Recurrent cutaneous squamous cell carcinoma in the occipital scalp with clinical perineural invasion developing jugular foramen syndrome

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INTRODUCTION

Perineural invasion (PNI) represents a poor prognostic factor in cases of cutaneous squamous cell carcinoma (cSCC). Microscopic or incidental PNI, detected during pathologic examination, ranges from 2.5% to 14%.[1] Clinical PNI is PNI presenting neurological symptoms or radiological findings. Clinical PNI accounts for 30%-40% of PNI, but it rarely leads to brainstem involvement. We report a case of microscopic PNI of recurrent cSCC in the occipital region, followed by clinical PNI of the posterior root of cervical spinal nerve 2 (C2) and jugular foramen syndrome.

Abbreviations used:

C2: cervical spinal nerve 2
cSCC: cutaneous squamous cell carcinoma
PNI: Perineural invasion

CASE REPORT

A Caucasian male in his 70s presented with a 3 cm occipital erythematous nodule for 2 months. His past medical history included right frontal scalp cSCC 7 years prior, right auricular cheek cSCC 5 years prior, and basal cell carcinoma of the left temporal region 3 months prior. He was not immunocompromised and was on no medication. The biopsy of the lesion revealed cSCC arising from actinic keratosis. He underwent a standard excision with a 5 mm margin, reconstructed with a flap, and a posterior cervical sentinel lymph node biopsy. The pathology showed a 2.6 × 1.1 cm, poorly differentiated SCC with lymphatic vessel invasion and no sentinel lymph node metastasis (0/2). The staging was pT2N0M0 (stage II, AJCC eighth cSCC of the head and neck) and T2b Brigham and Women's Hospital tumor staging system. The surgical margin was microscopically negative. Three months later, an erythematous nodule measuring 2 cm in diameter recurred near the site of the previous incision on the occipital region, confirmed through biopsy as a recurrence (Fig 1, *A*). Therefore, the patient underwent excision and skin grafting with a 1 cm margin. The pathology showed 3 foci of PNI in the level of subcutaneous fat.[1] The one located below the main lesion had the largest nerve diameter measuring 0.115 mm (Fig 1, *B* and *C*). The remaining 2 nerves were located bilaterally 4 mm and 9 mm away from the central nodular mass. The diagnosis was a local recurrence of poorly differentiated squamous cell carcinoma, rT3N0M0 (stage III, AJCC eighth) and T2b Brigham and Women's Hospital tumor staging system. The subsequent fluorodeoxyglucose positron emission tomography/computed tomography scan detected no evidence of tumors in the entire body. Postoperative radiotherapy was added to the occipital region and the posterior cervical region where the sentinel lymph nodes are located (50 Gy in 25 fractions). Eleven months later, he presented with severe headaches and right cervical muscle atrophy as well as hoarseness and dysphagia

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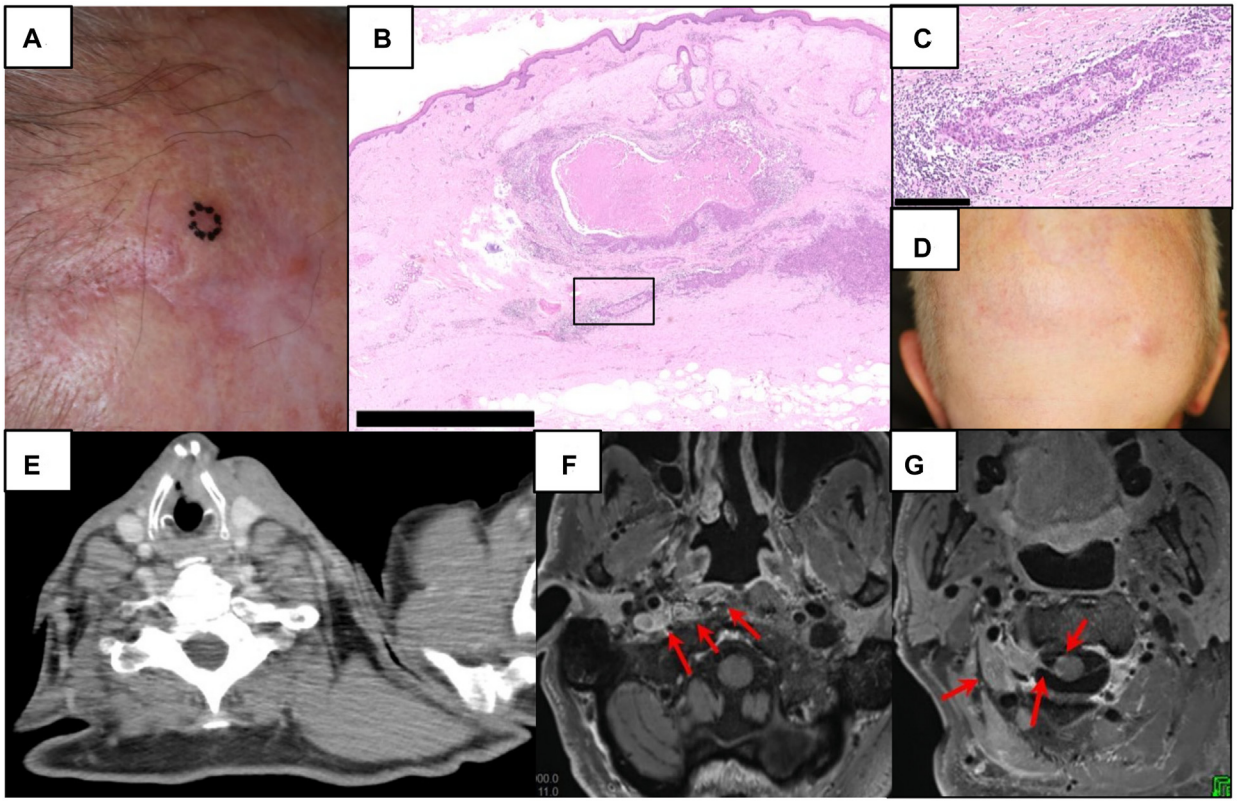

Fig 1. Clinical and pathological findings of the patient. **A,** A recurrent erythematous nodule on the occipital scalp near the site of surgery 3 months earlier. **B,** Hematoxylin & eosin staining of the nodule showed microscopic perineural invasion (PNI) in the subcutaneous adipose tissue beneath the tumor. A scale bar, 2.5 mm. **C,** The microscopic PNI of squamous cell carcinoma beneath the tumor had the largest nerve diameter measuring 0.115 mm. A scale bar, 250 μm. **D,** A recurrent right occipital nodule with cervical muscles atrophy 11 months after previous surgery. **E,** Axial contrast-enhanced computed tomogram showing atrophy of the right trapezius and sternocleidomastoid muscle in addition to a deviated pharynx. **F,** Axial contrast-enhanced MRI revealed a contrast lesion near the jugular foramen and the absence of the flow void of the occluded right internal jugular vein (*arrows*). **G,** contrast-enhanced MRI at the cervical spinal nerve 2 (C2) level showing a large mass near the right cervical spinal ganglion extending into the posterior root of C2 (*arrows*). *MRI*, Magnetic resonance image.

with another recurrent right occipital nodule (Fig 1, *D*). Neurologic examination revealed weakened trapezius and sternocleidomastoid muscles (with a manual muscle testing of 4/5 for each), dysarthria and dysphagia, which are consistent with jugular foramen syndrome. Contrast-enhanced computed tomography showed atrophy of the right trapezius and sternocleidomastoid muscle and a deviated pharynx (Fig 1, *E*). Furthermore, contrast-enhanced magnetic resonance imaging revealed a contrast lesion near the jugular foramen and an occluded right internal jugular vein (Fig 1, *F*). There was also a large contrast lesion near the right cervical spinal ganglion extending into the posterior root of C2 (Fig 1, *G*). We diagnosed jugular foramen syndrome caused by clinical PNI of scalp cSCC. The disease progressed rapidly and he died in spite of palliative radiotherapy.

DISCUSSION

Jugular foramen syndrome presents paralysis of the IX-XI cranial nerves traversing the jugular foramen along the internal jugular vein. The common symptoms of jugular foramen syndrome are hoarseness, dysphagia, or pain. The primary site of cSCC resulting in clinical PNI is the most commonly reported in the head and neck, especially the facial area involving the trigeminal nerve and facial nerve.[2] A systematic review of 241 clinical PNI cases of cSCC showed a 5-year overall survival of 66%, a local recurrence rate of 37%, and a distant metastasis rate of 0.5%.[2] Previous authors described that 14 out of 107 cases of clinical PNI of head and neck cSCC had brainstem invasion,[3-5] none of which involved the accessory nerve. Streams et al reported a case of cSCC of the

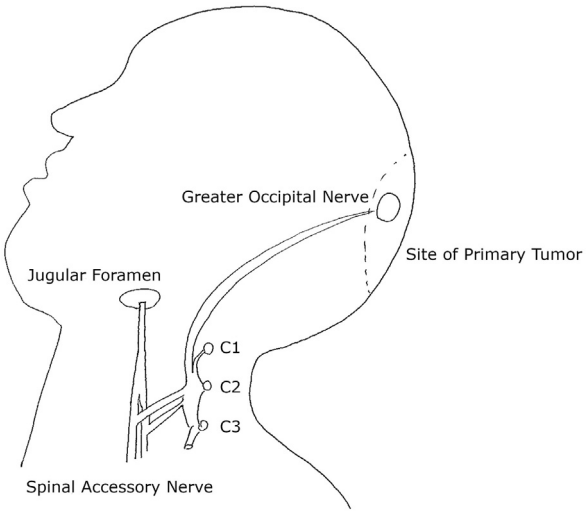

Fig 2. Schematic demonstrating the hypothetical route of perineural invasion. Schematic demonstrating the hypothetical route of perineural invasion along the spinal accessory nerve and the greater occipital nerve. *C1*, Cervical spinal nerve 1; *C2*, cervical spinal nerve 2; *C3*, cervical spinal nerve 3.

shoulder presented clinical PNI of the spinal accessory nerve without spreading into the jugular foramen.[6] Schweinfurth et al[7] reported a case of metastatic conjunctival malignant melanoma presenting jugular foramen syndrome. However, no report of cSCC with PNI presented jugular foramen syndrome.

The pathology of our case showed obvious microscopic PNI in recurrent cSCC of the occipital region, where the greater occipital nerve (a branch of C2) is innervating. Contrast-enhanced magnetic resonance imaging showed C2 infiltration extending into the brainstem and the right jugular foramen, which suggested a retrograde extension of perineural tumor cells via C2, reaching the brainstem. We hypothesized that the tumor had invaded the spinal accessory nerve at the confluence of the C2 in the cervical plexus and reached the jugular foramen (Fig 2). In conclusion, we reported a case with recurrent cSCC with microscopic PNI, followed by clinical PNI, including jugular foramen syndrome and brain stem invasion. Patients with an evident microscopic PNI warrant adjuvant radiotherapy and careful follow-up to detect clinical PNI promptly.

Conflicts of interest

None disclosed.

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