



Lymph Node Staging in Patients of Head & Neck Malignancies with Clinically Negative Neck Examinations by Ultrasound and Ultrasound Guided Aspiration Cytology

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ABSTRACT

Head and neck cancer is very common with incidence rates varying from 10-15% in various sociodemographic regions and approximately 50% of all malignant tumours in males in India. More than 90% of head neck cancers are squamous cell carcinomas with variety of malignant tumours. Clinical examination (Palpation) can miss the detection of lymph nodes in up to 60% of cases. In head and neck cancers, spread to the lymph nodes in the neck is relatively common and most important factor in determining the survival of patients with head neck cancer at any site depends on the metastatic disease in the neck. Size of lymph node is about 2-3 mm which normally can't be palpated. High resolution ultrasound can detect these nodes which are clinically not palpable and is non-invasive harmless procedure. Because of safety of ultrasound and ultrasound guided FNAC, the procedure is likely to be used in every patient of head neck malignancies, more wide spread use would result in better planning for management of metastatic lymph nodes of neck and better care of patient by decreasing the morbidity, mortality and cost associated with unnecessary surgery by avoiding the need for other diagnostic procedures. So it is suggested that in every patient of head and neck malignancy after clinical examination ultrasound with and /or without FNAC should be done as a mandatory procedure for the better management of the patient.

Keywords-Head neck malignancy, clinically negative neck, US guided FNAC

INTRODUCTION

The term head and neck cancer refers to neoplasm arising below the skull base to the region of thoracic inlet. It is very common with incidence rates varying from 10-15% in various sociodemographic

regions and account approximately 50% of all malignant tumours in males in India. More than 90% of head neck cancers are squamous cell carcinomas. Main etiological factors are tobacco, pan masala chewing and alcohol. Prolonged

irritation due to ill-fitting dentures, jagged teeth or chronic infections is no longer considered to be an important direct antecedent to oral cancer, but nonetheless it may contribute to oral precancerous lesions, such as leucoplakia which is important subsoil for development of oral cancers. Additional risk factors include diet (Vitamin A deficiency, iron deficiency) and viral etiology (HSV-1, 8 and 16 Epstein-Barr virus). In head and neck cancers, spread to the lymph nodes in the neck is relatively common. The spread of cancer to lymph nodes is dependent upon normal anatomical pathways but pattern of spread may also depend upon distortion of drainage by disease and treatment such as radiotherapy and surgery. Single most important factor in determining the survival of patients with head neck cancer at any site depends on the metastatic disease in the neck. Size of lymph node must be about 1 cm for palpation. High resolution ultrasound can detect these nodes which are clinically not palpable and is non-invasive harmless procedure.

The superficial location of lymph nodes in the neck area renders them suitable for FNAC. Aspiration of palpable masses is usually done without sonographic guidance but small or deep cervical masses may be impalpable and require imaging guidance for FNAC. High resolution sonography is an ideal imaging technique for such cases.

An oval shape of the examined lymph node (longitudinal/anteroposterior diameter ratio, L/A >1.5) and a central echogenic hilus indicated a benign lymphadenopathy. Roundness (L/A \leq 1.5), absence of the central echogenic hilus and a parenchymatous echogenicity are considered as signs of malignancy^[1]. The differentiation between benign and metastatic lymph nodes with ultrasound (US) is based primarily on the evaluation of size, shape, margin and internal echo structure. The shortest diameter, S/L ratio, margin and internal echo structure were considered to be critical indicators to differentiate between benign and metastatic nodes ^{[2],[3]} compared ultrasound-fine needle aspiration and computed tomography in patients undergoing elective neck dissection.

Ultrasound of the neck with fine needle aspiration (US-FNA) of suspicious lymph nodes has potential advantages over other radiologic techniques as a screening method for the no neck in head and neck cancer. The detection of cervical lymph node metastases plays an important role in staging of patients affected by esophageal cancer to perform the best therapeutic approach^[4]. Ultrasonographic evaluation of the neck can be done with a 7.5 or 10 MHz transducer, with selective scanning of the lymph node chains of the internal jugular veins and supraclavicular regions. The short-to-long axis ratio (S/L) was a useful way to detect lymph node metastasis. Lymph node exceeding 5 mm in long axis and with an S/L over 0.5 showed a higher incidence of metastasis than those with an S/L under 0.5. In the ultrasound evaluation of nodes, the most useful parameters are size of nodes, heterogeneity of internal echoes, morphology of the margins, and the deformation caused by compressive instrumental manipulation.

MATERIAL AND METHOD

This study was undertaken in department of Otolaryngology in collaboration with the departments of radiotherapy, radio-diagnosis and pathology on patients attending the outpatient department and admitted to the department. Detailed history was taken with particular emphasis on the presenting symptoms with onset of duration, personal habits (type of addiction, frequency, duration and mode of tobacco and /or alcohol used); family history; medical history; socio-economic status and previous mode of treatment. All the cases were subjected to a detailed general, physical examination and systemic examination to the rule out any associated systemic diseases, to assess general nutritional status and to look for any evidence for distant metastasis. After complete ENT examination, all cases were undergone, direct laryngoscopic as well as endoscopic examinations to see the extent of disease. Biopsy from primary for conclusive evidence of malignancy was taken. Routine blood investigation with X-ray chest, CT scan, high resolution ultrasonography and

Ultrasound guided FNAC was done where ever needed. Ultrasonographic examination was performed by a real time 2D ultrasound machine—SHIMADZU-SDU 1200 & GE RT 3200 ADWANTAGE-II instrument with a high resolution 7.5 and 10 MHz electronic sector probe with direct contact scanning technique.

Inclusion Criteria

Biopsy proven malignancy of head and neck with clinically negative neck examination.

Exclusion Criteria

1. Malignancy of head and neck with clinically positive neck node.
2. Malignancy head neck with distant metastasis.
3. Debilitated patients.

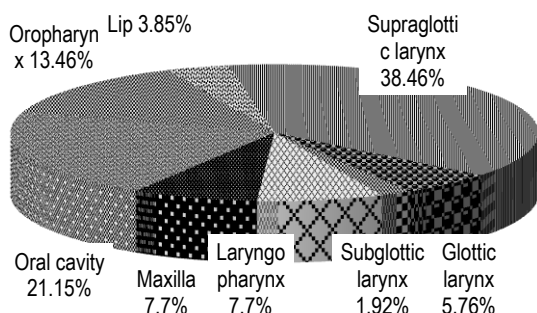
OBSERVATION

In this study 52 patients were observed and subjected to detailed examination with following results. The commonest age of patients with head neck cancers attending to the hospital were between 51-60 years of age 17(32.69%) with males predominance (92.30%) (Table 1).

Table-1: Showing Age-Wise Distribution of Patients

AGE	MALE	%	FEMALE	%	TOTAL	%
0-10	0	0	0	0	0	0
11-20	0	0	0	0	0	0
21-30	0	0	0	0	0	0
31-40	7	13.46	0	0	7	13.46
41-50	11	21.15	0	0	11	21.15
51-60	16	30.77	1	1.9	17	32.69
61-70	11	21.15	3	5.8	14	26.93
71-80	2	3.85	0	0	2	3.85
>80	1	1.92	0	0	1	1.92
TOT	48	92.30	4	7.7	52	100

Graph 1:-Site-wise distribution of Head and neck malignancies (n=52)



Maximum no. of cases 24(46.05%) were of laryngeal malignancies followed by 11(21.15%) of oral cavity, 7(13.46%) of oropharynx, 4(7.70%) each of laryngopharynx and maxilla and 2(3.85%) of lip (Graph 1).

Approximately 29(55.77%) cases of all head and neck malignancies on clinical examination found to be the stage T3, followed by 16(30.77%) cases of stage T2, 5(9.62%) cases of stage T1 and 2(3.84%) cases of stage T4(Table 2).

Table-2: Primary tumour (T) stage in head and neck malignancies on clinical examination

Tumour stage(T)	Oralcavity/Oropharynx	Hypo-pharynx	Larynx	PNS	Lip	Total(%)
T1	0	0	5	0	0	5(9.62)
T2	6	2	7	1	0	16(30.77)
T3	12	2	12	1	2	29(55.77)
T4	0	0	0	2	0	2(3.84)
TOTAL	18	4	24	4	2	52(100)

Most of the cases presented in stage III 29 (55.77%) and stage II 16(30.77%),while 9.62% patients presented in stage I and 3.84% presented in stage IV.

On ultrasound out of 24 cases 8(33.33%) involved level III followed by 6(25%) involving level I&II each and 4(16.67%) level IV group of lymph nodes. On ultrasonography out of 52 clinically negative neck 20(38.45%) cases upgraded from No to N1 while 2(3.85%) cases upgraded from No to N2b and No to N2c.Out of 18 clinically negative cases of oral cavity and oropharynx 7(38.92%) cases upgraded from No to N1 and 2(11.12%) cases from No to N2 (Table 3).

Table-3: Lymph node staging by ultrasound in head and neck malignancies with clinically negative neck

Lymph node	Oral cavity/Oropharynx	Hypo-pharynx	Larynx	PNS	Lip	Total No.(%)
No	9	2	13	3	1	28(53.85)
N1	7	1	10	1	1	20(38.45)
N2a	0	0	0	0	0	0
N2b	0	1	1	0	0	2(3.85)
N2c	2	0	0	0	0	2(3.85)
N3	0	0	0	0	0	0
Total	18	4	24	4	2	52(100)

In case of laryngopharynx 1(25%) patient upstaged from No to N1 and 1(25%) patient from No to N2b. In larynx 10(41.67%) patients upstaged from No to N1 and 1(4.17%) from No to N2b whereas 25% patients of paranasal sinus malignancy 50% patients of lip cancers upstaged from No to N 1. Thus in 46.15% cases there is upstaging of lymph nodes by ultrasound examination.

Ultrasound guided FNAC of the lymph nodes which were positive by ultrasound revealed that out of 24 cases FNAC was positive for malignant cells only in 21 cases, 3 cases were negative for malignant cells (2 cases from oral cavity & oropharynx), 1 case from larynx and in 1 case on FNAC that was not lymph node. Out of 18 patients of oral cavity and oropharynx 61.11% patients were No by US guided FNAC while 27.78% patients upstaged from No to N1, 11.11% patients upstaged from No to N2c. In case of larynx out of 24 cases 62.50% patients were No while 33.33% patients upstaged from No to N1 and 4.17% patients upstaged from No to N2b.

On clinical examination there were no lymph nodes palpable on ultrasound in 24 cases lymph nodes become positive and in 28 cases negative while on ultrasound guided FNAC out of 24 ultrasonographically positive cases, in 20 cases FNAC showed lymph nodes positive for malignant cells, in 3 cases there were no evidence of malignant cells and in one case there were no lymph node. On ultrasonography 46.15% were upstaged from N0 to N positive in which 38.46% were upstaged from N0 to N1 while on ultrasound guided FNAC 38.46% were upstaged from N0 to N positive in which 30.77% were upstaged from N0 to N1.

DISCUSSION

The present discussion is based on the study which was carried out on the patients of head and neck malignancies with clinically negative neck examination. An endeavour has been made to study these patients in detail and compare the results of clinical examination with ultrasound and ultrasound guided fine needle aspiration cytology. In the present study it was found that the peak incidence of head and neck malignancies was in 6th decades with

mean age 56.5 yrs. In the present study maximum number of patients (55.77%) presented in T3 stage followed by (33.77%) in T2 stage, (9.62%) in T1 stage and (3.84%) in T4 stage. In the present study most of the cases (55.77%) presented in stage III followed by 30, 77% in stage II, 9.62% in stage I and 3.84 % in stage IV. [5] reported the distribution of head and neck malignancies according to T stage as: T1- 17.8%, T2- 31.0%, T3- 31.3%, T4- 16.4%.

In the present study on ultrasound in 24 neck positive cases side wise involvement of nodes was as. Ipsilateral in 21 (87.50%) cases, bilateral in 2(8.33%) cases and contralateral in 1(4.17%) cases. [6] in his study found that out of 27 patients who presented with unilateral palpable neck mass, in 18 patients ultrasound revealed bilateral neck involvement while out of 32 patients in which no lesion was palpable clinically, in 15 patients multiple malignant lymph nodes were encountered on ultrasound examination. No contralateral nodal involvement was found in their study. In the present study out of 24 cases 8(33.33%) cases involved level III group of lymph nodes while 6(25%) involved level I and level II each. Level IV group of lymph nodes were involved in 4(16.67%) of cases. According to margins the results showed that nodes with irregular margins were FNAC positive in 94.44% of total nodes with irregular margins while nodes with regular margins were FNAC positive in 76.92% of total nodes with regular margins. Reversively FNAC negative were in nodes with regular margin in 23.08% cases. Thus the above result shows that the nodes with irregular margins were mostly malignant so even in the absence of FNAC, the nodes with irregular margins can be presumed to be malignant. A node should be considered if it is greater than 1 cm in diameter, spherical rather than flat or ovoid and harder to palpate than clearly uninvolved nodes. On the basis of size alone, about 80% of enlarged nodes are truly malignant and 20% are enlarged from benign hyperplasia [7].

In present study of lymph node staging in clinically negative patients by ultrasound shows that out of 52 clinically negative neck 20(38.45%) cases upgraded

from No to N1 while 2(3.85%) cases upgraded from No to N2b and No to N2c. Out of 18 clinically negative cases of oral cavity and oropharynx 7(38.92%) cases upgraded from No to N1 and 2(11.12%) cases from No to N2c. In case of laryngopharynx 1(25%) patient upstaged from No to N1 and 1(25%) patient from No to N2b. In larynx 10(41.67%) patients upstaged from No to N1 and 1(4.17%) from No to N2b whereas 25% patients of paranasal sinus malignancy 50% patients of lip cancers upstaged from No to N1. Ultrasound guided FNAC shows that out of 18 patients of oral cavity and oropharynx 61.11% patients were No while 27.78% patients upstaged from No to N1, 11.11% patients upstaged from No to N2c. In case of larynx out of 24 cases 62.50% patients were No while 33.33% patients upstaged from No to N1 and 4.17% patients upstaged from No to N2b. In a study 6% of necks were upstaged from N0 to N1 [8]. [9] reported that 2.5% of 40 cases were upstaged from N0 to N1, 10% of cases were upstaged from N0 to N2 and 10% of cases were upstaged from N1 to N2. [10] reported that imaging upstaging in 71% of N0 neck. In present study the result is consistent with previous studies.

On ultrasound examination 24 cases are positive for cervical lymph nodes while on ultrasound guided FNAC 20 cases are positive for malignant cells, 3 cases are negative for malignant cells and in 1 case on FNAC there is no evidence of lymphatic tissue. In the present study on ultrasound neck positive cases were 46.15% which is consistent with other previous study. Thus all the studies show that ultrasound is better than clinical examination (palpation) in study of neck for nodal status.

CONCLUSION

Head neck carcinoma usually occur in 6th and 7th decades of life, with male preponderance and strongly association with smoking and tobacco. Histopathologically, majority of are squamous cell carcinoma. Clinically detection of lymph nodes may be missed in up to 60% of cases for which ultrasound guided FNAC is more specific than ultrasound alone in detection of metastatic lymph

nodes and it has upstaged the clinically negative neck to neck positive in various studies.

Because of the high sensitivity, specificity and wide margin of safety of ultrasound and ultrasound guided FNAC, the procedure is likely to be used in every patient of head neck malignancies. More wide spread use would result in better planning for management of metastatic lymph nodes of neck and better care of patient by decreasing the morbidity, mortality and cost associated with unnecessary surgery by avoiding the need for other diagnostic procedures. So it is suggested that in every patient of head and neck malignancy after clinical examination ultrasound with and /or without FNAC should be done as a mandatory procedure for the better management of the patient.

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