

## Parapharyngeal abscess complicated by endophthalmitis: a rare presentation of nasopharyngeal carcinoma

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### Abstract

**Objective:** We report an extremely rare case of nasopharyngeal carcinoma presenting as a lateral neck abscess complicated by endogenous bacterial endophthalmitis. Endogenous bacterial endophthalmitis complicating a neck abscess has not been reported in the recent English literature. We discuss the possible pathophysiology of neck abscess as a presenting feature of nasopharyngeal carcinoma, and the relationship between the parapharyngeal abscess and endogenous bacterial endophthalmitis.

**Case report:** A middle-aged Chinese man presented with a left neck abscess associated with progressive vision deterioration and proptosis of the left eye. Incidentally, his random blood glucose was found to be elevated. Nasal endoscopy also revealed bilateral bogginess in the fossa of Rosenmuller. A diagnosis of left neck abscess with endogenous endophthalmitis associated with underlying diabetes mellitus was made. A computed tomography scan of the neck showed a left parapharyngeal abscess. Incision and drainage of the abscess together with biopsy of the nasopharynx was performed. Due to the non-salvageable condition of the left eye, evisceration was also performed. Pus culture studies from the neck abscess grew *Klebsiella pneumoniae*, and nasopharyngeal biopsy revealed undifferentiated carcinoma.

**Conclusion:** Nasopharyngeal carcinoma is endemic in South East Asia and can have multiple, varied presentations. Therefore, in this setting, the clinician should have a high index of suspicion, especially in a patient from the Chinese ethnic group.

**Key words:** Neck; Abscess; Nasopharynx Neoplasms; Diabetes Mellitus

### Case report

A 56-year-old Chinese gentleman initially presented to a private medical centre with fever and a left neck swelling of two weeks' duration. He had previously been well, with no known medical problems.

The patient was diagnosed with a left neck abscess. Due to an elevated random blood glucose test, he was incidentally discovered to have uncontrolled diabetes mellitus.

An urgent incision and drainage was performed by the resident otorhinolaryngologist. *Klebsiella pneumoniae* was isolated from the pus culture.

On the second post-operative day, the patient complained of increasing pain in the left eye, and his vision deteriorated significantly, to the point that he could only perceive light. An urgent ophthalmology consultation was arranged. He was diagnosed with left endogenous endophthalmitis, and a vitreous tap culture isolated *Klebsiella pneumoniae*.

Multiple intravenous antibiotics (ceftazidime, ciprofloxacin, metronidazole and ampicillin/clavulanate) were commenced in an attempt to salvage the eye. Despite this, the patient's vision continued to deteriorate and he developed orbital cellulitis. Subsequently, he was referred to our centre for further management.

On admission, the patient was alert, febrile and obviously ill, with a proptosed left eye. There was a diffuse, tender, 8 × 8 cm swelling over the left neck, with

frank pus still draining from the corrugated drain placed earlier. Bilateral level I, II, and III cervical lymph nodes, measuring less than 6 cm, were palpable.

On flexible nasopharyngolaryngoscopy, the left ethmoidal region demonstrated inflamed mucosa, and crusting was present over the posterosuperior wall of the nasopharynx. The underlying nasopharyngeal mucosa was inflamed and the fossa of Rosenmuller was boggy bilaterally. Other aspects of the ENT examination were unremarkable.

On review by the ophthalmologist, there was obvious proptosis of the left eye, with general haziness of the cornea. The conjunctiva was prolapsed, and vision was limited to perception of light only. The contralateral eye was normal.

The total white cell count was  $30.0 \times 10^9/l$ , with a relative neutrophilia of 93.0 per cent. However, the blood bacteriological analysis was negative.

The computed tomography (CT) scan of the orbit (Figure 1) showed a small (5 × 10 mm), hypodense area at the posterosuperior aspect of the left globe at the retrosclera space, suggestive of an abscess. There was also thickening of the preseptal space with low density in the orbit, in keeping with the preseptal changes. Bilateral extraocular muscles, optic nerves and canals, cavernous sinuses, superior orbital veins, and the right orbit were normal. A CT scan of the neck (Figure 2) showed an extensive neck abscess with left parotid and

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parapharyngeal extension. The abscess collection resulted in effacement of the fat of the carotid sheath. Inferiorly, it involved the left sternocleidomastoid muscle to the level of the thyroid cartilage, with medial extension into the left aryepiglottic fold. Multiple enlarged cervical lymph nodes were also present bilaterally. The fossae of Rosenmuller appeared to be symmetrical.

Therefore, a diagnosis of left endogenous endophthalmitis and residual left neck abscess with parapharyngeal extension, secondary to uncontrolled diabetes mellitus, was made.

Following this, an urgent re-exploration of the neck with drainage and left eye evisceration was performed. Intra-operatively, the vitreous was found to be liquefied and yellowish in colour and the cavity was filled with pus. Pockets of pus and necrotic tissue were also seen in the sclera, although the lens was clear. The 6 × 8 cm neck cavity was filled with foul-smelling, purulent discharge and slough, and posteriorly it extended to the carotid sheath.

A biopsy was taken from the abscess wall, from mucosa in the left ethmoidal region and from both fossae of Rosenmuller. The histopathology report from the left nasal cavity and bilateral fossae of Rosenmuller gave a most surprising diagnosis – undifferentiated carcinoma (Figure 3). The

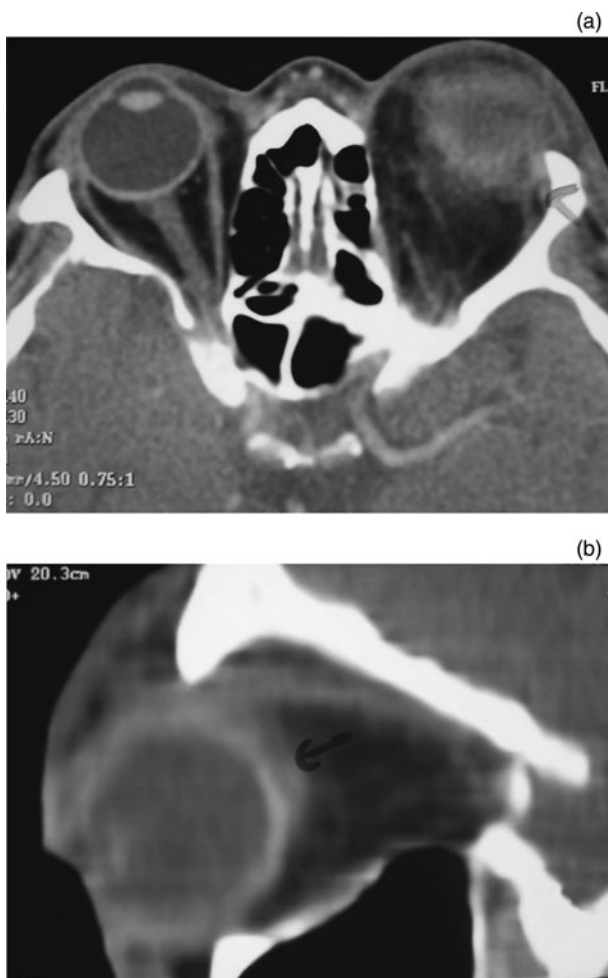


FIG. 1

Axial, orbital computed tomography scan. (a) Proptosis of the left eye. (b) A small, hypodense, 5 × 10 mm area at the posterosuperior aspect of the left globe at the retrosclera space, suggestive of an abscess. (Handwritten arrows were marked by the referring otorhinolaryngologist.)

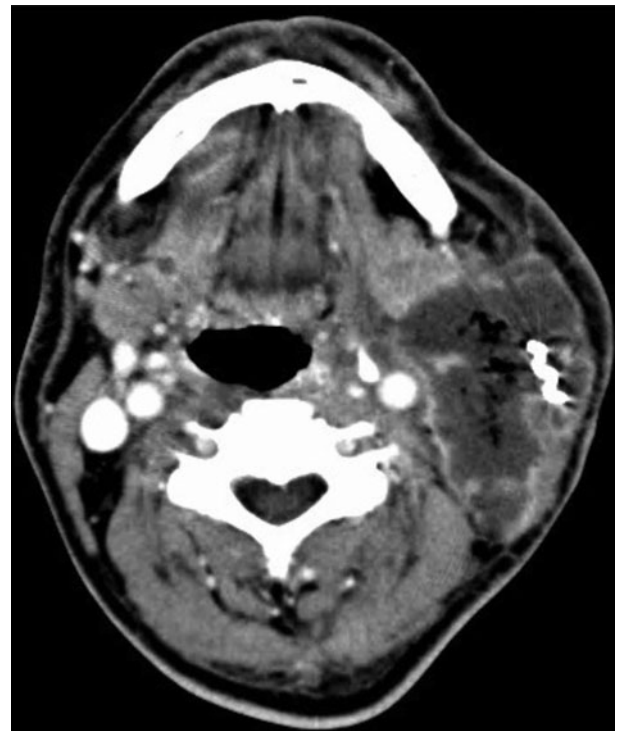


FIG. 2

Axial, contrast-enhanced computed tomography scans of the neck, showing extensive neck abscess with left parotid and parapharyngeal extension, together with cervical lymphadenopathy.

malignant cells were positive for cytokeratin. However, the abscess wall was free of malignancy. A diagnosis of nasopharyngeal carcinoma was made. The intraocular tissue demonstrated abscess with marked suppurative tissue, consistent with endophthalmitis (Figure 4).

On the ward, meticulous dressing of the neck wound was performed until it healed completely. Two weeks later, a post-operative magnetic resonance imaging (MRI) scan confirmed complete resolution of the cervical lymph nodes and the neck abscess collection. Ultrasound of the

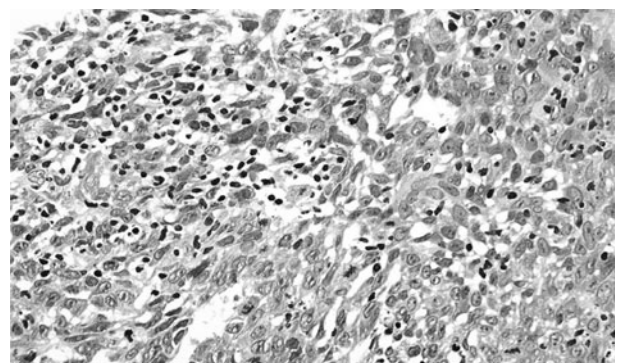


FIG. 3

Photomicrograph of biopsy from the bilateral fossae of Rosenmuller and left ethmoidal region, showing undifferentiated carcinoma. This consists of non-keratinised, undifferentiated, pleomorphic cells with vesicular nucleus, a distinct nuclear outline and a single, prominent nucleolus, separated by a dense infiltrate of lymphocytes and plasma cells (H&E; × 200).

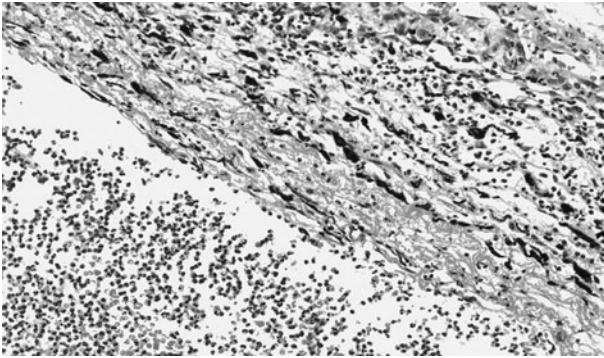


FIG. 4

Photomicrograph of biopsy from the left intraocular tissue, showing abscess and endophthalmitis. The degenerated choroid tissue, with pigmented melanocytes and retinal tissue, is infiltrated by a dense collection of neutrophils (H&E;  $\times 100$ ).

liver and a chest X-ray did not indicate any distant metastases.

The patient subsequently completed radiotherapy, comprising a total of 60 Gy to the neck and 70 Gy to the paranasal sinuses, with an additional boost of 10 Gy to the left neck region.

One year later, the patient was still being followed up for surveillance, but remained free of recurrence.

### Discussion

Nasopharyngeal carcinoma (NPC) is endemic in South East Asia, and multiple, varied presentations have been described in the literature. Even though retropharyngeal abscess as a presenting feature has been documented,<sup>1</sup> we believe there have been no previous reports of lateral neck abscess with parapharyngeal extension complicated by endogenous bacterial endophthalmitis as a presentation of NPC. Nasopharyngeal carcinoma is a non-lymphomatous, squamous cell carcinoma which occurs in the epithelial lining of the nasopharynx, frequently arising from the fossa of Rosenmüller.<sup>2</sup> In Malaysia, the Chinese ethnic group has the highest age-adjusted incidence rates, particularly for the age group 40–49 years, in which the incidence rate is 40.1 per 100 000 men and 14.9 per 100 000 women.<sup>3</sup>

The commonest (76 per cent) first presenting symptom of NPC is a neck mass indicating cervical lymph node metastasis.<sup>2</sup> The nasopharynx has a well established lymphatic network. The tumour cells commonly metastasise to the lymphatics in the node of Rouviere in the retropharyngeal space, before spreading to the other cervical lymph nodes in a superior to inferior direction. Occasionally, metastatic lymphadenopathy precedes the manifestation of primary tumour in the nasopharynx. For this purpose, MRI is superior to CT in displaying both superficial and deep nasopharyngeal soft tissue and in differentiating tumour from soft tissue. Magnetic resonance imaging is also more sensitive for the assessment of retropharyngeal and deep cervical nodal metastases.<sup>2</sup> However, in this case, the post-operative MRI showed an absence of cervical lymphadenopathy. The lymph nodes which had earlier been present would mostly have been inflammatory secondary to the infective focus. The pathophysiology of lateral neck abscess in this patient was most probably multifactorial.

Adjacent to the nasopharynx is the parapharyngeal space, a fat-filled potential space that can be divided

further into the prestyloid and poststyloid spaces. The more anteriorly located prestyloid space contains connective tissue, fat, the internal maxillary artery, the lingual nerve, the inferior alveolar nerve and the auriculotemporal nerve. The posterior or poststyloid compartment is essentially neurovascular, containing the internal carotid artery, the internal jugular vein, the lower cranial nerves (IX, X, XI and XII), the cervical sympathetic chain and lymph nodes. The rich parapharyngeal venous plexus can also be a potentially accessible route for distant metastasis via haematogenous spread. Metastatic deposits in the lymph nodes incite inflammatory reaction and, in a poorly controlled diabetic, can predispose to infective and suppurative changes.

In a diabetic patient, short- or long-term hyperglycaemia disrupts the immune functions, including neutrophil bactericidal function, cellular immunity and complement activation.<sup>4</sup> In addition, vascular insufficiency predisposes diabetic patients to a variety of severe or invasive infections. As the oral cavity is a rich reservoir of pathogenic bacteria, diabetic patients' high prevalence of oropharyngeal colonisation by Gram-negative bacilli may explain their susceptibility to focal infections.<sup>5,6</sup> Pharyngeal mucosal disruption by the tumour, exposing the underlying blood vessels to the local flora, is also a likely mechanism for spread of infection into the parapharyngeal space.<sup>7</sup> Furthermore, mucosal disruption (which is caused by dental caries, recent dental procedures or betel nut chewing) may also facilitate invasion of bacteria into the underlying tissues, and lead to local suppurative infections or metastatic complications.<sup>5</sup>

Endogenous bacterial endophthalmitis in this patient could have resulted from a direct extension of infection or from metastatic bacteraemia secondary to the uncontrolled diabetes mellitus. A potential route for direct spread of infection exists, as the parapharyngeal space communicates with the infratemporal fossa, which in turn opens up into the orbit via the inferior orbital fissure.

- This paper describes a case of parapharyngeal abscess complicated by endophthalmitis, as a rare presentation of nasopharyngeal carcinoma
- Nasopharyngeal carcinoma is endemic in South East Asia and can have multiple, varied presentations
- *Klebsiella pneumoniae* is a major pathogen of diabetes mellitus related endophthalmitis and deep neck space infection
- The rich parapharyngeal space venous plexus provides a potential route for dissemination of infection from the nasopharynx to the orbit

Endophthalmitis is defined as any inflammation of the internal ocular spaces, but in clinical practice it is usually taken to mean inflammation secondary to intraocular infection.<sup>8</sup> Symptoms include mild to severe pain, severe vision loss, photophobia and 'floaters'. Infectious endophthalmitis can be classified as exogenous or endogenous. Exogenous causes include intraocular surgery, penetrating injury and corneal ulcer with perforation.<sup>9</sup> Endogenous endophthalmitis, also termed metastatic endophthalmitis, occurs when organisms reach the eye via the bloodstream, and enter the internal ocular spaces by crossing the blood–ocular barrier. Endogenous bacterial endophthalmitis is less common than exogenous

bacterial endophthalmitis and accounts for only 2–6 per cent of all cases of endophthalmitis.<sup>8</sup> The prognosis for vision recovery is usually poor.

In a Taiwanese study, *Klebsiella pneumoniae* was reported as a major pathogen in cases of endophthalmitis (51.7 to 91.7 per cent) and deep neck space infection (64.5 per cent). The commonest organism (56.1 per cent) in the diabetic group was also *K pneumoniae*.<sup>5</sup> In fact, any patient who presents with a *K pneumoniae* deep neck space infection should be investigated for diabetes mellitus. In our patient, pus culture from the abscess grew *K pneumoniae* and the vitreous tap result was also consistent. In endophthalmitis, vitreous samples have been noted to be more sensitive than aqueous samples in identifying the offending organism.<sup>9</sup> In our patient, a negative blood culture did not exclude bacteraemic endophthalmitis, as he had already received multiple broad-spectrum intravenous antibiotics prior to admission.

### Conclusion

This case illustrates the simultaneous occurrence of lateral neck abscess with parapharyngeal extension and endogenous bacterial endophthalmitis in a diabetic patient, as an unusual presenting feature of nasopharyngeal carcinoma. The offending pathogen was identified as *Klebsiella pneumoniae*. Although a rare occurrence, this case emphasises the importance of vigilance regarding the varied presentations of nasopharyngeal carcinoma within an endemic region. Early treatment of deep neck space infection, with empirical antibiotic coverage for *K pneumoniae*, is warranted in order to reduce the morbidity of widespread infection, especially in a diabetic patient.

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