

## **Case Report**

### **Brain Abscess Mimicking Intracranial Extension Of Nasopharyngeal Carcinoma**

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#### **Abstract**

With the advent of more effective but aggressive cancer treatment regimens, survival in many types of cancer has improved including nasopharyngeal carcinoma (NPC). Radiotherapy (RT) is still the mainstay of treatment for patients with NPC. Unfortunately, it has led to several new complications of cancer and its therapy. One of the most important complications is central nervous system (CNS) infections. We report a case of NPC presented with signs of increased intracranial pressure making the diagnosis of intracranial extension of NPC. Imaging studies later on proved that it was an abscess which responded well with conservative medical treatment.

**Key words:** nasopharynx, carcinoma, neurology, complication, abscess

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#### **Introduction:**

It has been postulated that patients with nasopharyngeal carcinoma are more prone to CNS infection<sup>1</sup> However, the number is still small, with only few reports available in the literature to describe this clinical entity. In 15 years duration, Huang et al<sup>2</sup> could only identified five NPC patients with bacterial meningitis. Leonette et al., reported four post irradiated patients with intracranial complications, and only one of them suffered from NPC<sup>3</sup>. Because the manifestations of CNS infections may be subtle or may mimic tumor recurrence or metabolic disturbance, clinicians must be alert to those circumstances in which CNS is particularly at risk of infection<sup>4</sup>. Furthermore, higher incidence of CNS infection is seen in post irradiated patients with otitis media or chronic rhinosinusitis which might be the infection source in such patients<sup>1</sup>.

#### **Case summary**

A 49-year-old Malay man teacher was diagnosed to have NPC (T1N2M0) of World Health Organization (WHO) classification type III. He completed chemo radiotherapy treatment. Around six months post-treatment, follow-up computed Tomography (CT) scan assessment revealed persistent left Fossa of Rosenmuller (FOR) fullness but no calcification or

necrosis seen within it. Hence, repeat biopsy of left FOR was done but it was negative for malignancy. Two months later, patient was diagnosed to have acute suppurative otitis media (ASOM) with presenting features of pain and discharge in left ear. It was associated with high grade fever, mild headache, nausea and vomiting which warrant admission. Previously, patient has already had bilateral myringotomy and grommet done one month earlier for middle ear effusion. The ASOM episode resolved after 2 weeks of intravenous antibiotics. He was discharged well with no residual symptoms. One month later, he presented again with severe bilateral throbbing headache, high grade fever and nausea but no vomiting. The headache was progressive in nature and associated with seizures (two episodes of generalized tonic clonic of 10 minutes duration each), photophobia and neck stiffness but no blurred vision. Neurological examination revealed drowsy patients with neck rigidity, photophobia, and hyperreflexia in all four limbs with positive Babinski's sign. Intracranial metastasis was suspected at this time and CT scan imaging was ordered. The CT scan taken showed multiple well defined peripherally enhancing lesions seen in the right temporo-parieto-occipital region with mass effect and edema; with 1.3cm midline shift to the

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left. Features likely to represent intracranial metastasis (Figure I and II); but brain abscess could not be totally ruled out.

Eventually, magnetic resonance imaging (MRI) was done for further evaluation of patient's intracranial lesion. MRI showed multiple well-defined heterogeneous, thick irregular walls lesions of varying sizes in the right inferior temporal and splenium of corpus callosum. The T1-weighted film showed multiple heterogeneous hypointense lesions (Figure III & IV) and heterogeneous hyperintense appearance in T2-weighted film (Figure V & VI). Correlating with the current clinical presentation, multiple ring-enhancing lesions with extensive perilesional edema and ependymal enhancement were suggestive of brain abscess.

The patient improved with corticosteroids and antibiotics without any surgical intervention. He was discharged after completion of two weeks intravenous antibiotics. He was planned for next follow-up to our combined oncology and otolaryngology clinic for further evaluation and treatment with regards of his intracranial complications and suspected poor respond to previous treatment or recurrent NPC due to persistent appearance of left FOR fullness in repeated CT scan and MR imaging.

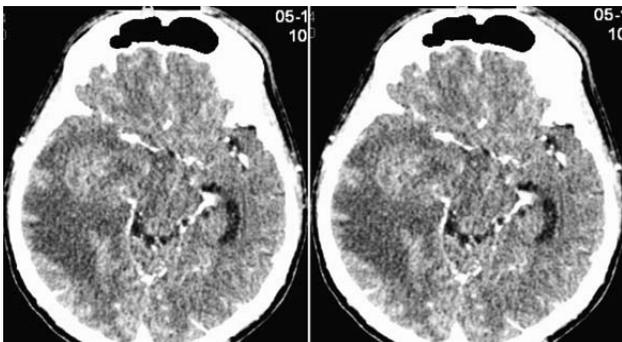


Figure I & II- CT scan showed multiple well defined peripherally enhancing lesions seen in the right temporo-parieto-occipital region.

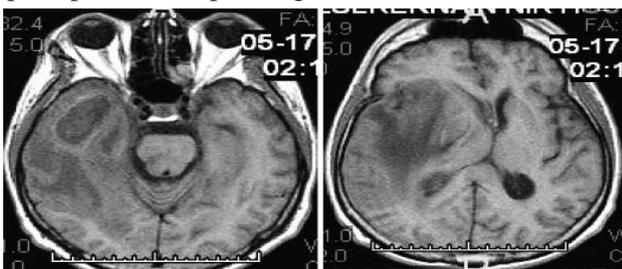


Figure III & IV: Heterogeneous hypointense lesions in the right inferior temporal area in T1-weighted MR imaging.

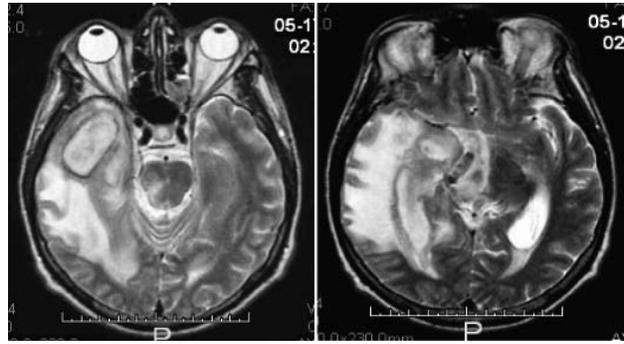


Figure V & VI: Heterogeneous hyperintense lesions in the right inferior temporal area in T2-weighted MR imaging.

### **Discussion:**

Post-irradiated NPC patient is assumed to be prone to get CNS infection. However, there are only few articles related to the clinical manifestation or prognosis of this clinical entity. Previous studies have not identified the risk factors of this CNS infection despite it being the factors for poor prognosis and frequently results in severe morbidity or mortality<sup>1</sup>. A retrospective case controlled study was conducted to better understand the clinical manifestations of CNS infection in 36 post-irradiated NPC patients. The study has found out that 18 of their patients with CNS infection, except one, had otitis media or chronic rhinosinusitis with or without skull base osteoradionecrosis (ORN)<sup>1</sup>. Therefore, it is believed that otitis media or chronic rhinosinusitis might be the infection source, as seen in our patient who has history of otitis media but no ORN detected in all his imaging investigations.

On the other hand, infection caused by cerebral radiation damage could not be ruled out. Damage to the cerebrum is classified into acute, subacute and late delayed, according to the time of occurrence. Late radiation effects occur from six months to many years after treatment. The peak period is between one to three years post-treatment<sup>5</sup>. In this patient it presented after one year of completion his chemoradiotherapy treatment. However, radiotherapy related cerebral insult is uncommon nowadays because of development in better targeted radiotherapy techniques such as brachytherapy, intensity modulated radiation therapy (IMRT), etc. with better techniques to produce high energy radiations for better penetrating power and sparing untowards effects to the more superficial tissues to the targeted tumour.

Both intracranial metastasis with or without infections may cause raised intracranial pressure or focal

mass effect and edema. Hence, it may delay in establishing the diagnosis due to overlapping and non-specific presenting symptoms. Initially, this patient was diagnosed to have intracranial metastasis. As the symptoms progressed; favoring an infective pathology are fever, neck stiffness and signs of clinical sepsis. The imaging studies also favour the diagnosis of brain abscess.

Intracranial lesions cause generalized raised intracranial pressure or focal mass effect. Headache, nausea, vomiting, and papilloedema commonly occur in patients with abscesses, tumour recurrence and radiation necrosis<sup>6</sup>. These overlapped features of multiple brain pathologies can complicate the process of making the final diagnosis. Eventually, MRI which is superior in assessing the soft tissues was used in this case. It provides better diagnostic imaging quality. Radiation damage to the brain parenchyma results in an increase in tissue water content, producing prolonged T1 and T2 relaxation times<sup>7</sup>.

The three leading presenting symptoms of CNS

infection among post-irradiated NPC patients were fever (94.4%), altered mental status (72.2%), and headache (55.6%)<sup>1</sup>. Other presenting symptoms were diverse, including seizure, hearing loss, multiple cranial nerves palsies, hemiplegia, and hemiparesis<sup>1</sup>. In our patient, besides having otitis media, he presented with headache and later on developed seizures and photophobia which associated with neck rigidity.

The clinical manifestations of NPC with intracranial metastasis and CNS infection in NPC patients often overlapped, varied and non-specific. Therefore, the diagnosis and management of CNS infections in cancer patients remain challenging. Hence, we should be aware of emerging infections, transfusion safety issues, epidemiologic trends, changing microbial susceptibilities, synergistic infections, and changing cancer therapies that will continue to impact the nervous system in new ways<sup>8,9</sup>. There is possibility that two or more diseases may exist concurrently<sup>4</sup>.

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