been identified but a short history and poorly defined tumour margin on CT scan are the most common findings. It must be borne in mind, however, that the presence of a prolonged history, well-defined tumour margins on imaging, and the absence of an antecedent autoimmune disorder, does not rule out lymphoma from the differential diagnosis.

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