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ULTRASONIC DIAGNOSIS OF ORAL AND NECK MALIGNANT LYMPHOMA

BY

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ABSTRACT

A series of 14 patients with nodal and extranodal non-Hodgkin's lymphoma of the oral and neck region was analyzed by ultrasonogram evaluation. Eight nodal lymphomas and six extranodal lymphomas commonly exhibited almost completely similar ultrasonographic findings, specifically, clear delineation of the boundary echo and a homogeneous, weak internal echo, the so-called pseudo-liquid-like images. The results derived from our study suggest that ultrasonic diagnosis is also helpful in evaluating patients with lymphoma during the initial diagnosis and initial treatment like other diagnostic imaging modalities.

Key words: Oral lymphoma, Non-Hodgkin's lymphoma, Diagnostic ultrasound, Initial diagnosis

INTRODUCTION

Malignant lymphoma is often difficult to distinguish from other more commonly occurring lesions in the maxillofacial region (Koga et al. [1]). Consequently, performing a surgical biopsy and initiation of treatment may be delayed. This delay may be detrimental to the further course of the disease, especially in high-grade malignant lymphomas (Liliemark et al. [2]). However, if the possibility of malignant lymphoma is suspected, initial diagnosis should be made.

In this light, the purpose of our study was to uncover the diagnostic potential of ultrasonic diagnosis of the malignant lymphoma on the basis of our 14 cases.

MATERIALS AND METHODS

From 1983 to 1990, ultrasonography was performed on 14 patients histologically diagnosed as non-Hodgkin's lymphoma. This number included eight cases diagnosed as nodal lymphoma: two recurrent and six extranodal lymphoma. Ultrasound examinations were performed by real-time linear scanner using a 5-MHz probe (Toshiba SAL-30A) or sector scanning using a 7.5-MHz or 10-MHz probe (Aloka SSD-125).

RESULTS

Clinical data of the 14 cases are summarized in Table 1. Of these, nine were males and five were females. The average age of the 14 patients was 47.7 years, ranging

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from 5 to 86 years. Of the six patients with extranodal primary tumor, three involved the palate and one each the cheek, parotid gland (Fig. 1) and sinus (Figs. 2a, 2b). Of the eight patients with nodal primary tumor, the most commonly involved nodes were submandibular (five patients), followed by deep cervical nodes.

Histological typing was made according to the Japanese Lymphoma Study Group Classification (Shuchi et al. [3]). The most frequent histologic type was the diffuse type (10 cases or 71.4%), followed by the follicular type (two cases or 14.3%). The remaining two were the Burkitt type and the lymphoblastic type.

We examined the ultrasound characteristics of the nodal and extranodal lymphoma separately. All of the nodal lymphomas displayed a clear, smooth boundary echo

Table 1. Nodal Lymphomas

Case No.	Age	Sex	Tumor site	Histologic diagnosis
1.	70	F	Submandibular	Follicular, medium-sized cell type
2.	30	M	Submandibular	Diffuse, large cell type
3.	63	F	Deep cervical	Diffuse, large cell type
4.	55	M	Deep cervical	Diffuse, burkitt type
5.	86	M	Deep cervical	Diffuse, large cell type
6.	45	F	Submandibular	Diffuse, large cell type
7.	26	M	Submandibular	Diffuse, large cell type
8.	10	M	Submandibular	Follicular
9.	75	F	Palate	Diffuse, mixed type
10.	55	M	Palate	Diffuse, large cell type
11.	8	F	Cheek	Diffuse, lymphoblastic type
12.	75	M	Parotid gland	Diffuse, large cell type
13.	5	M	Maxillary Sinus	Diffuse, large call type
14.	65	M	Palate	Diffuse, large cell type

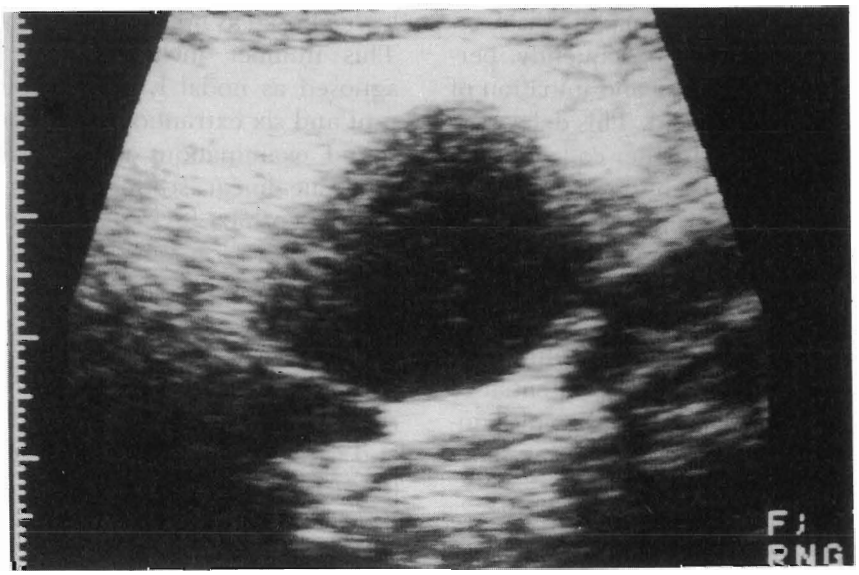

Fig. 1. Longitudinal Scan of Left Parotid Gland
Initial diagnosis was benign parotid tumor. (Case 12)

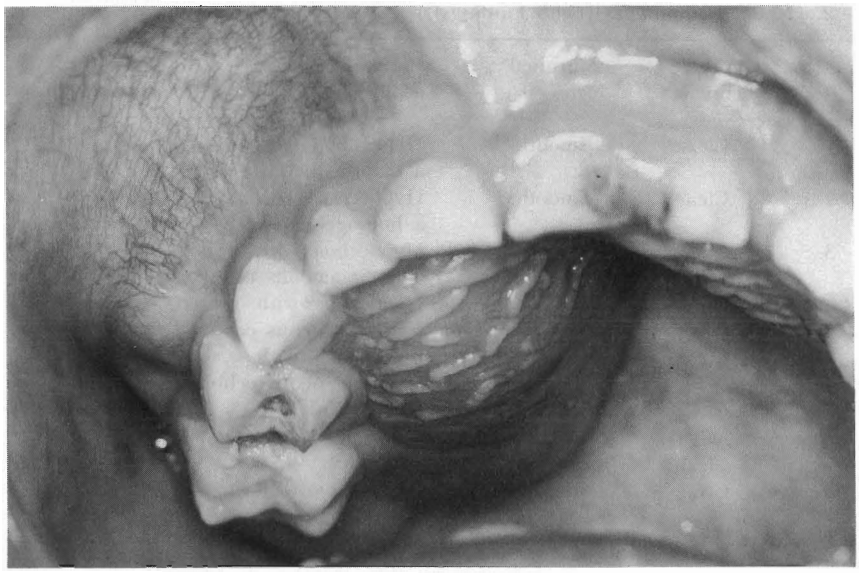

Fig. 2a. Patient at Initial Presentation with Right Vestibule of Mouth and Palate Swelling (Case 13)

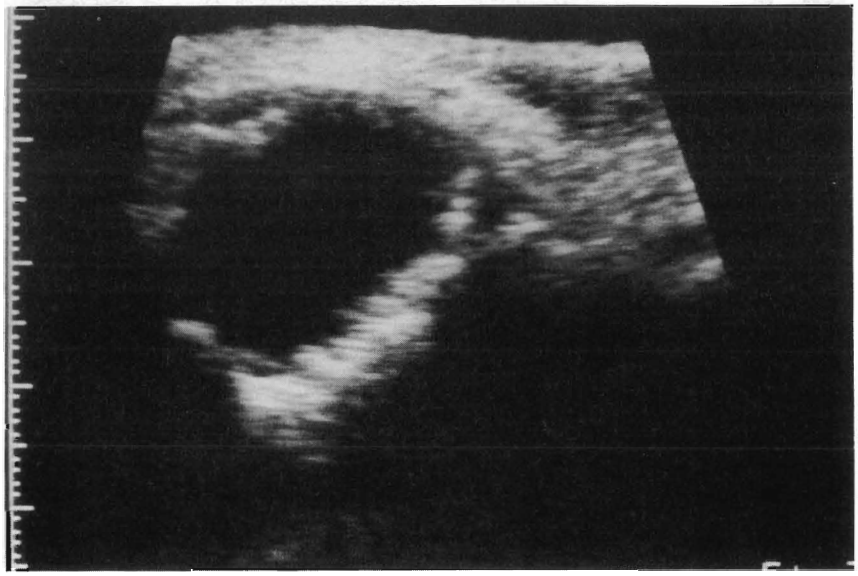

Fig. 2b. Longitudinal Scan of Right Cheek of Same Patient
Ultrasonographic examination shows the cystic mass in the right maxillary sinus. (Case 13)

(Table 2). The internal echo pattern was hypoechoic with a homogeneous pattern (five cases) (Fig. 3) and a heterogeneous pattern (one case). The other pattern was hyperechoic with a homogeneous pattern (one case) (Fig. 4). The remaining case featured an anechoic pattern. Posterior wall echo enhancement appeared in six cases (66.7%). Multiple node involvement was delineated in seven out of eight cases

Table 2. Nodal Lymphomas (Echo Findings)

Case No.	Boundary echo	Marginal echo	Internal echo	Posterior echo enhancement
1.	Clear	Smooth	Hypoechoic with a heterogeneous echo	+
2.	Clear	Smooth	Hypoechoic with a homogeneous echo	+
3.	Clear	Smooth	Hypoechoic with a homogeneous echo	−
4.	Clear	Smooth	Hypoechoic with a homogeneous echo	+
5.	Clear	Smooth	Hypoechoic with a homogeneous echo	−
6.	Clear	Smooth	Hyperechoic with a homogeneous echo	+
7.	Clear	Smooth	Anechoic	+
8.	Clear	Smooth	Hypoechoic with a homogeneous echo	−

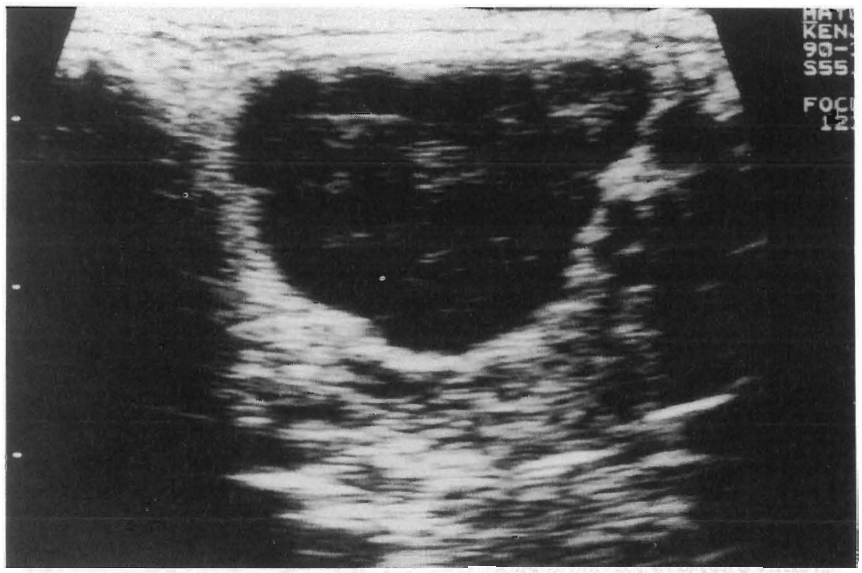

Fig. 3. Transverse Scan of Left Submandibular Region
Ultrasonogram shows heterogeneous internal echo. (Case 8)

of nodal lymphoma.

All but one extranodal lymphoma displayed a clear, smooth boundary echo (Table 3). The internal echo was hypoechoic with a homogeneous pattern (two cases) and a heterogeneous pattern (one case). The other was hyperechoic with a heterogeneous pattern (one case). The others featured an anechoic pattern. Posterior wall echo enhancement appeared in one case, while the other cases could not be evaluated because the maxilla interfered with the ultrasound passing through the tumor.

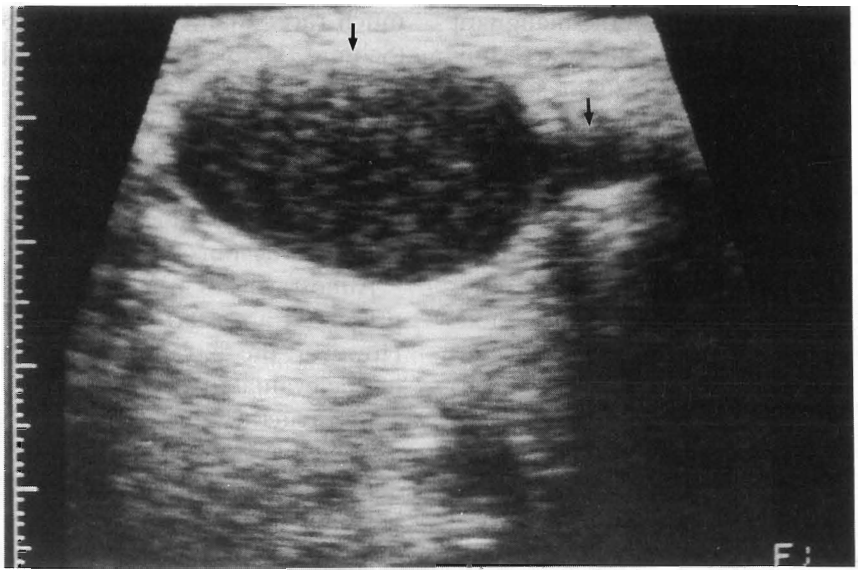

Fig. 4. Transverse Scan of Left Submandibular Region
Ultrasonogram shows two nodes (arrows). The larger tumor shows a diffuse fine spot-like internal echo. (Case 6)

Table 3. Extra nodal Lymphomas (Echo Findings)

Case No.	Boundary echo	Marginal echo	Internal echo	Posterior echo enhancement
9.	Clear	Smooth	Hypoechic with a heterogeneous echo	?
10.	Unclear	—	Hyperechoic with a heterogeneous echo	?
11.	Clear	Smooth	Hypoechic with a homogeneous echo	?
12.	Clear	Smooth	Hypoechic with a homogeneous echo	+
13.	Clear	Smooth	Anechoic	?
14.	Clear	Smooth	Anechoic	?

Discussion

Malignant lymphoma in the oral, maxillofacial and neck region is relatively uncommon (Tomich and Shafer [4]; Fukuda et al. [5]). The oral malignant tumor of our series appeared in 685 cases treated over the past 15 years, whereas our coauthor (Suzuki et al. [6]), reported only 44 cases of malignant lymphoma for the same period (6.4%). In addition to the difficulty in making an exact diagnosis of malignant lymphma (Koga et al. [1]), very few reports of ultrasonic diagnosis of malignant lymphoma are seen in the literature.

The ultrasonographic features of non-Hodgkin's lymphoma, which was commonly seen in the nodal and extranodal lymphoma, were a clear delineated boundary echo and a homogeneous, weak internal echo. These findings were thought to reflect the homogeneous feature of the

histopathological findings of the malignant lymphoma. These echo findings are similar to those obtained for cysts or schwannomas. Consequently, malignant lymphoma is to be differentiated from these diseases (Bruneton et al. [7]; Callen and Marks [8]; Gooding [9]). In our nodal cases, malignant lymphoma is to be differentiated from lymphadenitis and metastatic nodes. Distinguishing between the nodal lymphoma of the submandibular region and the submandibular gland tumor is especially crucial. According to Bruneton et al. [7], the homogeneous nature of malignant lymphoma displayed only a slightly echoic or even a pseudo-liquid-like feature on the echogram, whereas the metastatic lymph node from the squamous cell carcinoma generated a heterogeneous internal echo, which corresponded to a clump of cells separated by the supportive tissue.

Submandibular gland tumor, which was located within the gland, could be differentiated from the nodal lymphoma situated outside the gland, based on the relationship between the tumor and the submandibular gland. CT-sialography was specifically useful for the differential diagnosis of this region.

In all nodal lymphomas but one, the ultrasonogram showed more than two nodes. The delineation of the multiple nodes was thought to be one of the ultrasonic findings of nodal lymphoma.

Though it was important to clearly differentiate the extranodal lymphoma of the palate from the minor salivary gland tumor, it was almost impossible for us to differentiate it from the pleomorphic adenoma of the palate using only the echogram. The benign parotid gland tumor and the malignant lymphoma of the parotid gland presented similar ultrasonic findings and the primary malignant lymphomas of the parotid gland appear to be much rarer than the parotid gland tumor (Schmid, Helbron and Lennert [10]). For this reason, differential diagnosis was difficult to achieve utilizing the diagnostic images. The primary maxillary sinus lymphomas was mistakenly diagnosed as benign maxillary tumor, for example, the odontogenic fibroma or myxoma.

Almost all of the nodal lymphomas presented a posterior echo enhancement. However, the extranodal lymphoma could not be evaluated in most cases because the bone structure prevented the ultrasonic imaging beneath the tumor. Therefore, we did not recognize the posterior echo enhancement as being a useful parameter of the extranodal lymphoma. Furthermore, no relationship arose between the histological typing and the echo findings. This should thus be considered the reason for the presence of our few cases of lymphoma.

The ultrasonogram of the malignant lymphoma presented a characteristic finding, since we experienced a case for which a diagnosis of lymphoma prior to biopsy was suggested by the ultrasonogram.

The diagnosis of lymphoma depends on the exact pathologic evaluation (DePeña, Tassel and Lee [11]). Moreover, the treatment and prognosis of lymphoma both depend on the histologic subtype and the clinical staging of the extent of the disease (DePeña, Tassel and Lee [11]). We therefore considered that a biopsy should be performed immediately since the result obtained by ultrasonography would suggest a malignant lymphoma and the consequent initiation of treatment.

In conclusion, the results of this study suggest that diagnostic ultrasound is helpful in evaluating patients with lymphoma during the initial diagnosis and treatment in addition to other diagnostic imaging modalities.

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