

Original Article: Incidence of Neck Lymph Nodes Metastases at First Presentation of Patients Diagnosed with Oral Squamous Cell Carcinoma

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Abstract: Background: Neck lymph nodes metastases in oral squamous cell carcinoma are important diagnostic anticipators. Objective: To assess the incidence of neck lymph nodes metastases at first presentation of Jordanian patients diagnosed with oral squamous cell carcinoma. Methods: Our retrospective investigation included 100 patients, aged 29 - 66 years, of both genders and diagnosed with oral squamous cell carcinoma at King Hussein hospital, King Hussein medical city, Amman, Jordan, during the period Sept.2017 - Mar 2023. Incidence of neck lymph nodes metastases was determined (present or absent) using ultrasound, computed tomography and magnetic resonance imaging and were compared to the ultimate pathological findings of neck dissection metastases (present or absent). A score was recorded for lymph node size, configuration, clustering, peripheral enhancement, hilus sign, architecture, blood flow and central necrosis. Lymph nodes were positive if 2 of the following were found: pathological configuration, hilus sign, central necrosis, cluster, peripheral enhancement, architecture and blood flow (US and MRI). Histopathological specimens were positive if tumor cells were found in any of the lymph nodes indifferent of size or site where the respective side of the neck was positive. Results: Forty (40%) patients experienced neck lymph nodes metastases at first presentation. Fifty - eight (58%) patients had uni - or bilateral neck dissection. The combination of CT with MRI was optimum for staging neck lymph nodes in initial oral squamous cell carcinoma. The diameter of lymph nodes in US examinations was 1.6 - 36.7 mm (mean: 6.81 mm). The diameter of lymph nodes was 3.8 - 41.7 mm (mean: 10.8 mm) in CT and 3.6 - 40.5 mm (mean: 12.95 mm) in MRI. Regarding US, 20 sides were positive; computed tomography, 39 sides were positive and MRI, 21 sides were positive. Conclusion: The incidence of neck lymph nodes metastases at first presentation of Jordanian patients diagnosed with oral squamous cell carcinoma was forty percent but fifty - eight percent of all patients had neck dissection.

Keywords: oral squamous cell carcinoma; neck lymph node metastases

1. Introduction

Oral squamous cell carcinoma is the most frequent malignancy in the head and neck. It has extensive biological character and regional metastasis. 50% of patients with oral squamous cell carcinoma have neck lymph node metastasis at the time of confirmation⁽¹⁾. Neck lymph nodes are the most important prognostic factors and life expectancy is reduced by 50% if there is one positive neck lymph node. Oral squamous cell carcinoma is found in males and females. The frequency is increasing by 2.1%⁽²⁾. Smoking, meat diet, bad oral hygiene and dentition are risk factors⁽³⁾. The prognosis of oral squamous cell carcinoma is poor with a recurrence of 30%⁽⁴⁾. 50% of oral squamous cell carcinoma affects the tongue⁽⁵⁾. Lymph node ratio and enhanced patient stratification can improve prognosis.

Neck lymph node metastases in oral squamous cell carcinoma are an important factor in high recurrence. Neck metastasis has 50% decreased total survival with higher metastatic lymph node⁽⁶⁾. There is no radiological procedure to replace elective neck dissection. The accuracy of PET investigation of lymph nodes more than 10 mm and the less false positive rate compared to CT might rule out unrequired neck dissections⁽⁷⁾.

The goal of our investigation was to assess the incidence of neck lymph nodes metastases at first presentation of Jordanian patients diagnosed with oral squamous cell carcinoma

2. Methods

This retrospective investigation recruited 100 patients, aged 29 - 66 years, of both genders, diagnosed with initial oral

squamous cell carcinoma with uni - or bilateral neck dissection and re - staged by the 8th AJCC classification, at King Hussein hospital, King Hussein medical city, Amman, Jordan, during the period Sept.2017 - Mar 2023, after obtaining written informed consent from all participants and approval from our local ethical and research board review committee of Jordanian Royal medical services. Patients managed conservatively only (by radio - and/or chemotherapy) were ruled out.

Incidence of neck lymph nodes metastases was determined (present or absent) using ultrasound, computed tomography and magnetic resonance imaging and were compared to the ultimate pathological findings of uni - or bilateral neck dissection metastases (present or absent). To determine the identity of a lymph node by imaging, the score including the cervical lymph node size and shape criteria was recorded. Lymph nodes more than 10 mm were positive except for I and II where the cut off value was more than 15 mm ⁽⁸⁾. Lymph nodes were positive if 2 of the following were found:

pathological configuration, hilus sign, central necrosis, cluster, peripheral enhancement, architecture and blood flow (US and MRI). A lymph node was positive on sonography if the smallest diameter was more than 10 mm and the ratio of the longest to smallest diameter was less than 2. The findings of node positivity on CT or MRI were: a largest diameter more than 15 mm at level II and more than 10 mm at other levels and a ratio of the longest to smallest diameter less than 2 ⁽⁵⁾. Tables I - A, I - B and I - C ⁽⁸⁾.

Histopathological specimens were positive if tumor cells were found in any of the lymph nodes indifferent of size or site where the respective side of the neck was positive.

3. Statistics

Continuous parameters were rated as means with standard deviations and categorical parameters were rated as numbers with percentages.

Table I (A): Primary tumor (T) for oral cavity cancer ⁽⁸⁾.

T1	Tumor less than 2 cm and depth of invasion less than 5 mm.
T2	Tumor less than 2 cm, depth of invasion more than 5 mm and less than 10 mm or tumor more than 2 cm and less than 4 cm and depth of invasion less than 10 mm.
T3	Tumor more than 4 cm or any tumor with depth of invasion more than 10 mm.
T4	
T4a	Tumor invades nearby structures only.
T4b	Tumor invades masticator space, pterygoid plates, or skull base.

Table I (B): Clinical regional lymph nodes ⁽⁸⁾.

N0	No regional lymph node metastasis
N1	Metastasis in a single ipsilateral lymph node, less than 3 cm.
N2	Metastasis in a single ipsilateral lymph node more than 3 cm and less than 6 cm; or metastases in multiple ipsilateral lymph nodes, less than 6 cm; or in bilateral or contralateral lymph nodes, less than 6 cm.
N2a	Metastasis in a single ipsilateral lymph node more than 3 cm and less than 6 cm.
N2b	Metastases in multiple ipsilateral lymph nodes, less than 6 cm.
N2c	Metastases in bilateral or contralateral lymph nodes, less than 6 cm.
N3	Metastasis in a lymph node more than 6 cm; or metastasis in any lymph node (s).
N3a	Metastasis in a lymph node more than 6 cm.
N3b	Metastasis in any lymph node (s).

Table I: (C) Pathological regional lymph nodes ⁽⁸⁾.

N0	No regional lymph node metastasis.
N1	Metastasis in a single ipsilateral lymph node, less than 3 cm.
N2	Metastasis in a single ipsilateral lymph node, less than 3 cm; or metastasis in a single ipsilateral lymph node more than 3 cm and less than 6 cm; or metastases in multiple ipsilateral lymph nodes, less than 6 cm; or in bilateral or contralateral lymph nodes, less than 6 cm.
N2a	Metastasis in a single ipsilateral lymph node, less than 3 cm; or metastasis in a single ipsilateral lymph node more than 3 cm and less than 6 cm.
N2b	Metastases in multiple ipsilateral lymph nodes, less than 6 cm.
N2c	Metastases in bilateral or contralateral lymph nodes, less than 6 cm.
N3	Metastasis in a lymph node more than 6 cm; or metastasis in a single ipsilateral node more than 3 cm in highest size; or multiple ipsilateral, contralateral, or bilateral nodes; or a single contralateral node of any size.
N3a	Metastasis in a lymph node more than 6 cm.
N3b	Metastasis in a single ipsilateral node more than 3 cm in highest size; or multiple ipsilateral, contralateral, or bilateral nodes; or a single contralateral node of any size.

4. Results

Forty (40%) patients experienced neck lymph nodes metastases at first presentation. Fifty - eight (58%) patients had uni - or bilateral neck dissection. Forty - six patients had an US examination, 57 subjects had a CT scan and 39 had an MRI. Two imaging examinations were performed in 45

patients (US and CT). Three radiological methods were performed in 34 patients (US, CT and MRI). Twenty - two patients were females (37.9%) and 36 patients were males (62.1%) with a mean age of 49.4 ± 9.2 years at the time of diagnosis of the tumor.

The site of the initial tumor is seen in Table II. Tumor size and lymph node staging in terms of the TNM classification are found in Tables III and IV, respectively. Histopathological grading is seen in Table V. In 42 patients, neck dissection was done on the tumor side only (20 on the right and 22 on the left side). Sixteen patients had bilateral neck dissection. The diameter of lymph nodes in US examinations was 1.6 - 36.7 mm (mean: 6.81 mm). The diameter of lymph nodes was 3.8 - 41.7 mm (mean: 10.8 mm) in CT and 3.6 - 40.5 mm (mean: 12.95 mm) in MRI. Regarding US, 20 sides were positive of which, 12 sides (60%) were positive due to size and shape, 1 side (5%) was positive due to enlarged lymph node and 7 sides (35%) were positive due to normal size but pathological shape lymph nodes. Regarding computed tomography, 39 sides were positive of which 24 sides (61.5%) were positive due to size and shape, 2 sides (5.1%) were positive due to enlarged lymph nodes and 13 sides (33.3%) were positive due to normal size but pathological shape lymph nodes. Regarding MRI, 21 sides were positive of which 16 sides (76.2%) were positive due to size and shape, 1 side (4.8%) was positive due to enlarged lymph nodes and 4 sides (19.04%) were positive due to normal size but pathological shape lymph nodes.

Table II: Demographics of patients with neck dissection

Number of patients with oral squamous cell carcinoma	100	
Number of patients with neck lymph nodes metastases at first presentation	40	
Number of patients with neck dissection	58	
Age (years) range (mean+/-)	29 - 66 (49.4+/- 9.2)	
Sex (NO., %)		
M	36 (62.1)	
F	22 (37.9)	
Site (no., %)		
floor of the mouth	24	41.4
mandible	12	20.7
tongue	9	15.5
palate	8	13.8
maxilla	5	8.6
Overall	58	100

Table III: Clinical tumor size and lymph nodes

Tumor size			Lymph nodes		
T - Stage	No.	%	N - stage	No.	%
1	15	25.9	0	21	36.2
2	13	22.4	1	9	15.5
3	5	8.6	2	10	17.2
4	12	20.7	2a	7	12.1
4a	9	15.5	2b	8	13.8
4b	4	6.9	2c	3	5.2
Overall	58	100	Overall	58	100

Table IV: Pathological tumor size and lymph nodes

Tumor size			Lymph nodes		
T - Stage	No.	%	N - stage	No.	%
1	22	37.9	0	30	51.7
2	23	39.7	1	8	13.8
3	2	3.5	2	2	3.5
4	5	8.6	2a	1	1.7
4a	5	8.6	2b	9	15.5
4b	1	1.7	2c	8	13.8
Overall	58	100	Overall	58	100

Table V: Grades.

GRADE	NO.	%
1	6	10.3
2	35	60.3
3	17	29.3
Overall	58	100

5. Discussion

The most increased size of the tumor was the most important feature for T staging in oral cancer. Deeper invasion tumors have higher risk of nodal metastases (T stages in the AJCC 8th edition). Clinical differentiation between thin (less than 5 mm), intermediate (more than 5 mm and less than 10 mm) and thick (more than 10 mm) lesions is usually possible with professionals.

Our goal of our investigation was to record neck lymph node metastases in primary oral squamous cell carcinoma. Oral squamous cell carcinoma is the dominant malignancy in the oral cavity. Males are more diagnosed with oral squamous cell carcinoma than females. The age of confirmation of oral squamous cell carcinoma ranges between 45 and 64 years in 50% of patients ⁽⁹⁾. Precise confirmation using potential including of lymph nodes determines optimum management. Sonography is deficient in studying structures deeper than 3-4 cm and differentiating between inflammatory and metastatic lymph nodes. CT and MRI can assess superficial and deep structures (lymph nodes) but the resolution is limited to 3 mm.

In squamous cell carcinoma of the upper aero - digestive tract, levels I, II and III were the most frequent metastatic locations and the frequencies of levels IV and V were 20 and 4%, respectively ^(10 - 11). Level VI in the neck is surrounded by the hyoid superiorly, the suprasternal inferiorly and the strap muscles laterally. It receives lymphatic drainage from the anterior neck, larynx, hypopharynx, thyroid, trachea and cervical esophagus and then goes to the lymph nodes at levels II, III and IV. Level VI isn't a frequent potential metastatic location in recurrent oral squamous cell carcinoma, but never in primary oral squamous cell carcinoma patients. Lymphatic drainage might be modified by past operative manipulation and radiotherapy. Lymph node drainage in axillary and internal mammary nodes was changed in patients following excisional biopsies of breast masses. Malignant cells were seeded in the central neck after tracheotomy, incision wounds being fertile ground for cancer cell growth.

There are deficient standard criteria for the definition of malignant lymph nodes which make confirmation of radiological findings difficult. Normal lymph nodes might be as big as 10-15 mm. Lymph node architecture, blood flow and vascularity must be investigated. A group of lymph nodes must be investigated differently in comparison to a single node. Tumor cells might advance by local invasion, lymphatics, blood vessels and direct implantation. Local invasion and direct implantation cannot be the causes if there is long distance between the primary tumor and metastatic location. Regarding infrequent metastatic site: drainage via crossing lymphatics and the complexity of the

lymphatics in the head and neck is accepted and retrograde metastasis.

Lymph collected at level VI goes into lymph nodes at levels II to IV, but in advanced neck disease, tumor emboli may occlude the afferent lymph collectors, causing misdirection of lymphatic drainage along other pathways. Hematogenous metastasis was also a leader. Although a soft tissue deposit may reflect an affected lymph node, the possibility of distant metastasis foci cannot be excluded.

Risk factors for metastasis in oral squamous cell carcinoma and frequent anticipators are advanced - stage disease and poor differentiation. Clinically positive lymph nodes were easy to spot, but possibilities of other malignancies must be excluded. Metastasis was frequent in thyroid cancer and squamous cell carcinoma of the larynx, hypopharynx and esophagus and a systemic examination of the digestive and respiratory tracts is recommended.

6. Conclusion

The incidence of neck lymph nodes metastases at first presentation of Jordanian patients diagnosed with oral squamous cell carcinoma was forty percent but fifty - eight percent of all patients had neck dissection.

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