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Original Article

Numb chin with mandibular pain or masticatory weakness as indicator for systemic malignancy – A case series study

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Received 5 June 2017; received in revised form 2 July 2017; accepted 4 July 2017

KEYWORDS

Numb chin syndrome;
Mandibular pain;
Malignancy

Background/Purpose: Numb chin syndrome (NCS) is a critical sign of systemic malignancy; however it remains largely unknown by clinicians and dentists. The aim of this study was to investigate NCS that is more often associated with metastatic cancers than with benign diseases.

Methods: Sixteen patients with NCS were diagnosed and treated. The oral and radiographic manifestations were assessed.

Results: Four (25%) of 16 patients with NCS were affected by nonmalignant diseases (19% by medication-related osteonecrosis of the jaw and 6% by osteopetrosis); yet 12 (75%) patient conditions were caused by malignant metastasis, either in the mandible (62%) or intracranial invasion (13%). NCS was unilateral in 13 cases and bilateral in three cases. Mandibular pain and masticatory weakness often dominate the clinical features in NCS associated with cancer metastasis. In two patients, NCS preceded the discovery of unknown malignancy (breast cancer and leukemia). In nine others, NCS heralded malignancy relapse and progression. Metastatic breast cancer in four (36%) cases accounted for the most common malignancy. Other metastatic diseases included two multiple myelomas, and one each of leukemia, prostate cancer, colon cancer, lung cancer, maxillary sinus adenoid cystic carcinoma and adrenal gland neuroblastoma. Radiographic examinations showed obvious mandibular metastasis with compression of the inferior alveolar nerve or mental nerve in nine patients, and leptomeningeal seeding or intracranial metastasis to the trigeminal nerve root at the skull base in two patients.

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<http://dx.doi.org/10.1016/j.jfma.2017.07.002>

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Please cite this article in press as: Lu S-Y, et al., Numb chin with mandibular pain or masticatory weakness as indicator for systemic malignancy – A case series study, Journal of the Formosan Medical Association (2017), <http://dx.doi.org/10.1016/j.jfma.2017.07.002>

Conclusion: NCS without obvious odontogenic causes or trauma often signals systemic malignancy. It may be the first clue of occult malignancy.

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Introduction

Numb chin syndrome (NCS), also called mental nerve neuropathy (MNN), is characterized by hypoesthesia, paresthesia or pricking pain over the chin, lower lip and gingiva mucosa in the distribution of the mental nerve or inferior alveolar nerve (IAN), and/or neuropathic weakness in the muscles of mastication.^{1,2} It is usually unilateral, but bilateral presentation may occur. The overall prevalence and incidence of NCS is not known.

Various etiologies of NCS including traumatic, vascular, inflammatory, demyelinating, infectious, and neoplastic disorders have been reported.^{3–8} However, mounting evidence suggests that NCS is most often a harbinger of cancer relapse and progression, or may precede the discovery of unknown cancer.^{9,10} The possibility of metastatic cancer, usually breast cancer or hematologic malignancy should be first considered if dental diseases or trauma are excluded.^{11–15} NCS, a seemingly benign presentation, is an important sign and dangerous symptom for primary care clinicians. Nevertheless, NCS has been rarely mentioned in either the undergraduate or postgraduate of dental and medical syllabuses. NCS is almost unknown or remains in limited awareness by dentists and physicians.^{10,16}

The trigeminal nerve has three branches, the ophthalmic (V1), maxillary (V2) and mandibular (V3) nerves that provide several sensory and motor functions to the face. The mandibular branch courses downward from the trigeminal ganglion and exits the middle cranial fossa inferiorly via the foramen ovale, then divides into an anterior motor division that supplies the masticatory muscles, and a posterior sensory division that enters the mandibular canal as the inferior alveolar nerve (IAN). The V3 has five sensory nerves including meningeal, auriculotemporal, buccal, lingual and the IAN, the latter that gives rise to the mental nerve via mental foramen. IAN provides pure sensory innervation to the cheek, lower teeth, gingiva, and floor of the mouth, lower lip and chin.² Pathologic mechanism behind MNN in cancer patients is often induced by malignant infiltration of IAN sheath or direct compression of IAN or mental nerve by mandibular metastasis or local tumor.^{3,9,10} However, leptomeningeal carcinomatosis and intracranial metastases to the base of skull have also been implicated in a small percentage of patients who may represent NCS accompanying other neurological symptoms.^{17–19}

Patients with NCS should be investigated aggressively without delay until proven otherwise. NCS is a rare but well-documented neurological manifestation of metastatic malignancy. Clinical evaluation should include evaluation for occult malignancy or relapse of any known previous cancer. Here we report 16 cases with NCS illustrating the seriousness of this symptom and the literatures regarding

the multiple etiologies and significance of NCS are reviewed.

Methods

The study was approved by the necessary Institutional Review Board. A total of 157 patients including 53 cases with oral manifestations from metastatic cancers and 103 cases with medication-related osteonecrosis of the jaw (MRONJ) plus one case of osteopetrosis, were examined for NCS between October 1990 and June 2016. Sixteen consecutive patients (12 females and 4 males) with numbness of lower face and a wide range of mandibular pain visiting the Oral Medicine Clinic of Kaohsiung Chang Gung Memorial Hospital and finally diagnosed with NCS, were included in this study. Those patients with numb chin caused by iatrogenic trauma, dental extraction, orthognathic surgery or oral cancer operation were excluded from this survey. Data were retrieved from chart notes made at each visit. A full dental and medical history was recorded including oral complaints, alteration in the oral mucosa and jaws, medications, previous care regarding internal cancers, and generalized symptoms and signs such as body weight loss, fatigue, tiredness, pallor, bone pain, headache or other neuropathy.

Patients underwent panoramic radiographs or special examinations including bone scintigraphy, multi-slice CT scan of head, magnetic resonance imaging (MRI) of the brain, and cone-beam computed tomography (CBCT) or a mandibular biopsy after informed consent.

The incidence of NCS between metastatic cancer patients and benign disease patients was analyzed by using chi-square test. A value of $p < 0.05$ was considered statistically significant.

Results

A total of 16 patients with a wide range of ages (9–83 years) and female predominance (12 of 16, 75%) complaining about mostly oral symptoms led to the diagnosis of NCS associated with metastatic cancers in 12 (75%) patients, MRONJ in three (19%) patients and osteopetrosis in one (6%) patient (Table 1). The prevalence of NCS was 23% (12 of 53) in those who had metastatic cancers and 4% (4 of 104) in those who had benign diseases with a significant difference ($p < 0.001$, Table 2).

NCS was unilateral in 13 (81%) cases and bilateral in three (19%) cases. The histopathologic studies from mandibular biopsies confirmed clinical diagnosis of cancer metastasis in eight patients. In two (17%) of 12 patients, NCS preceded the discovery of unknown malignancy (breast

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