Size of Cervical Lymph Node and Metastasis in Squamous Cell Carcinoma of the Oral Tongue and Floor of Mouth

Weerawut Jarungroongruangchai MD*,
Mongkol Charoenpitakchai MD**, Tawatchai Silpeeyodom MD***,
Chatchai Pruksapong MD*, Chairat Burusapat MD*

** Division of Plastic and Reconstructive surgery, Department of Surgery, Phramongkutklao Hospital, Bangkok, Thailand*
*** Department of Pathology, Phramongkutklao college of Medicine, Bangkok, Thailand*
**** Department of Anatomical Pathology, Army Institute of Pathology, Bangkok, Thailand*

Background: *Squamous cell carcinoma (SCC) of the oral tongue and floor of mouth are the most common head and neck cancers. Regional metastasis of SCC is most likely found at the cervical lymph node. Size and characteristics of pathologically suspicious lymph nodes are related to the aggressiveness of the primary tumor. The objective of this study is to analyze the correlation between sizes of cervical node and metastasis in SCC of oral tongue and floor of mouth.*
Material and Method: *Retrospective review was conducted from the patient's charts between January 2008 and December 2012. Clinical, histopathology and surgical records were reviewed. Cervical lymph nodes of SCC of oral tongue and floor of mouth were reviewed and divided into four groups depending on their size (1-5 mm, 6-9 mm, 10-30 mm and more than 30 mm). A p-value <0.05 was considered statistically significant.*
Results: *196 patients with SCC of the oral cavity were recorded. Sixteen patients of SCC of the oral tongue and 15 patients of SCC of the floor of mouth underwent neck dissection (641 cervical nodes). Most of the patients were diagnosed with stage 3 (41.94%). Extracapsular extension was found in 72.15% of SCC of oral tongue and 73.33 % of SCC of the floor of mouth. Size of cervical lymph nodes less than 10 mm was found to be metastasis at 9.27% and 10.82% of SCC of oral tongue and floor of mouth, respectively.*
Conclusion: *Cervical node metastasis can be found in SCC of the oral tongue and floor of mouth with clinically negative node and size of cervical node less than 10 mm. Here in, size of cervical node less than 10 mm was still important due to the chance for metastasis especially high grade tumors, advanced stage cancer and lymphovascular invasion.*

Keywords: *Squamous cell carcinoma, Oral tongue, Floor of mouth, Cervical lymph node*

J Med Assoc Thai 2014; 97 (Suppl. 2): S101-S106
Full text. e-Journal: *http://www.jmatonline.com*

Squamous cell carcinoma (SCC) of the oral tongue and floor of mouth are the most common head and neck cancers. SCC can grow into the mucosal surface and underneath tissue. Regional metastasis of SCC is most likely at the cervical lymph node. Size and characteristics of pathologically suspicious lymph nodes relate to the aggressiveness of the primary tumor[1]. Usually, size of cervical nodes larger than 10 mm is significant for nodal metastasis. Presently, cervical node metastasis affects the survival rate of the patients. Complications for neck dissection include torticollis, shoulder dystrocia and facial swelling.

The investigations for cervical node metastasis such as Computed Tomography (CT)[2,3], Magnetic Resonance Imaging (MRI)[3-6], Positron Emission Tomography (PET)[7,8], Doppler Ultrasound[9] give more information than clinical examination especially in obese patients; however, recurrence rates reach 7.5% at two years after neck dissection procedure in patients with histologically negative nodes[10].

The objective of this study is to review the size of cervical lymph nodes and analyze the correlation between cervical node metastasis and size of cervical node for appropriate selection of further treatment in oral tongue and floor of mouth cancer.

Correspondence to:
Burusapat C, Division of Plastic and Reconstructive surgery, Department of Surgery, Phramongkutklao Hospital, Bangkok 10400, Thailand.
Phone: 08-1371-3392
E-mail: pataranat@hotmail.com

Material and Method

The present study was approved by the Ethic

Committee of Phramongkutklao Hospital.

This was a retrospective review of patients with SCC of the oral tongue and floor of mouth in Phramongkutklao Hospital between January 2008 and December 2012. The authors reviewed database and hospital records on demographics, stage of tumors, tumor differentiation, and treatment. Seven hundred and ninety-eight nodes were reviewed for size, metastasis, and extracapsular extension under a microscopic by pathologist. Inclusion criteria were patients with squamous cell carcinoma of oral tongue and floor of mouth. Exclusion criteria were patients with other types of oral cavity cancer including carcinoma of thyroid, pharynx, larynx, tonsil, pathologic report showing other type of carcinoma and patients with preoperative chemoradiation.

The authors divided sizes of cervical node into four groups by microscopic and ranging from 1-5 mm, 6-9 mm, 10-30 mm and larger than 30 mm, respectively. All cervical nodes were reviewed under microscope and recorded include size of lymph node, lymphovascular invasion, perineural invasion, extracapsular extension and metastasis (positive and negative cervical nodes).

Data analysis was performed in percentage of both positive and negative cervical nodes in-patient with SCC of the oral tongue and floor of mouth including neck dissection and subgroup analysis in each type of oral cavity cancer. Correlation between cervical nodes and tumors was analyzed. The univariate analysis of the independent variables was accomplished using Fisher's exact test or Chi-square test. A p-value <0.05 was considered statistically significant.

Results

In the five-year period of review, 196 patients with SCC of oral cavity were recorded (Table 1). Thirty-one patients of SCC of the oral tongue and floor of mouth were underwent neck dissection. 79.59% of patients were male with the most common age 45-60 years (45.92%). The most common sites of SCC were oral tongue (41.96%). Stage 1, stage 3, stage 4 and stage 2 were diagnosed 53.57%, 16.84%, 15.31% and 14.29%, respectively. 86.2% of patients had a history of betel nut chewing. The most common co-morbidity was hypertension (38.78%). Thirty-two patients underwent fine needle aspiration (FNA) of cervical nodes (16.33%) and 25 patients showed positive FNA. Thirty-one patients of SCC of the oral tongue and floor of mouth underwent neck dissection and 641 nodes were found. According to histopathology reviewed, SCC of the oral tongue showed lymphovascular invasion 42.85%, while SCC of the floor of mouth showed lymphovascular invasion 57.89%. Clinical stage 3, stage 2, and stage 4 were diagnosed 41.94%, 29.03%, and 29.03%, respectively (Table 2). Therapeutic neck dissections were performed in 15 patients and divided into 9 cases of SCC of the oral tongue and 6 cases of

Table 1. Demographic data of 196 patients of oral cavity cancer

Demographic data	n	(%)
Gender		
Male	156	79.59
Female	40	20.41
Age		
<45 years	41	20.92
45-60 years	90	45.92
>60 years	65	33.16
Site of SCC		
Oral tongue	94	47.96
Base of tongue	20	10.20
Lip	36	18.37
Floor of mouth	29	14.80
Buccal mucosa	11	5.61
Retromolar trigone	6	3.06
Clinical staging		
Stage 1	105	53.57
Stage 2	28	14.29
Stage 3	33	16.84
Stage 4	30	15.31
Risk factor		
Smoke	99	50.51
Alcohol	103	52.55
Betel nut chewing	114	58.16
Co-morbidity		
Diabetes mellitus	28	14.28
Hypertension	76	38.78
Dyslipidemia	25	12.76
Cardiovascular disease	19	9.69
Other (kidney, liver disease, etc)	44	22.45
Investigation		
Ultrasound of liver	164	83.67
Bone scan	163	83.16
CT of head and neck	145	73.97
MRI of head and neck	8	4.08
FNA of cervical node	32	16.33
Treatment		
Surgery	165	84.18
Chemotherapy	114	58.16
Radiation	153	78.06

SCC = squamous cell carcinoma; CT = computed tomography; MRI = magnetic resonance imaging; FNA = fine needle aspiration

Table 2. Demographic data of 31 patients of oral tongue and floor of mouth cancer and neck dissection

Demographic data	n	(%)
Gender		
Male	26	83.87
Female	5	16.13
Age		
<45 years	9	29.03
45-60 years	11	35.48
>60 years	11	35.48
Site of SCC		
Oral tongue	16	51.61
Floor of mouth	15	48.39
Clinical staging		
Stage 1	0	0.00
Stage 2	9	29.03
Stage 3	13	41.94
Stage 4	9	29.03
Risk factor		
Smoke	10	32.26
Alcohol	5	16.13
Betel nut chewing	25	80.65
Co-morbidity		
Diabetes mellitus	3	9.68
Hypertension	16	51.61
Dyslipidemia	5	16.13
Cardiovascular disease	2	6.45
Other (kidney, liver disease, etc)	24	77.42
Investigation		
Ultrasound of liver	31	100.00
Bone scan	31	100.00
CT of head and neck	27	87.10
MRI of head and neck	4	12.90
FNA of cervical node	4	12.90
Treatment		
Surgery	31	100.00
Chemotherapy	24	77.42
Radiation	30	96.77

SCC = squamous cell carcinoma; CT = computed tomography; MRI = magnetic resonance imaging; FNA = fine needle aspiration

SCC of the floor of mouth.

The most common sizes of cervical node were less than 10 mm in both groups of SCC (Fig. 1). Metastasis could be found in all sizes of cervical nodes (Fig. 2). SCC of the oral tongue was found 410 cervical nodes, 79 nodes showed positive for malignancy distributed in groups 1, 2, 3, and 4 as 16, 22, 40, and 1 nodes, respectively. SCC of the floor of mouth was found 231 cervical nodes, 45 nodes showed positive for malignancy distributed in groups 1, 2 and 3 as 8, 17, and 20 nodes, respectively (Table 3).

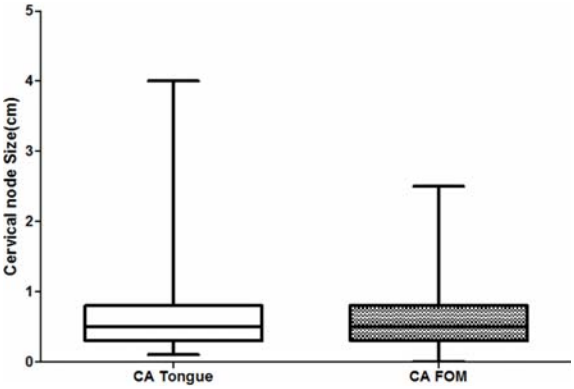

Fig. 1 Boxplots shows the comparison between size of cervical node and site of cancer.

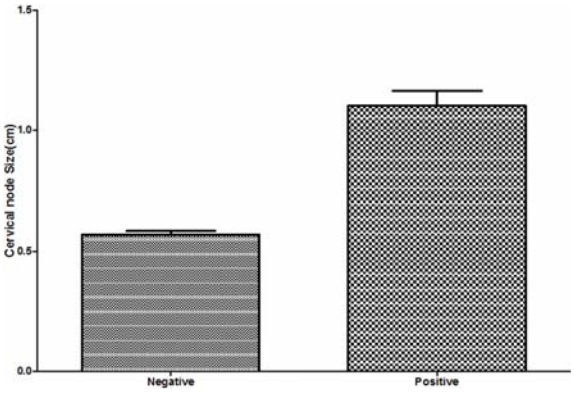

Fig. 2 Bar graph shows the comparison between size of cervical node and nodal metastasis.

Extracapsular extension was found 72.15% of SCC of oral tongue and 73.33% of SCC of the floor of mouth. The size of cervical lymph nodes less than 10 mm was found to be metastasis at 9.27% and 10.82% of SCC of oral tongue and floor of mouth, respectively (Table 4).

Discussion

Oral cavity cancer is one of the most common cancers of the head and neck. SCC is the most common type of cancer in this area. Morbidity and mortality are related to regional and distant metastasis and their complications. Size of cervical node more than 10 mm is significant for metastasis. However, size of cervical node less than 10 mm is still important because of the chance for metastasis especially in high grade tumor, advanced stage cancer and lymphovascular invasion.

Cervical node metastasis is an important prognostic factor for head and neck cancer[11]. Literature

Table 3. Demonstration of positive and negative cervical nodes in each size of SCC of the tongue and floor of mouth

Size of cervical node	SCC of oral tongue (n = 410)		SCC of floor of mouth (n = 231)	
	Negative (n = 331)	Positive (n = 79)	Negative (n = 186)	Positive (n = 45)
1-5 mm	157	16	91	8
6-9 mm	105	22	68	17
10-30 mm	68	40	27	20
>30 mm	1	1	0	0

Table 4. Percentage of extracapsular extension in positive nodes of SCC of the tongue and floor of mouth

Site of cancer	Extracapsular extension (n = 124)	
	Negative (n = 34) (27.42%)	Positive (n = 90) (72.58%)
Oral tongue	22 (17.74%)	57 (45.97%)
Floor of mouth	12 (9.68%)	33 (26.61%)

review showed that cervical node status, tumor size and site were important risks for distant metastasis[12]. However, Alkureishi LW et al reported that the size of cervical node was an inaccurate predictor of nodal metastasis and could not be regarded as an accurate means of staging in the patients with clinically negative nodes[13]. Some literature suggested therapeutic neck dissection in-patient with clinically negative nodes because pathologic positive nodes might be found in some patients[14]. Therefore, neck dissection was a challenging treatment in patients with clinically negative nodes.

Size of cervical node was varied from 1-40 mm. Although, negative nodes were more numerous than positive nodes, the sizes of positive nodes were still larger than negative nodes. It meant that larger nodes have more chance to metastasize than smaller nodes. However, size of positive node 6-9 mm had still more chance for metastasis than a nodal size 1-5 mm. Therefore, aggressive tumors such as poor differentiation, tumor with lymphovascular invasion and/or perineural invasion and extracapsular nodal extensions were important factors for increase the chance of nodal metastasis.

Surgical treatment of cervical nodes can be divided between therapeutic neck dissection and prophylactic neck dissection. Therapeutic neck dissection is performed in patients with clinically positive nodes while prophylactic neck dissection is done in patients with clinically negative nodes if indicated and depended on site of cancer, tumor differentiation, and tumor aggressiveness. SCC of the floor of mouth was found to be more aggressive cancer than SCC of the tongue which demonstrated by the percentage of lymphovascular invasion of SCC of the floor of mouth (57.85%) higher than SCC of the tongue (42.85%).

Most of SCC of the floor of mouth had crossed the midline and were near the cervical node; therefore, it can metastasize to the nodes easily, making it necessary to perform prophylactic neck dissection on contralateral clinically negative nodes. However, physicians should be aware of cervical node metastasis in patients with oral tongue and floor of mouth cancer stages T1, T2 with clinically negative nodes by close observation.

Conclusion

Cervical node metastasis can be found in SCC of the oral cavity with clinical negative nodes. Metastasis at the cervical node less than 10 mm can be found. Herein, size of cervical node less than 10 mm was still important because of the chance for metastasis especially in high grade tumors, advanced stage cancer and lymphovascular invasion.

Acknowledgement

The authors wish to thank Mrs. Supak

Ukritchon, the research assistant at Office of Research Development, Phramongkutklao College of Medicine for kind help in the statistic analysis of this article.

Disclosure

None of the authors has a financial interest in any of the products, devices, or drugs mentioned in this article.

Potential conflicts of interest

None.

References

1. Larson DL. Tumors of the lips, oral cavity and oropharynx. In: Mathes SJ, editor. Plastic surgery. 2nd ed. Philadelphia: Saunders Elsevier; 2006: 159-87.
2. Hung SH, Lin CY, Lee JY, Tseng H. Computed tomography image characteristics of metastatic lymph nodes in patients with squamous cell carcinoma of the head and neck. Auris Nasus Larynx 2012; 39: 606-10.
3. Wiener E, Pautke C, Link TM, Neff A, Kolk A. Comparison of 16-slice MSCT and MRI in the assessment of squamous cell carcinoma of the oral cavity. Eur J Radiol 2006; 58: 113-8.
4. Ding ZX, Liang BL, Shen J, Xie BK, Huang SQ, Zhang B. Magnetic resonance imaging diagnosis of cervical lymph node metastasis from lingual squamous cell carcinoma. Ai Zheng 2005; 24: 199-203.
5. de Bondt RB, Nelemans PJ, Bakers F, Casselman JW, Peutz-Kootstra C, Kremer B, et al. Morphological MRI criteria improve the detection of lymph node metastases in head and neck squamous cell carcinoma: multivariate logistic regression analysis of MRI features of cervical lymph nodes. Eur Radiol 2009; 19: 626-33.
6. Feinmesser R, Freeman JL, Noyek AM, Birt D, Gullane P, Mullen JB. MRI and neck metastases: a clinical, radiological, pathological correlative study. J Otolaryngol 1990; 19: 136-40.
7. Matsubara R, Kawano S, Chikui T, Kiyosue T, Goto Y, Hirano M, et al. Clinical significance of combined assessment of the maximum standardized uptake value of F-18 FDG PET with nodal size in the diagnosis of cervical lymph node metastasis of oral squamous cell carcinoma. Acad Radiol 2012; 19: 708-17.
8. Yamazaki Y, Saitoh M, Notani K, Tei K, Totsuka Y, Takinami S, et al. Assessment of cervical lymph node metastases using FDG-PET in patients with head and neck cancer. Ann Nucl Med 2008; 22: 177-84.
9. Kagawa T, Yuasa K, Fukunari F, Shiraishi T, Miwa K. Quantitative evaluation of vascularity within cervical lymph nodes using Doppler ultrasound in patients with oral cancer: relation to lymph node size. Dentomaxillofac Radiol 2011; 40: 415-21.
10. Ariyan S. Management of regional metastatic disease of the head and neck: diagnosis and treatment. In: Mathes SJ, editor. Plastic surgery. 2nd ed. Philadelphia: Saunders Elsevier; 2006: 465-474.
11. Haksever M, Inancli HM, Tuncel U, Kurkcuoglu SS, Uyar M, Genc O, et al. The effects of tumor size, degree of differentiation, and depth of invasion on the risk of neck node metastasis in squamous cell carcinoma of the oral cavity. Ear Nose Throat J 2012; 91: 130-5.
12. Kuperman DI, Auethavekiat V, Adkins DR, Nussenbaum B, Collins S, Boonchalermvichian C, et al. Squamous cell cancer of the head and neck with distant metastasis at presentation. Head Neck 2011; 33: 714-8.
13. Alkureishi LW, Ross GL, MacDonald DG, Shoaib T, Gray H, Robertson G, et al. Sentinel node in head and neck cancer: use of size criterion to upstage the no neck in head and neck squamous cell carcinoma. Head Neck 2007; 29: 95-103.
14. Ozer F, Ozer C, Erkan AN, Yavuz H. The therapeutic role and effectiveness of selective neck dissection in the management of N0 neck. Kulak Burun Bogaz Ihtis Derg 2009; 19: 192-7.

ขนาดของต่อมน้ำเหลืองที่คอกับการแพร่กระจายของมะเร็งชนิดผิวเรียบบริเวณลิ้นและพื้นช่องปาก

วีรวุฒิ จรุงรุ่งเรืองชัย, มงคล เจริญพิทักษ์ชัย, ธวัชชัย ศิลปีโยดม, ชาติชาย พฤกษาพงษ์, ชัยรัตน์ บุรุษพัฒน์

ภูมิหลัง: มะเร็งชนิดผิวเรียบของลิ้นและพื้นช่องปากเป็นมะเร็งหน้าและคอที่พบได้บ่อย การกระจายในบริเวณใกล้เคียงมักมาต่อมน้ำเหลืองที่คอ ขนาดและลักษณะของต่อมน้ำเหลืองที่สงสัยการแพร่กระจายจะสัมพันธ์กับความรุนแรงของมะเร็ง

วัตถุประสงค์: เพื่อดูความสัมพันธ์ของการกระจายของมะเร็งชนิดผิวเรียบของลิ้นและพื้นช่องปากที่มาต่อมน้ำเหลืองที่คอกับขนาดต่าง ๆ ของต่อมน้ำเหลือง

วัสดุและวิธีการ: เป็นการศึกษาย้อยหลังระหว่างเดือนมกราคม พ.ศ. 2551 ถึง เดือนธันวาคม พ.ศ. 2555 ลักษณะทางคลินิก พยาธิวิทยาและข้อมูลการผ่าตัดจะถูกรวบรวมต่อมน้ำเหลืองที่ขอของมะเร็งชนิดผิวเรียบบริเวณลิ้นและพื้นช่องปาก จะแบ่งออกเป็น 4 กลุ่มตามขนาดต่าง ๆ (1-5 มม., 6-9 มม., 10-30 มม. และมากกว่า 30 มม.) จากนั้นจะนำมาวิเคราะห์ในแต่ละตำแหน่งของมะเร็งโดยใช้ค่า p-value ที่น้อยกว่า 0.05 ในการคำนวณความแตกต่างทางสถิติอย่างมีนัยสำคัญ

ผลการศึกษา: มีผู้ป่วยมะเร็งชนิดผิวเรียบช่องปากจำนวน 196 โดยมี 16 ราย เป็นมะเร็งที่ลิ้นและ 15 ราย เป็นมะเร็งที่พื้นช่องปากที่ได้รับการผ่าตัดเลาะต่อมน้ำเหลืองที่คอ (ได้ต่อมน้ำเหลือง 641 ต่อม) ร้อยละ 41.94 ของผู้ป่วยอยู่ในระยะที่ 3 มีการลุกลามของมะเร็งออกไปนอกต่อมน้ำเหลืองร้อยละ 72.15 ของมะเร็งของลิ้นและร้อยละ 73.33 ของมะเร็งพื้นช่องปาก ต่อมน้ำเหลืองที่ขนาดเล็กกว่า 10 มม. มีการกระจายมาร้อยละ 9.27 และ 10.82 ของมะเร็งลิ้นและพื้นช่องปากตามลำดับ

สรุป: การกระจายของมะเร็งชนิดผิวเรียบของลิ้นและพื้นช่องปากมาที่ต่อมน้ำเหลืองที่คอสามารถพบได้แม้ทางคลีนิก จะตรวจไม่พบและขนาดของต่อมน้ำเหลืองจะเล็กกว่า 10 มม. ก็ตามดังนั้นขนาดของต่อมน้ำเหลืองที่มีขนาดเล็กกว่า 10 มม. ยังคงมีความสำคัญอยู่เนื่องจากมีโอกาสในการแพร่กระจายมาได้โดยเฉพาะอย่างยิ่งในพวกมะเร็งที่มีการแบ่งตัวมาก มะเร็งระยะลุกลามและมีการลุกลามของระบบน้ำเหลืองและหลอดเลือด