

Level IIb lymph node metastasis in transglottic laryngeal squamous cell carcinoma

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Abstract

Objective: To evaluate the clinical and pathologic parameters associated with level IIb metastasis in transglottic laryngeal carcinoma.

Methods: A total of 238 laryngeal squamous cell carcinoma patients admitted to our tertiary center and surgically treated between January 2006 and January 2014. Of these 238 patients, 134 patients with transglottic laryngeal SCC were enrolled in the study. The type of neck dissection, the location of histopathologically proven metastatic lymph nodes, clinical N and T stages were reviewed. Palpable lymph nodes were accepted clinically cN(+) and the opposite as cN(-).

Results: Of the 134 patients, 116 were diagnosed as cN(-), and 18 were as cN(+). Level IIb metastasis was diagnosed in 12 patients in the cN(+) group, and in two patients in the cN(-) group. Histopathological level IIb metastasis was shown in 14 of 134 patients, representing 16 of 268 neck dissection specimens. Level IIb metastasis was shown in the ipsilateral specimens in 12 patients and contralateral specimens in two patients. Forty-one of 134 patients presented cartilage invasion, and nine of them were diagnosed with level IIb metastasis.

Conclusion: Thyroid cartilage invasion, the presence of level IIa invasion and advanced stage disease are the risk factors for level IIb metastasis. Therefore, level IIb should not be neglected during neck dissection in transglottic laryngeal carcinoma.

Keywords: Level IIb, lymph node metastasis, transglottic, laryngeal squamous cell carcinoma.

Özet: Transglottik larinks skuamöz hücreli karsinomlarda level IIb lenf nodu metastazi

Amaç: Çalışmanın amacı transglottik laringeal karsinomda level IIb metastazi ile ilişkili klinik ve patolojik parametreleri araştırmaktır.

Yöntem: 2006 Ocak ve 2014 Ocak arasında üçüncü basamak kliniğimizde parsiyel veya total larenjektomi uygulanan 238 hastanın medikal kayıtları retrospektif olarak tarandı. Bu 238 hastadan transglottik larinks skuamöz hücreli karsinomu olan 134'ü bu çalışmaya dahil edildi. Boyun diseksiyonu tipi, histopatolojik lenf nodları ve lokalizasyonları, klinik N evresi ve T evresi verileri değerlendirildi. Palpabl lenf nodlarının varlığında klinik olarak boyun pozitif cN(+) olarak kabul edildi.

Bulgular: Yüz otuz dört hastanın 116'sı cN(-) ve 18'i cN(+) olarak saptandı. Level IIb metastazi cN(+) grupta 12 hastada, cN(-) grupta 2 hastada bulundu. Histopatolojik level IIb metastazi 134 hastanın 14'ünde ve 268 boyun diseksiyonu spesmeninin 16'sında saptandı. Level IIb metastazi ipsilateral spesmenlerin 12'sinde ve kontralateral spesmenlerin 2'sinde gösterildi. 134 hastanın 41'inde tiroid kartilaj invazyonu mevcuttu ve bu hastaların 9'unda aynı zamanda level IIb metastazi vardı.

Sonuç: Larinks kanserlerinde tiroid kartilaj invazyonu, level IIa metastazi ve ileri evre olması level IIb metastazi için risk faktörü olarak bulundu. Bu nedenle transglottik karsinomlarda level IIb diseksiyonu ihmal edilmemelidir.

Anahtar sözcükler: Level IIb, lenf nodu metastazi, transglottik, larinks skuamöz hücreli karsinomu.

The treatment of laryngeal squamous cell carcinoma (SCC) is based on proper design of therapeutic strategies aimed to control cervical lymph node metastasis. Cervical nodal metastasis is one of the most important prognostic factors in

carcinoma of the larynx.^[1] The incidence of clinically detectable lymph node metastasis in laryngeal carcinoma is high, and the levels II, III, and IV are the most commonly involved lymphatic groups in carcinoma of the larynx.

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Understanding of the lymphatic spread of the laryngeal SCC is important for performing selective neck dissection (SND).

Since the first description of neck dissection, it has been the most common treatment option for cervical lymph node metastases of laryngeal cancer. Recently, surgical treatment of neck metastasis has evolved to provide oncologic efficacy while reducing morbidities. Despite all efforts to preserve, the spinal accessory nerve (SAN) may still be damaged because of various intraoperative factors and causes an extensive decrease in the quality of life. Previous studies showed that the severity of postoperative shoulder syndrome is directly proportional to the extent of neck dissection. These studies indicated 18% to 77% frequency of shoulder syndrome in functional neck dissection while 29% to 39% in SND.^[2-4] The clearance of the lymph nodes lying posterior and superior to the SAN might traumatize SAN. These lymph nodes were named as “level IIb” by Suen et al.^[5] If these lymph nodes are not cleared, the SAN dysfunction can be decreased.^[6-8]

The preservation of the IIb region is reported to be possible in N0 cases of laryngeal cancer. However, level IIb metastasis can be observed in laryngeal SCC carcinomas. Consequently, determination of high-risk patients for level IIb metastasis may allow the surgeon to perform SND, in which the lymph nodes at greatest risk of metastasis are resected. So, in low-risk patients, further dissection of level IIb may be avoided.

The aim of this study was to evaluate the clinical and pathologic parameters associated with level IIb metastasis in transglottic laryngeal carcinoma.

Materials and Methods

Study design

This retrospective study has been conducted in accordance with the principles of the Helsinki Declaration and approved by the local Institutional Review Board. A total of 238 laryngeal squamous cell carcinoma patients admitted to our tertiary center between January 2006 and January 2014 and treated with total or partial laryngectomy with or without neck dissection constituted the study group. Of these 238 patients, 134 patients with transglottic laryngeal SCC were enrolled in the study. The term transglottic was used for tumors that invaded supraglottic, glottic, and subglottic regions and displayed a vertical progression.

Surgical approach to the neck

To determine the type of neck dissection, frozen sections were examined intraoperatively. If the lymph nodes of the

ipsilateral SND II-IV material were diagnosed as metastatic on frozen section, level V was added to the neck dissection, and contralateral SND II-IV was also performed. If metastasis was diagnosed postoperatively, radiation therapy was applied.

Outcome parameters

The evaluated data included the type of neck dissection, the histopathological metastatic lymph nodes and their locations, clinical N stage, and T stage. Estimations were made according to the American Joint Committee for Cancer (2002). Palpable lymph nodes were accepted clinically cN(+) and the opposite as cN(-). Cases were examined in terms of level IIb metastasis.

Statistical analyzes

Data were analyzed using the Statistical Package for Social Sciences (SPSS) software version 15.0 for Windows (SPSS Inc., Chicago, IL, USA). Parametric tests were applied to data with normal distribution and non-parametric tests were applied to data with questionably normal distribution. The distribution of categorical variables in both groups was compared using Fisher's exact test. Data are expressed as mean±SD or median (interquartile range), as appropriate. Statistical significance was assumed for p<0.05.

Results

The study group consisted of 128 men and six women. The mean age was 62.32 (range: 42 to 76) years. The mean follow-up was 49 (range: 12 to 96) months.

Total laryngectomy was performed in 118 patients, supracricoid laryngectomy in 13 patients, and near-total laryngectomy in three patients. Bilateral neck dissection was performed in all patients with a total of 268 neck dissections. Metastasis to level IIb was diagnosed in 16 neck dissection specimens of 14 patients.

Of the 134 patients, 12 were diagnosed as stage T2, 75 as T3, and 47 as T4. Of the 134 patients, 116 were diagnosed as cN(-), and 18 were as cN(+). Metastasis to level IIb was diagnosed in 12 patients in the cN(+) group and in 2 patients in the cN(-) group. The relationship between level IIb metastasis and clinical N stage was found to be statistically significant. Of the 14 patients with level IIb metastasis, one patient was diagnosed as stage T2, three patients were as T3, and 10 patients were as T4.

Histopathological level IIb metastasis was shown in 14 of 134 patients, representing 16 of 268 neck dissection specimens. Level IIb metastasis was shown in the ipsilateral-

al specimens in 12 patients and contralateral specimens in 2 patients. There was no isolated level IIb involvement. For patients who had ipsilateral level IIb metastasis, ipsilateral level IIa, ipsilateral level III, and contralateral level IIa metastasis were also observed. For patients who had contralateral level IIb metastasis, level IIa and level III metastasis were also observed ipsilaterally and contralaterally. Two patients were cN(-), and 12 were cN(+).

Forty-one of 134 patients presented cartilage invasion and 9 of them were diagnosed with level IIb metastasis. A total of 32 patients had ipsilateral level IIa metastasis. Of these 32 patients, 12 had ipsilateral level IIb metastasis. Of these 14 patients, 12 had isolated ipsilateral level IIb metastasis and 2 isolated ipsilateral and contralateral level IIb metastasis. A total of two patients were diagnosed with bilateral level IIb metastasis. All of these patients had ipsilateral level IIa metastases.

Discussion

The present study aimed to define the risk of level IIb lymph node metastasis in transglottic laryngeal carcinomas. Determination of the high-risk patients for level IIb lymph node metastasis can guide surgeons for further dissection of level IIb. Performing neck dissection only to these high-risk patients may reduce overtreatment and shoulder syndrome.

The lymphatic drainage of glottic and supraglottic larynx area is mainly toward the lymph nodes in levels II, III, and IV. Laryngeal carcinomas metastasize primarily to levels II and III before other lymph node regions according to the current understanding of the lymphatic drainage pathway.^[9] However, the role of level IIb lymph nodes in laryngeal carcinoma is less clear. Various studies have shown that metastases are rarely found in level IIb in laryngeal carcinoma.^[8-16] Metastases in level IIb are often associated with level IIa metastases.^[9] In the present study, 14 (10.4%) of 134 patients diagnosed with transglottic laryngeal SCC, 16 level IIb metastases were detected as a result of 268 neck dissections. 32 patients had ipsilateral level IIa metastases, and 14 of them had ipsilateral level IIb metastases. Two patients had both contralateral level IIa and level IIb metastases.

Koybasioglu et al. reviewed 49 patients with laryngeal SCC and reported that level IIb lymph nodes were negative in all of the dissection materials.^[8] Of these 49 patients, neck staging was N0 in 29 patients, N1 in 17 patients, and N2 in three patients. They concluded that level IIb should not be added to lateral neck dissection to avoid damage to the SAN.

Sezen et al. reviewed 98 neck dissections performed in 63 laryngeal carcinomas and reported six level IIb metas-

tases in 63 cases.^[17] However, all six cases were cN(+), and metastases in level IIb were not found in cN(-) cases. Of the studied six patients, five were supraglottic cancers and one was subglottic cancer. The T stages were T3 or T4 in all cases. To be brief, these authors revealed that level IIb can be conserved in cN0 cases. In the present study, 116 of 134 with transglottic laryngeal SCC patients were diagnosed as cN(-), and 18 were as cN(+). Metastasis to level IIb was diagnosed in 14 necks in the cN(+) group and two necks in the cN(-) group. One of the patients with level IIb metastasis was T2, three patients were T3, and 10 patients were T4.

Dundar et al. reported their results of neck dissections for the treatment of 81 patients with laryngeal SCC for whom 148 SNDs and modified radical neck dissection type II were performed.^[18] In five of the 148 neck dissection specimens was metastasis found in level IIb. In the present study, 40 of 81 patients were diagnosed as transglottic laryngeal SCC, with four of them diagnosed as level IIb metastasis. However, Wiegand et al. reported transglottic carcinomas in 12 of 73 patients, with no presence of level IIb metastasis.^[19]

In our single institution series of transglottic laryngeal carcinoma, cartilage invasion, advanced stage and level IIa metastasis were found to be associated with level IIb metastasis. In cases with advanced stage tumors and/or cartilage invasion, the omittance of level IIb dissection to protect SAN may result in a diminished surgical success.

Conclusion

According to our results, thyroid cartilage invasion, the presence of level IIa invasion and advanced stage disease are the risk factors for level IIb metastasis. Therefore, level IIb should not be neglected during neck dissection in transglottic carcinoma.

Conflict of Interest: No conflicts declared.

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