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N3 Neck Disease in the Course of Small (T1) Laryngeal Cancer – Case Report

Zaawansowany miejscowo guz szyi (N3) w przebiegu ograniczonego ogniska raka krtani (T1) – opis przypadku

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Abstract

In the paper the authors present the problem of diagnostic and therapy for advanced neck metastasis. The authors discuss a case of a 54-year-old man with quickly increasing N3 neck lymph nodes in the course of T1 supraglottic cancer. The patient after tumor excision and immediate one stage reconstruction with pectoralis major flap was irradiated up the dose of 68 Gy. Both surgical and radiation procedures were well tolerated. Diagnostic problems concerning advanced neck metastatic tumors are interdisciplinary similarly to the therapeutic procedures often involving head and neck, vascular plastic surgeon as well as radio- and chemotherapist what enable to obtain successful outcome. Some of the modern diagnostic and treatment alternatives are presented (*Adv Clin Exp Med 2006, 15, 2, 393–397*).

Key words: neck metastases, laryngeal carcinoma, surgical therapy.

Streszczenie

W artykule przedstawiono problemy związane z diagnostyką i leczeniem zaawansowanych przerzutów nowotworowych do węzłów chłonnych szyi. Omówiono przypadek 54-letniego chorego z szybko wzrastającym guzem szyi (N3) w przebiegu raka krtani w niskim stopniu zaawansowania miejscowego (T1). Pacjent po usunięciu guza szyi, z jednoczasową rekonstrukcją płatem z mięśnia piersiowego większego, został poddany radioterapii do dawki całkowitej 68 Gy. Problem szybkiej i skutecznej diagnostyki zmian na szyi dotyczy lekarzy różnych specjalności, podobnie jak leczenie, które wielokrotnie wymaga udziału zespołu wielospecjalistycznego: chirurga głowy i szyi, chirurga plastyka, chirurga naczyniowego, radio- i chemioterapeuty. Takie postępowanie umożliwia uzyskanie sukcesu terapeutycznego nawet w przypadkach o wysokim stopniu zaawansowania. W artykule autorzy omawiają elementy diagnostyki i leczenia guzów szyi (*Adv Clin Exp Med 2006, 15, 2, 393–397*).

Słowa kluczowe: przerzuty węzłowe, rak krtani, leczenie chirurgiczne.

Metastatic tumors in the cervical lymph nodes still remain one of the challenging oncological problem regarding both diagnosis and therapy. The head and neck region is multilevel, anastomosing network of lymphatic drains with about 300 lymph nodes (30% of all human nodes). According to the Merkulov's rule, tumors account for 80% of all the masses in the neck not connected with thyroid gland, 80% of those tumors have malignant character and metastatic cancer represents 80% of them [1].

Over 74% of the cervical lymph nodes containing metastases develop from primary lesions in head and neck and only 11% originate from lesions outside that region [2]. To standardize nomenclature and diagnosis American Joint Committee on Cancer divided cervical lymph nodes into six regions, which might be connected with the most probable location of the primary lesion [3]. Region I: submental and submandibular lymph nodes – cancer of the lip, oral cavity; region II: craniojugular lymph nodes – oral cavity, nasopharynx; region III:

mediojugular lymph nodes – tonsils, hypopharynx, larynx. Lymph node metastases localized in the lower vessel sheath (region IV: caudojugular lymph nodes and V: lymph nodes of the posterior triangle) are often caused by tumor in the hypopharynx, nasopharynx, upper esophagus or bronchial system. Region VI is connected with subglottic tumors. The staging system of head and neck cancer includes also classification of nodal disease into N1, N2, and N3. N1 is described as ipsilateral lymph node metastasis 0 to 3 cm in diameter, N2 as 3 to 6 cm, and N3 as more than 6 cm.

The presence of cervical lymph node metastases in head and neck squamous cell carcinoma (HNSCC) is a very poor prognostic indicator. It seems to be impossible to disregard growing masses in such a visible region like human neck. But in spite of modern diagnostics and increasing knowledge about cancer one still very often faces patients with N3 stage of the disease.

Herein the authors present the case of N3 neck patient developed from a very small (T1) primary side of squamous cell cancer located in the larynx. The authors discuss the lymphatic spread of metastases and the therapeutic procedures.

Case Report

54-year-old man, heavy smoker, was admitted to Department of Otolaryngology with big mass in left submandibular region of the neck. In 1999 and 2003 he underwent laryngeal polypectomy and excision biopsy due to the hypertrophic laryngitis.



Fig. 1. N3 metastatic tumor of the neck covered by ulcerated skin

Ryc. 1. Guz przerzutowy na szyi w stopniu zaawansowania N3



Fig. 2. Intraoperative picture after neck dissection with pectoralis myocutaneous flap prepared for dislocation

Ryc. 2. Zdjęcie śródoperacyjne po radykalnej operacji węzłowej z przygotowanym, uszypułowanym płatem z mięśnia piersiowego większego



Fig. 3. Intraoperative picture presenting neck defect covered by pectoralis myocutaneous flap with pedicle running through the channel under the skin over the left clavicle

Ryc. 3. Zdjęcie śródoperacyjne przedstawiające ubytek po operacji węzłowej uzupełniony płatem z mięśnia piersiowego z szypułą umieszczoną nad obojczykiem

The patient noticed slowly progressing growth of the lesion for four months when it was 1 cm in diameter. The tumor was tough, fixed, painless, covered by reddish, ulcerated skin. The course of antibiotic therapy was unsuccessfully administered by GP. After two months, he was admitted to the district hospital where fine needle aspiration biopsy (FNAB) and open biopsy of the neck was performed and did not show any pathology.

In authors' department indirect laryngoscopy revealed small lesion (cT1) on the left aryepiglottis fold. During the stay, FNAB of the neck and biopsy from the aryepiglottis fold showed cancerous tissue. Magnetic resonance imaging (MRI) revealed big

(6×7 cm) smooth outlined, homogenous tumor located in upper and mediojugular space (region II and III), reaching the left parotid cranially, and the skin laterally (Fig. 1). There was no evidence of extension of the lesion into the carotid artery or jugular vein, which were displaced medially by the tumor. No connection between the lesion and upper aerodigestive tract was observed. Primary as well as metastatic tumor have been almost asymptomatic for 5 months.

The authors decided to treat the patient by ipsilateral neck dissection (ND) followed by radiotherapy to the primary side and the neck. Radical ND was administered to remove all the nodes and lymphatic drains. Because skin was involved by the tumor, commonly performed incision was not possible. Appropriate wide excision of the skin around the tumor was performed (Fig. 2). Dissection of the neck included sacrifice of the accessory nerve because of its infiltration, removal of sternomastoid muscle and dissection up to the trapezius muscle. The internal jugular vein was transected close to clavicle and high near the skull base. Dissection was continued medially where common carotid and internal carotid artery were preserved, however, disease had to be peeled of artery with subadventitial dissection. Submandibular nodes were removed after ligation of facial artery.

Then single stage reconstruction with pedicle myocutaneous flap was performed. The skin paddle was outlined in the shape necessary to fit the surgical defect. After identifying the vascular pedicle musculocutaneous flap was elevated and dissected. The flap was then brought up over the clavicle to the neck (Fig. 3). The patient was discharged from the hospital after uneventful postoperative period. Subsequently he received conventional, fractionated irradiation, 2 Gy per fraction five times per week to a total dose of 68 Gy. Radiotherapy was directed to the larynx, cervical lymph nodes and left supraclavicular fossa which received a total dose of 50 Gy. The lodge after the tumor excision was additionally irradiated up the dose of 68 Gy. Radiation therapy was delivered using 6 MV linac radiation. The treatment was well tolerated. Histopathological examination of excised tumor revealed SCC, the surgical margins and the rest of the removed lymphatic system was clear from cancer. Also the control biopsies from the left parotid gland and the postoperative bed confirmed radicality of surgical intervention. The patient has remained free of disease for one year after therapy.

Discussion

Head and neck cancer accounts for about 5% of all malignant tumors in Poland. The most fre-

quent locations of cancer is larynx (50%), followed by oral cavity (16%) and lower lip (13%) [4]. The rate of metastases varies widely according to the location and volume of the primary lesion and its biological aggressiveness. Approximately 15% of patients with HNSCC present with mass in the neck as their only complaint. In 70% of patients with metastatic tumor in the neck as a first symptom of the disease the primary side of cancer is located in nasopharynx, palatine tonsil or hypopharynx. Having the patient with such symptoms, careful examination of oral cavity with palpation of tonsils, nasopharyngoscopy and laryngoscopy with flexible and rigid endoscopes must be performed. If indicated the procedure should be conducted under the general anesthesia followed by blind biopsy from suspicious mucous sides or/and bilateral tonsillectomy. Histological diagnosis of primary and neck mass should be repeated if necessary. Only in a small group of patients (5–12%) the primary tumor is never found. Each delay on the diagnostic stage may advance the spread of the disease and worsen the prognosis.

The first symptoms of laryngeal cancer in most of the cases come from the primary side. Except for glottic SCC, laryngeal tumors spread regionally through the lymphatic vessels and distally by haematogenous dissemination. Usually regional metastases arise ipsilateral to the primary site. The common distant sites are lungs (45%) and bones (25%) [5].

The lymphatic supply of the true vocal cord is sparse, for this reason glottic cancer rarely produces cervical node metastases (1–4% for T1–T2). Because of the rich lymphatic system, tumors of the supraglottic larynx have a higher propensity of regional lymphatic metastases. Lymphatic drainage passes through the lateral hypopharynx and the thyrohyoid membrane into the jugulocarotid region (region III). Then metastatic cells may spread into the tracheoesophageal groove and along the trachea, retropharyngeal space (Rouvier's nodes) and down to the mediastinum. These tumors also have a relatively high incidence of contralateral neck failure (10–20%) [6]. However, cancer of the larynx presents relatively low susceptibility for distant spreading (about 8%) [7], in patients with advanced HNSCC it is important to rule out pulmonary metastases either with a routine chest or with a CT before any major surgical treatment. Despite the lesions of the suprahyoid epiglottis and aryepiglottis folds have a high incidence of regional metastases ranging from 20 to 60% for lesions between T1 and T4, N3 neck accompanying T1 supraglottic tumor is worth to refer. Such an advanced regional disease suggests high biological activity of metastatic cells, diffi-

culty in establishing the primary side or patient's easiness regarding tumor on the neck.

In described case shallow, superficial character of tumor growth without cartilaginous destruction or perichondrial invasion made radiation therapy of primary side justifiable. Alternatively the patient could be treated by transoral laser resection of the tumor. Historically in most of such patients with epiglottic cancer horizontal supraglottic laryngectomy were administrated.

Patients with a large burden of metastatic cancer to the neck, particularly N3 disease, have an extremely poor prognosis [8, 9] but there are limited trials aimed at improving the efficacy of treatment of N3 disease. Although there is a trend to treat patients with chemo- and radiotherapy to achieve organ preservation in that group, it seems to be not enough. Sanguineti et al. [10] in a 2-year follow up after definitive chemoradiotherapy alone observed 0% neck control rate for N3 disease. Chan et al. [11] reported that 5 years neck control rate among patients treated by surgery with postoperative radiotherapy was 46% what was higher in comparison with the group with preoperative radiotherapy (11%) and patients treated with surgery alone (0%). Patients who had adjuvant radiotherapy had more favorable outcomes than those treated only with surgery.

The extension of ND can be determined preoperatively on the basis of clinical evaluation, imaging studies (CT, MRI, PET), and the proximity of the metastasis disease to the vital structures. The classical surgical approach for those patients used to be "comprehensive" ND when all lymph node basins in the neck are removed. Comprehensive ND could be classified into radical, extended and modified radical ND [12]. Standard radical ND includes removal of all lymph node basins in the neck along with three important structures – sternomastoid muscle, internal jugular vein, and the accessory nerve. The operation is defined as modified when one of those structures is preserved. The authors advocate preserving the spinal accessory nerve whenever it is not directly involved by tumor. Extended ND implies removal of structures other than those commonly removed in radical ND. It is generally used in patients who present with bulky nodal metastases, soft tissue extension, or gross extranodal disease. It is also indicated in patients who present with involvement of the skin or platysma. Extension of the disease into the dermis is considered to be an ominous prognostic factor, especially if there is a major subdermal lymphatic invasion. The structures commonly removed in extended ND include skin, platysma, posterior belly of the digastric, the styloid group of muscles, hypoglossal nerve,

external carotid artery, and periosteum of the mandible; rarely, the vagus, phrenic, or sympathetic trunk may need to be removed [13].

The decision must be made regarding the sacrifice of the hypoglossal nerve. Sacrifice of the vagus and hypoglossal nerve may lead to considerable problems related to aspiration and swallowing. In elderly patients with a fragile general condition, aspiration may be quite detrimental and the patient may need long-term tube feeding or percutaneous gastrostomy. If the disease extends and is adherent to the mandible, the periosteum can be peeled off along with the main bulk of the disease. If there is extensive disease in the tail of the parotid, the incision needs to be extended to the pretragal area and superficial parotidectomy performed with identification and preservation of the facial nerve and its branches. Most of the time carotid can be easily preserved, however, it could be more difficult in patients after previous radiotherapy. Carotid rupture and carotid blow out were common complications of head and neck surgical procedures in the 70's and 80's. The use of carotid protection with pectoralis myocutaneous flap or free flaps protects the carotid artery with extensive soft tissue coverage. The radiation therapy leads to weakening of the carotid sheath [13]. The carotid blow out used to be a catastrophic complication with a dire emergency.

Before surgical intervention, it is vitally important to plan appropriate reconstruction, whether pectoralis myocutaneous flap, latissimus flap, or a free flap such as radial forearm or rectus abdominus flap. On the basis of clinical findings surgeon should make decision on further dissection. The pectoralis major is flat, fanshaped muscle covering the upper chest. The dominant blood supply is a large segmental vessel the thoracoacromial artery. That artery permits the development a flap with excellent mobility by elevating a portion of the muscle isolated on its vascular pedicle. Very good blood supply protects also against bacterial infection. This flap is reliable for single-stage reconstruction even despite previous radiation. Finally, it restores also symmetry to the neck. Alternatively one could use, especially among women, latissimus dorsi flap.

Optimal way of treating patient with metastatic cancer to the neck is widely discussed in literature. Although there are some differences in extension of ND and usage of radiotherapy it is widely accepted that the course of therapy should be always planned individually. In all of the cases, especially those with high rate of metastases, during first 3-year careful follow-up examination after the therapy must be enrolled.

References

- [1] **Merkulov V, Petrov N:** The role of ultrasonography in the diagnosis of neck lymphadenopathies. *Centr East Europe J ORL-HNS* 1997, 2, 28.
- [2] **Jones AS, Cook JA, Phillips DE, Roland NR:** Squamous carcinoma presenting as an enlarged cervical lymph node. *Cancer* 1993, 72, 1756–1761.
- [3] **American Joint Committee on Cancer:** AJCC Cancer Staging Handbook. Springer Verlag, New York 2002, 6th ed.
- [4] **Kawecki A, Towpik E:** Nowotwory głowy i szyi. W: *Zasady rozpoznawania i leczenia nowotworów*. Red. Kułakowski A, Towpik E, Warszawa PFESO 1997.
- [5] **Licitra L, Bernier J, Grandi C, Locati L, Merlano M, Gatta G, Lefebvre JL:** Cancer of the larynx. *Crit Rev Oncol Hematol* 2003, 47, 65–80.
- [6] **Janczewski G, Osuch-Wójcikiewicz E:** Rak krtani i gardła dolnego. α -medica press, Bielsko-Biała 2002.
- [7] **Spector JG, Sessions DG, Haughey BH, Chao KSC, Simpson J, El Mofty S, Perez CA:** Delayed Regional Metastases, Distant Metastases, and Second Primary Malignancies in Squamous Cell Carcinomas of the Larynx and Hypopharynx. *Laryngoscope* 2001, 111(6), 1079–1087.
- [8] **Ahmed K, Robbins K, Wong F:** Efficacy of concomitant chemoradiation and surgical salvage for N3 nodal disease associated with upper aerodigestive tract carcinoma. *Laryngoscope* 2000, 110, 1789–1793.
- [9] **Boyd T, Harari P, Tannehill S:** Planned postradiotherapy neck dissection in patients with advanced head and neck cancer. *Head Neck* 1998, 20, 132–137.
- [10] **Sanguineti G, Corvo R, Benasso M:** Management of the neck after alternating chemoradiotherapy for advanced head and neck cancer. *Head Neck* 1999, 21, 223–228.
- [11] **Chan SW, Mukesh BN, Sizeland A:** Treatment outcome of N3 nodal head and neck squamous cell carcinoma. *Otolaryngol Head Neck Surg* 2003, 129, 55–60.
- [12] **Robbins KT, Clayman G, Levine PA:** Neck dissection classification update: Revisions proposed by the American Head and Neck Society and the American Academy of Otolaryngology – Head and Neck Surgery. *Arch Otolaryngol Head Neck Surg* 2002, 128, 751–758.
- [13] **Shaha AR:** Extended neck dissection. *Operative Techniques in Otolaryngology* 2004, 15, 184–189.

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