Frontal sinus nasopharyngeal carcinoma recurrence masquerading as chronic frontal sinusitis: a case report

Liew Yew Toong[a], Lott Pooi Wah[b], Adzreil Bakri[a], Narayanan Prepageran[a]

Departments of [a]Otorhinolaryngology, [b]Opthalmology, Faculty of Medicine, University Malaya Medical Centre, Lembah Pantai, Lumpur, Malaysia

Correspondence to Liew Yew Toong, MS ORL-Head and Neck Surgery (University Malaya), Department of Otorhinolaryngology, University Malaya Medical Centre, Lembah Pantai, 59100 Kuala Lumpur, Malaysia.
fax: +60 5495 7036;
e-mail: lyewtoong@yahoo.com

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Recurrence of nasopharyngeal carcinoma (NPC) is still a worrying issue despite the advent and advancement of treatment strategies. Presentation of recurrent NPC is different from primary NPC and indicates poor prognosis. Frontal sinus metastasis without any involvement of other sinuses is very rare and could be mistaken as sinusitis or mucocele. Owing to its rare occurrence, it presents a great challenge for clinicians to make a prompt diagnosis. The background chronic rhinosinusitis symptoms as a result of irradiation for NPC may masquerade the underlying paranasal sinus recurrence.

Keywords:
frontal sinus, nasopharyngeal carcinoma, recurrence

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Introduction

Nasopharyngeal carcinoma (NPC) is a malignant tumor that arises from epithelial lining of nasopharynx.

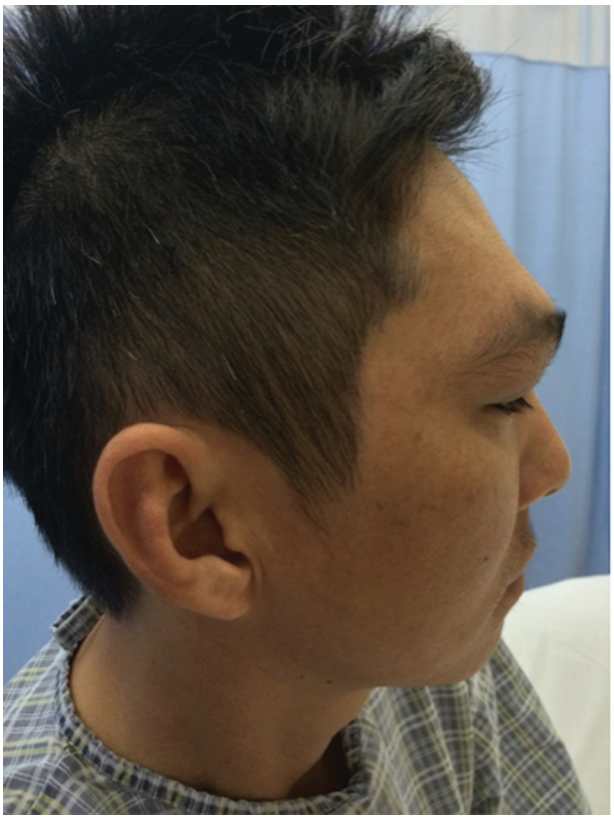
The neoplastic epithelial cells are frequently found intermingled with lymphoid cells, and therefore, it was previously known as lymphoepithelioma. It is the most common malignancy among inhabitants in Southern China. Outcome and survival of patients with NPC has improved significantly in the past two decades with the introduction of concurrent cisplatin-based chemotherapy and radiotherapy. Five-year cumulative rate of locoregional recurrence ranges from 12 to 22% [1]. Clinical features of recurrent NPC may be different from primary NPC, and here, we reported a rare presentation of recurrent NPC at the right frontal sinus. For the past few years, there were reports on distant metastasis in NPC to other rare sites such as pericardium, small bowel, colon, and parotid. However, metastasis to the frontal sinus is extremely rare, and to our knowledge, this is the first reported case of recurrent NPC at the frontal sinus [2].

Case report

A 31-year-old man was diagnosed to have NPC in April 2013. His tissue histological was of undifferentiated type or WHO III. He was staged as T1N0M0, where the primary tumor was localized to nasopharynx only without any cervical and distant metastasis (according to TNM staging 7th ed., American Joint Committee on Cancer). He received 3D conformal radiotherapy at a dose of 70 Gy to the nasopharynx in 35 conventional fractions for a total of 7 weeks. Cisplatin and 5-fluorouracil were given weekly. He was well till 8 months after the treatment when he presented with diplopia and right frontal swelling. There was associated headache as well without symptoms of raised intracranial pressure. He denied any nasal, otological, neck, or systemic symptoms. Fever was present for a short period of time during the initial presentation, and he was treated with oral antibiotics by general practitioner. On examination, he was comfortable generally. There was right orbital proptosis and diplopia on right lateral gaze. Right frontal mass was palpable and measured 5 cm×4 cm (Figs 1 and 2).

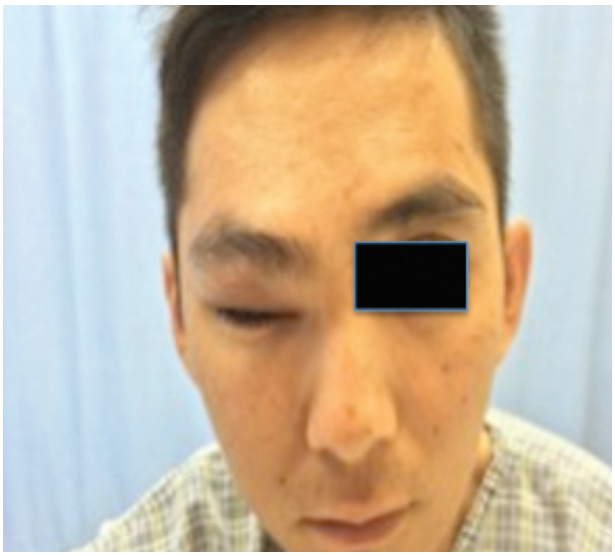
Extraocular movement was normal. His visual acuity was at 6/6 without presence of relative afferent pupillary defect. Other cranial nerves were intact. There was no cervical lymphadenopathy. Endoscopic nasal examination showed normal nasal cavity and nasopharynx clear of tumor. Computed tomography (CT) and MRI of brain and paranasal sinus showed mass in right frontal sinus with eroded posterior frontal bone table and intracranial extension (Figs 3 and 4). Other sinuses, nasal cavity, and nasopharynx were clear. Craniofacial resection of tumor was performed and tumor was excised en bloc. Histological examination revealed recurrent NPC (Fig. 5). He recovered well with resolution of proptosis and diplopia. However, he defaulted follow-up 1 year later.

Figure 1



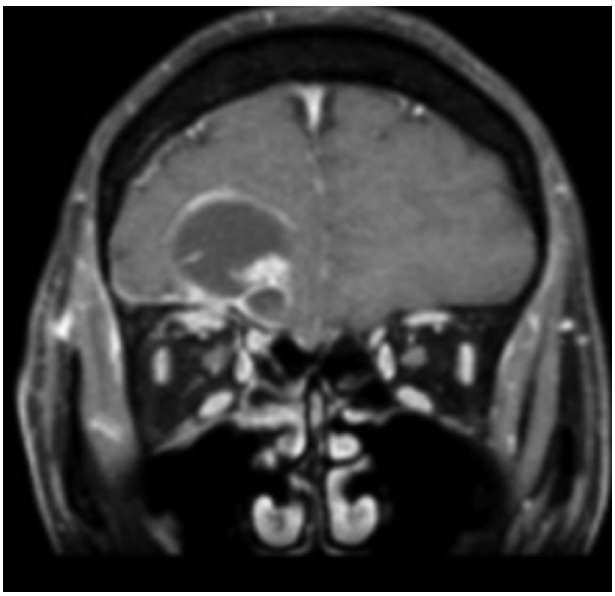
Side view showed right eye proptosis from frontal sinus swelling.

Figure 2



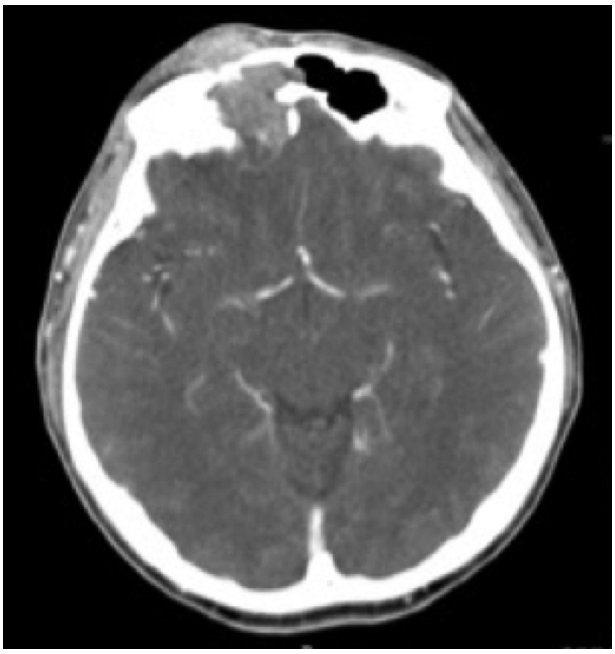
Front view showed right orbit being pushed down by frontal sinus swelling.

Figure 3



MRI showed right frontal sinus mass with intracranial involvement.

Figure 4



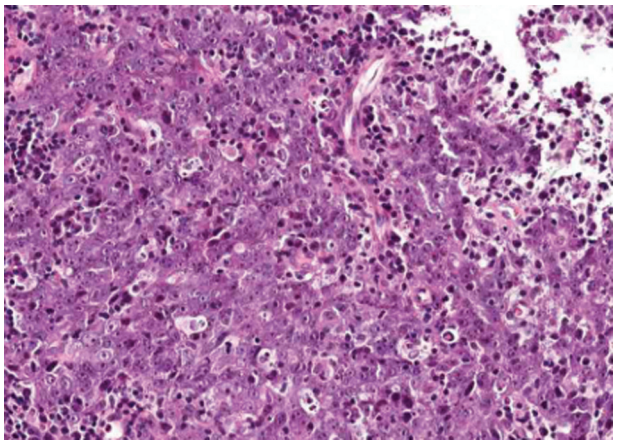
Computed tomography showed extensive right frontal sinus lesion with erosion of posterior table.

Discussion

Despite improved treatment regime for NPC, locoregional and distant recurrence is one of common failures after radiotherapy. Its treatment is challenging for both otorhinolaryngologist and oncologist. Li *et al.* [3] reported various clinical features of recurrent NPC in 351 patients. Local recurrence constituted 73.5% of all types of recurrence followed by locoregional disease including nasopharynx and neck.

Distant metastasis to bone, liver, lung, parotid, and medial eye canthus was least common, which was recorded in a total of 6.6% of cases [3]. Leung *et al.* [4] found that bone metastasis was the commonest site

Figure 5



Histopathology of tissue revealed dence neoplastic epithelial cells with marked pleomorphic nuclei, and lymphoplasmacytic infiltrate (×4, haemotoxylin and eosin).

of distant metastasis. None of these cases presented with recurrence at frontal sinus as reported in our case.

Frontal sinus recurrence is considered as distant metastasis in head and neck region. The location of sinus is fairly far from nasopharynx where direct extension of tumor to sinus is impossible without involvement of other paranasal sinuses or infratemporal fossa. Paranasal sinuses commonly involved are posterior ethmoids and sphenoid, where direct invasion is the mode of spread. Possible mechanism that may lead to tumor recurrence in frontal sinus is via hematogenous route. Another hypothesis would be owing to submucosal spread of primary NPC to the sinuses. This may lead to micrometastasis in the frontal sinus mucosa which shows up later in time as this area is not covered in the clinical target volume of radiotherapy. The tumor grows gradually and later presents as gross frontal sinus mass. Malignant frontal sinus tumor is extremely rare. Primary frontal sinus malignant tumor is more common than secondary metastasis. It is less than 2% of cases of paranasal sinus tumor, more often being involved by extension of a tumor arising elsewhere [5]. Among paranasal sinuses, the frontal sinus is one of the least affected, with an incidence of ~0.3% [5]. There were few reports on metastasis to frontal sinus from primary sites such as breast, lung, and renal cell carcinoma [6–8]. To date, recurrence NPC to frontal sinus was never reported before from literature search.

CT has long been used to assess locoregional recurrence of NPC and it is superior in showing bony anatomy and as an effective tool for preoperative planning for endoscopic sinus work. On the contrary, MRI is more accurate than CT to assess tumor extension into surrounding soft tissue such as intracranial involvement. Thus, we would suggest that CT and MRI are contemporary for NPC recurrence.

The mainstay of treatment for locoregional recurrence of NPC is surgery. Re-irradiation is another option in those surgically unfit patients but it does come with various complications to the surrounding vital structures owing to increased absorbed radiation dose. Osteoradionecrosis, temporal lobe necrosis, temporomandibular joint dysfunction, cervical spine instability, and second malignancy were commonly seen. Nowadays, with the advancement of radiotherapy technology such as brachytherapy and intensity-modulated radiotherapy, these complications are reduced to minimal [9]. Approach to frontal sinus tumor could be combined endoscopic or open craniofacial resection or combined.

Endoscopic approach has been getting more acceptances with its advantages of avoiding external scar and brain parenchymal retraction, shorter hospital stay, and less risk of meningitis [10]. Craniofacial resection was chosen in our case owing to its disease extension with intracranial invasion. We believe that it is superior in terms of achieving complete en bloc excision with adequate margin control. This approach also provided maximal exposure during surgery [11]. There is no previous case series on the management and prognostic value and survival rate of NPC metastasis to frontal sinus owing to its rarity, but we believe with complete excision and close follow-up, survival will definitely be prolonged.

Despite advancement on the treatment, the incidence of NPC recurrence has been reported as high as 77.5% following remission, in which 48.1% occurred after 2 years whereas 17.4% recurred following 7–12 months after irradiation [12]. The rare incidence of NPC recurrence at frontal sinus presents a great challenge to clinicians, and at its initial stage, patients are usually asymptomatic, and endoscopic examination of nose is expected to have negative yield. Nonetheless, the radiation treatment for NPC is associated with impairment of nasomucociliary clearance, and the chronic rhinosinusitis symptoms may masquerade the underlying sinus recurrence till it reaches advanced state [13].There was a limitation in this study owing to lack of details of radiotherapy dosimetry. More extensive research studies are required to be done into this area of interest to help manage this devastating complication and to suggest the best and safest tool of surveillance of the paranasal sinuses. Thus far, we suggest both close endoscopic surveillance and paranasal sinus radiograph, with 6 monthly to yearly CT scan. The endoscopic images

ought to be recorded in patient's file system to ease follow-up to allow comparison and to detect changes, so that further action can be expedited.

Conclusion

Radiotherapy treatment in patients with NPC is known to cause sinomucosal changes that put them at higher risk of paranasal sinus complications such as sinusitis or mucocele. However, it should be bore in mind that recurrence of tumor is possible in any of the paranasal sinuses. Frontal sinus is one of rare site for recurrence as compared with ethmoid and sphenoid. Question is raised if irradiation field should always cover this vital area regardless of any stage of disease and weighing risk of irradiation to surrounding structures such as frontal lobe and orbit.

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Conflicts of interest

There are no conflicts of interest.

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