

Nasopharyngeal Carcinoma Invading the Lacrimal Apparatus— A Case Report

Tung-Tsun Huang, Peir-Rong Chen, Yung-Hsiang Hsu¹, Tzung-Shiahn Sheen², Yih-Leong Chang³,
Lee-Ping Hsu

Department of Otolaryngology, Pathology¹, Buddhist Tzu Chi General Hospital, Hualien, Taiwan; Department of Otolaryngology²,
Far Eastern Memorial Hospital, Taipei, Taiwan; Department of Pathology³, National Taiwan University Hospital, Taipei, Taiwan

ABSTRACT

Although ocular symptoms are not infrequently seen in patients with nasopharyngeal carcinoma (NPC), direct tumor invasion into the orbital cavity is uncommon. Orbital invasion confined to the lacrimal apparatus is even rarer. We report a patient with recurrent NPC with anterior orbit/lacrimal apparatus invasion, who developed an anteromedial orbital mass at the medial canthus 5 years after the diagnosis of NPC. Epiphora occurred before the palpable orbital mass. Pathologic study proved the recurrence of NPC, and the patient subsequently underwent radiotherapy. The route of invasion remains obscure. We proposed the possibility of tumor invasion by means of tumor implantation via the nasolacrimal duct. The presence of epiphora or a mass at the medial canthus in a patient with previously treated NPC should prompt further study unless tumor recurrence in the nasal cavity or lacrimal apparatus is excluded. (*Tzu Chi Med J* 2005; **17**:349-352)

Key words: nasopharyngeal carcinoma, orbit, lacrimal apparatus

INTRODUCTION

Nasopharyngeal carcinoma (NPC), one of the most common malignancies in Taiwan, can present a variety of symptoms caused by direct invasion of the tumor into adjacent structures or regional lymphatic metastasis [1]. However, anterior orbital invasion confined to the lacrimal apparatus is rarely seen in NPC and has received little attention [2,3]. We report on a case of recurrent NPC with anterior orbit/lacrimal apparatus invasion. The route of invasion and treatment modality are discussed.

CASE REPORT

A 50-year-old man, who had been treated for NPC (T2N1M0, 1997 AJCC classification) with radiotherapy in 1997 and selective neck dissection for submental recurrence in 1999, presented with a right anteromedial orbital mass at the medial canthus in January 2002. Right epiphora had also been noted for 2 years. MRI and CT studies disclosed a soft-tissue lesion at the anteromedial aspect of the right orbit with displacement of the right eyeball and enlargement of the right nasolacrimal canal (Fig. 1). There was no evidence of tumor recurrence in the nasopharynx, nasal cavity, or neck. CT-guided biopsy of the orbital mass revealed an undifferentiated carcinoma, compatible with the previous pathology. In situ hybridization of Epstein-Barr virus-encoded RNA (EBER-1) was positive (Fig. 2). Under the impression of anterior orbit/lacrimal apparatus invasion by NPC,

Received: January 24, 2005, Revised: February 15, 2005, Accepted: March 15, 2005

Address reprint requests and correspondence to: Dr. Lee-Ping Hsu, Department of Otolaryngology, Buddhist Tzu Chi General Hospital, 707, Section 3, Chung Yang Road, Hualien, Taiwan

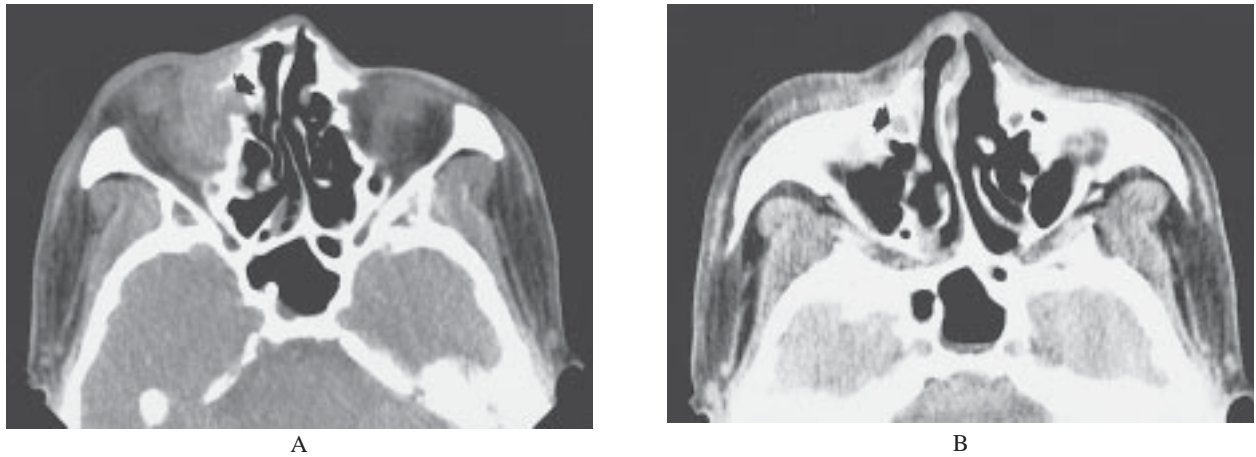


Fig. 1. (A) CT, axial view. A soft tissue lesion occupies the medial aspect of the right anterior orbit and has expanded the lacrimal fossa (arrow). (B) CT, axial view. The diameter of the right nasolacrimal canal (arrow) is relatively larger than that on the left.

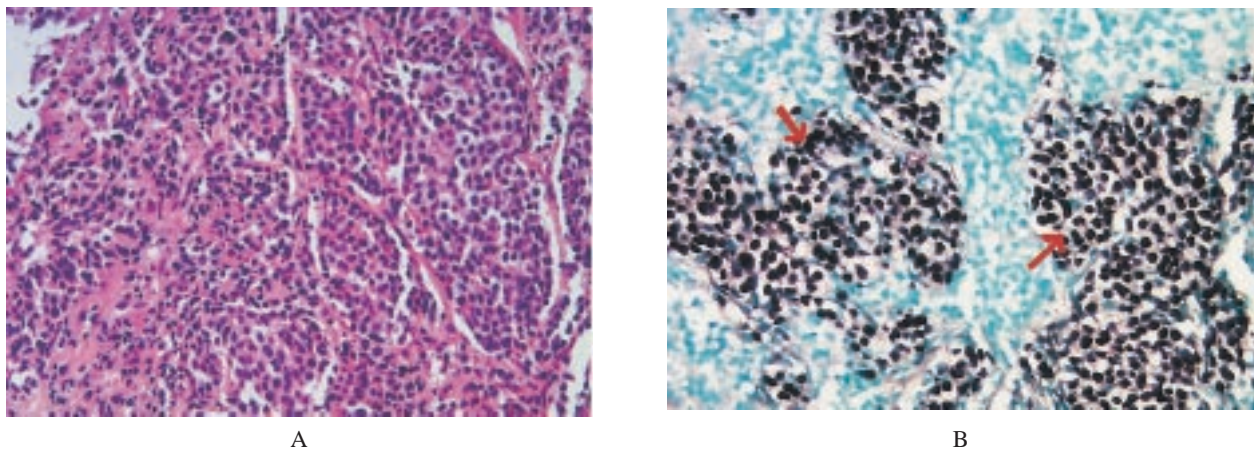


Fig. 2. (A) Biopsy of the orbital mass revealing a metastatic carcinoma (H&E, original magnification $\times 100$). (B) EB virus-encoded RNA expression presenting in the nuclei of undifferentiated tumor cells of the orbital mass (arrow) (in situ hybridization, original magnification $\times 100$).

he received 1 full course of radiotherapy (6800 cGy). The tumor completely responded to radiotherapy.

Unfortunately, a recurrent tumor in the right inferior nasal meatus presenting with nasal bleeding was noted in December 2002 (Fig. 3). Another course of radiotherapy (5040 cGy) to the nasal cavity was given. The tumor completely remitted. The right epiphora improved after final radiotherapy, and there has been no evidence of tumor recurrence to date.

DISCUSSION

Although ocular symptoms are not infrequently seen

in patients with NPC, direct tumor invasion into the orbital cavity is uncommon. Luo et al found the pterygopalatine fossa and inferior orbital fissure to be the most-common routes of orbital invasion in NPC patients, followed by invasion via the ethmoid and/or sphenoid sinuses [4]. Extension of the tumor to the cavernous sinus and further anteriorly to the superior orbital fissure is another alternative pathway [5]. Orbital invasions by these routes present with posterior orbital masses on imaging studies. In contrast, anteromedial orbital masses due to NPC invasion are extremely rare, indicating the possible involvement of the lacrimal drainage apparatus (lacrimal canaliculi, lacrimal sac, and nasolacrimal duct). To our knowledge, only 3 patients with detailed

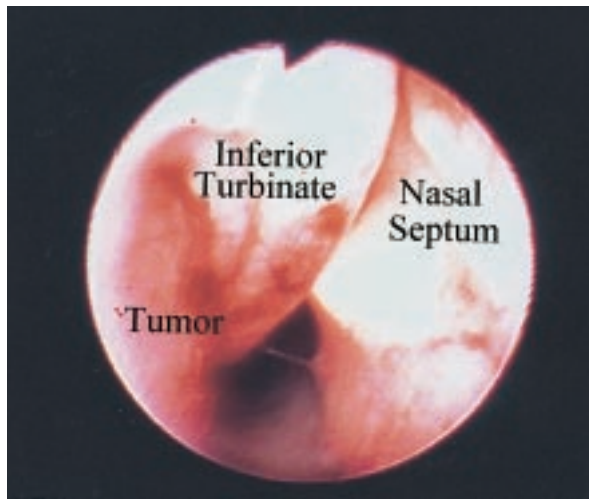


Fig. 3. Bulging tumor completely filling the right inferior nasal meatus 6 months after radiotherapy to the anteromedial orbit.

clinical manifestations have been reported in the English literature to date [2,3]. Shu et al [2] reported a 38-year-old man with NPC, who was found to have a recurrent tumor at the anterior border of the initial radiation portals in the nasal cavity 24 months after radiotherapy. The recurrent tumor further extended into the lacrimal sac. Amrith [3] reported a 33-year-old man with NPC, who was found to have a recurrent tumor at the bilateral anteromedial orbit and nasolacrimal ducts 4 years later. The nasopharynx and nasal cavity were normal on the CT scans. Amrith also reported a 59-year-old woman with NPC, who was found to have a recurrent tumor in the nasal cavity, which had extended to the bilateral nasolacrimal ducts and left anteromedial orbit 18 months later.

The possible routes of tumor invasion into the anterior orbit/lacrimal apparatus, postulated in the previous literature [2,3], include metastasis and direct invasion through the nasal cavity into the nasolacrimal duct. In our patient, it was difficult to explain why the hematogenous spread invaded the lacrimal apparatus but spared the visceral organs predisposed to distant metastases. In another aspect, no associated tumor was found in the nasal cavity. Therefore, the above 2 mechanisms seem inadequate to explain the invasion route in our patient. Another mechanism of cancer spread, implantation [6], has been postulated to be associated with metastasis to the percutaneous gastrostomy, tracheostomy, and thumb from head and neck cancer [7-9]. We propose that implantation of cancer cells is another possibility for lacrimal apparatus invasion by NPC, because reflux through the nasolacrimal duct can

occur [10], especially when a patient blows his/her nose.

NPC patients with lacrimal apparatus involvement usually presented with epiphora and an anteromedial orbital mass [2,3], consistent with the common manifestations of lacrimal sac tumors (epiphora, recurrent dacryocystitis, and lacrimal sac mass) [11]. The presence of epiphora can provide an opportunity for early suspicion of tumor recurrence, because it usually occurs before an orbital mass becomes palpable. CT scanning is a good tool for thoroughly delineating the orbit, lacrimal fossa, and nasolacrimal canal, resulting in an early diagnosis of lacrimal sac neoplasms and nasolacrimal relapse of NPC [12,13].

Radiotherapy is the mainstay of treatment for NPC. Surgery is reported to have successfully cured residual or recurrent neck lymph node metastasis or the primary tumor in the nasopharynx [14,15]. However, effective treatments for lacrimal apparatus invasion by NPC are not well established. Shu et al [2] demonstrated good local control with salvage surgery for the anterior marginal recurrence of NPC after radiotherapy, including 1 patient with lacrimal sac invasion who received a partial maxillectomy plus postoperative radiotherapy. We selected radiotherapy as the main treatment because of the radiosensitive nature of NPC, the high risk of eyeball injury during surgery, and the relatively limited radiation exposure of the anteromedial orbit during previous radiotherapy in this patient. Radiation injury to the eye is a potential complication. The entire lacrimal system and inferior nasal meatus should be included in the surgical excision or irradiation field, because the tumor may grow along the lacrimal drainage system. Otherwise, subclinical tumor invasion in a portion of the lacrimal drainage system may result in treatment failure.

In conclusion, the presence of epiphora or a mass at the medial canthus in a patient with previously treated NPC should prompt further study unless tumor recurrence in the nasal cavity or lacrimal system is excluded. CT scanning can provide early diagnosis of tumor recurrence. Open biopsy or CT-guided biopsy can confirm the final result.

REFERENCES

1. Hsu MM, Tu SM: Nasopharyngeal carcinoma in Taiwan. Clinical manifestations and results of therapy. *Cancer* 1983; **52**:362-368.
2. Shu CH, Shiau CY, Chi KH, Yen SH, Li WY: Salvage surgery for recurrent nasopharyngeal carcinoma in anterior marginal miss after radiotherapy. *Otolaryngol Head Neck Surg* 1999; **121**:622-626.
3. Amrith S: Antero-medial orbital masses associated with

- nasopharyngeal carcinoma. Singapore Med J 2002; **43**: 97-99.
4. Luo CB, Teng MM, Chen SS, Lirng JF, Guo WY, Chang T: Orbital invasion in nasopharyngeal carcinoma: Evaluation with computed tomography and magnetic resonance imaging. Zhonghua Yi Xue Za Zhi 1998; **61**: 382-388.
 5. Long W, Wang L, Luo X: Clinical and MRI diagnosis of nasopharyngeal carcinoma with orbital spread. Zhonghua Yan Ke Za Zhi 2001; **37**:295-297.
 6. Cole WH: The mechanisms of spread of cancer. Surg Gynecol Obstet 1973; **137**:853-871.
 7. Douglas JG, Koh W, Laramore GE: Metastasis to a percutaneous gastrostomy site from head and neck cancer: Radiobiologic considerations. Head Neck 2000; **22**:826-830.
 8. Armstrong M, Price JC: Tumor implantation in a tracheotomy. Otolaryngol Head Neck Surg 1992; **106**: 400-403.
 9. Lewin JS, Cleary KR, Eicher SA: An unusual metastasis to the thumb in a laryngectomized tracheoesophageal speaker. Arch Otolaryngol Head Neck Surg 1997; **123**:1007-1009.
 10. Orlick ME, Kastl PR, Donzis PB, Howard R 3rd, Rice J, Tauber S: Ocular effects and detection in tears of aerosolized intranasal cocaine and fluorescein. Ann Ophthalmol 1990; **22**:249-254.
 11. Stefanyszyn MA, Hidayat AA, Pe'er JJ, Flanagan JC: Lacrimal sac tumors. Ophthalm Plast Reconstr Surg 1994; **10**:169-184.
 12. Russell EJ, Czervionke L, Huckman M, Daniels D, McLachlan D: CT of the inferomedial orbit and the lacrimal drainage apparatus: Normal and pathologic anatomy. AJR Am J Roentgenol 1985; **145**:1147-1154.
 13. Ching AS, Chong VF, Khoo JB: CT evaluation of nasolacrimal relapse of nasopharyngeal carcinoma. Clin Radiol 2003; **58**:642-647.
 14. Yen KL, Hsu LP, Sheen TS, Chang YL, Hsu MM: Salvage neck dissection for cervical recurrence of nasopharyngeal carcinoma. Arch Otolaryngol Head Neck Surg 1997; **123**:725-729.
 15. Hsu MM, Ko JY, Sheen TS, Chang YL: Salvage surgery for recurrent nasopharyngeal carcinoma. Arch Otolaryngol Head Neck Surg 1997; **123**:305-309.