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Sinonasal tuberculosis associated with osteomyelitis of the ethmoid bone and cervical lymphadenopathy

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Abstract
Sinonasal tuberculosis is a rare disease; its association with osteomyelitis of surrounding bone and cervical lymphadenopathy has been reported rarely. In this article, we report a case of sinonasal tuberculosis that was complicated by osteomyelitis of the ethmoid bone and cervical lymphadenopathy. Infection of the bone was demonstrated by biopsy and ^{99m}Tc-MDP bone single photon emission computed tomography (SPECT), and cervical lymphadenopathy was confirmed by histology. This case will be discussed with specific emphasis on the imaging characteristics.

Key words: Paranasal Sinuses; Tuberculosis; Osteomyelitis; Lymphadeniditis, Tuberculous

Introduction

Tuberculosis is re-emerging as a major health problem.[1] Among the several extra-pulmonary manifestations of tuberculosis, sinonasal tuberculosis has been regarded as a rare entity.[2] Tuberculosis in the sinonasal area is reported to present typically with an involvement of the nasal mucosa and the cartilaginous septum, sparing the bony portion.[3] Due to the proximity of the nasal mucosa to the underlying bony structure, nasal tuberculosis may have bony involvement as well as mucosal infection. It can also manifest with locoregional lymphadenopathy. However, an invasion of the tuberculosis into the bony framework of the paranasal sinuses and cervical lymphadenopathy has seldom been reported in sinonasal tuberculosis.[4]

Recently, we experienced a case of sinonasal tuberculosis that presented with osteomyelitis of the ethmoid bone and ipsilateral cervical lymphadenopathy. Infection of the bone with acid-fast bacilli and resultant osteomyelitis was demonstrated by biopsy and ^{99m}Tc-MDP bone SPECT. Tuberculous cervical lymphadenopathy was confirmed by histology and diagnostic imaging using magnetic resonance imaging (MRI) and computerized tomography (CT). To provide a better insight into the clinical behaviour of the sinonasal tuberculosis, we present this case, focusing particularly on the imaging characteristics.

Case report

A 42-year-old Korean woman presented to our clinic with a three-month history of progressive right nasal obstruction, rhinorrhoea, post-nasal drainage and a recent increasing right neck mass. She denied crusting, epistaxis, or pain. She had no prior history of sinonasal problems, allergies, or trauma but had a history of pulmonary tuberculosis 10 years ago, for which she received treatment for one year. She denied significant exposure to toxic inhalant or environmental irritants.

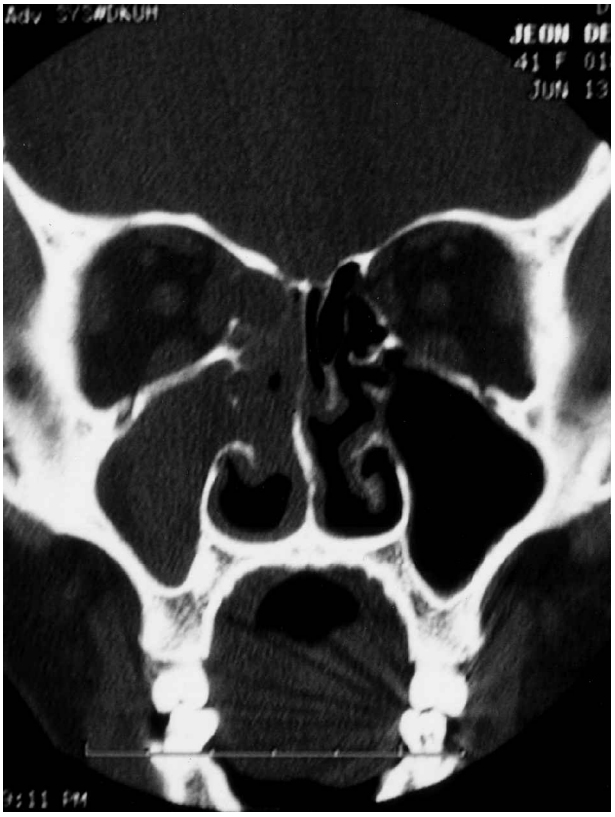

Fig. 1

Sinonasal CT scan. Coronal scan, before endoscopic sinus surgery, demonstrating soft tissue filling densities in the right maxillary and ethmoid sinuses. It also shows a destroyed right middle turbinate and partial defect of the right lamina papyracea.

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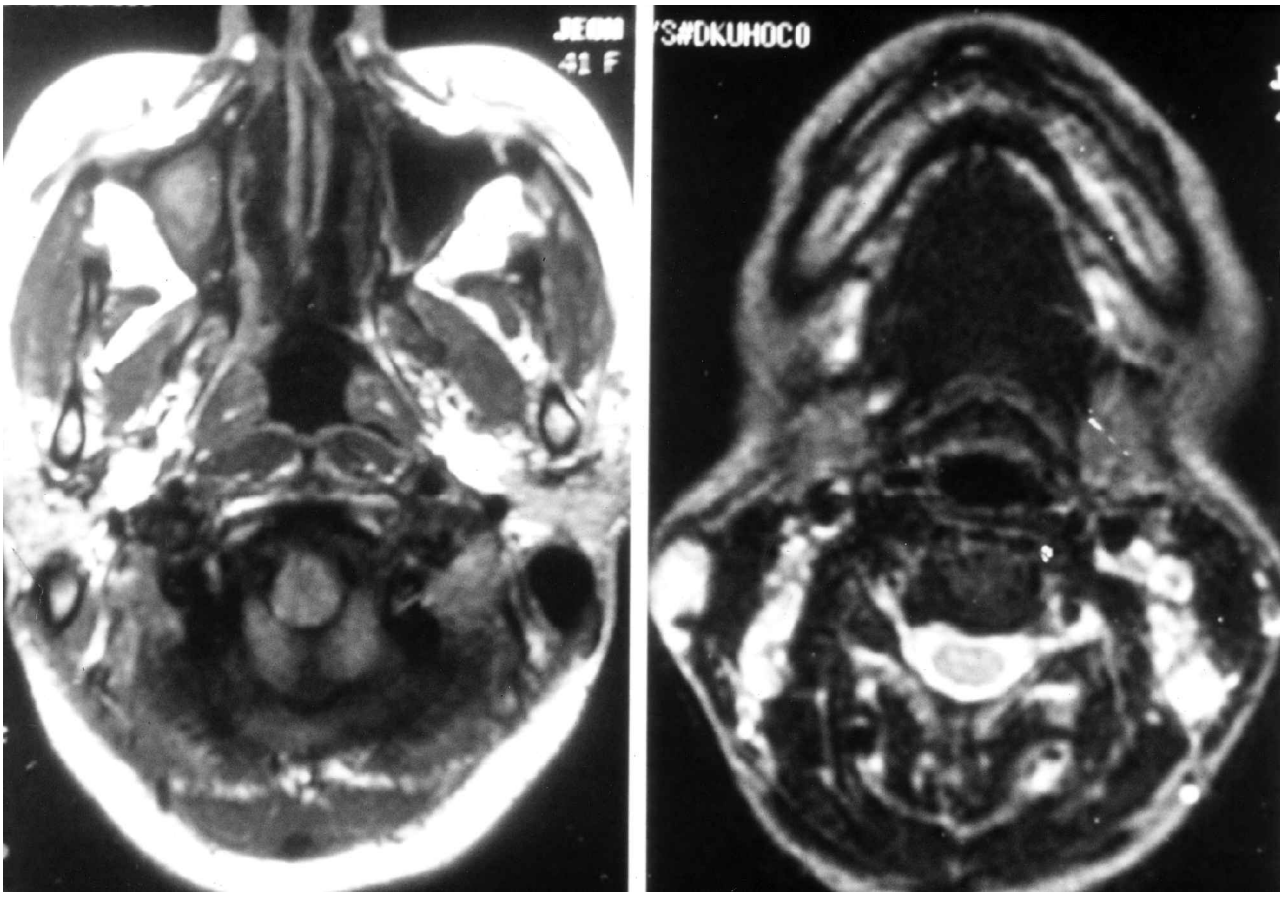

FIG. 2

Paranasal sinus MRI. T1-weighted image demonstrating hyperintense mass filling signals in the right nasal cavity, maxillary, ethmoid, and sphenoid sinuses (right). It also showed multiple enhancements of both the posterior cervical, internal jugular lymph nodes on gadolinium-DTPA enhanced images (left).

On physical examination, the nasal septum was deviated to the right and the middle and inferior turbinates were eroded. The patient's oropharynx, and larynx were without lesions. Head and neck examination revealed a few palpable non-tender lymph nodes in her right mid-neck. Laboratory surveys were within normal limits including the white blood cell count, erythrocyte sedimentation rate, blood urea nitrogen, creatinine, serum calcium, liver function tests, and urinalysis. Human immunodeficiency virus (HIV) testing was negative. Plain X-ray film of the paranasal sinuses demonstrated opacified right maxillary, and ethmoid sinuses. A chest radiograph showed irregular nodular capacity in the bilateral upper lung fields and right lower lobe area, suggesting scarring due to old pulmonary tuberculosis. A fine-needle aspiration was performed on the right neck lymph node, the result was inconclusive. CT showed a destroyed right middle turbinate and soft tissue filling density in the right maxillary and ethmoid sinuses (Figure 1). MRI also revealed soft tissue filling signals in the right sided paranasal sinuses and nasal cavity. The maxillary sinus lesion was characterized by a hypointense signal with central isointensity on T1-weighted images (Figure 2, left) and a hyperintense lesion with central hypointensity on T2-weighted images. On gadolinium-DTPA enhanced images, the lesion showed thick peripheral enhancement with extension to the cheek soft tissue across the anterior bony wall through a focal defect. In addition, it revealed multiple necrotic lymph nodes in both the posterior cervical, internal jugular, and right superficial mid-neck (Figure 2, right). The 99m Tc-MDP bone SPECT showed increased uptake of bone scan agent in the right nasal cavity and paranasal sinuses (Figure 3).

The patient underwent endoscopic sinus surgery combined with excisional biopsy of the right cervical lymph nodes. Biopsy of the right nasal cavity mucosa and ethmoid bone demonstrated chronic granulomatous inflammation with caseation necrosis.

She began a planned therapeutic regimen of out-patient oral isoniazid 300 mg per day, ethambutol 2 g per day, rifampin 600 mg per day, and pyrazinamde 2 g per day for two months, followed by 10 months of isoniazid and rifampin. After one month of treatment she had complete resolution of her nasal symptoms and lymphadenopathy. Two years after the diagnosis, she remains without evidence of recurrent disease.

Discussion

The currently increasing incidence of tuberculosis is further complicated by the aggressive nature of the tuberculosis in subjects infected with HIV and also by resistance to formerly effective chemotherapeutic regimens.[5,6] Extrapulmonary tuberculosis is uncommon, and sinonasal tuberculosis is still rarer.[1] Tuberculosis of the nose usually occurs secondary to pulmonary tuberculosis via contagious, haematogenous or lymphatic routes.[7] The most common site of the involvement has been understood as cartilaginous septum, followed by the inferior turbinate.[1] An association of cervical tuberculous lymphadenopathy has been uncommon.

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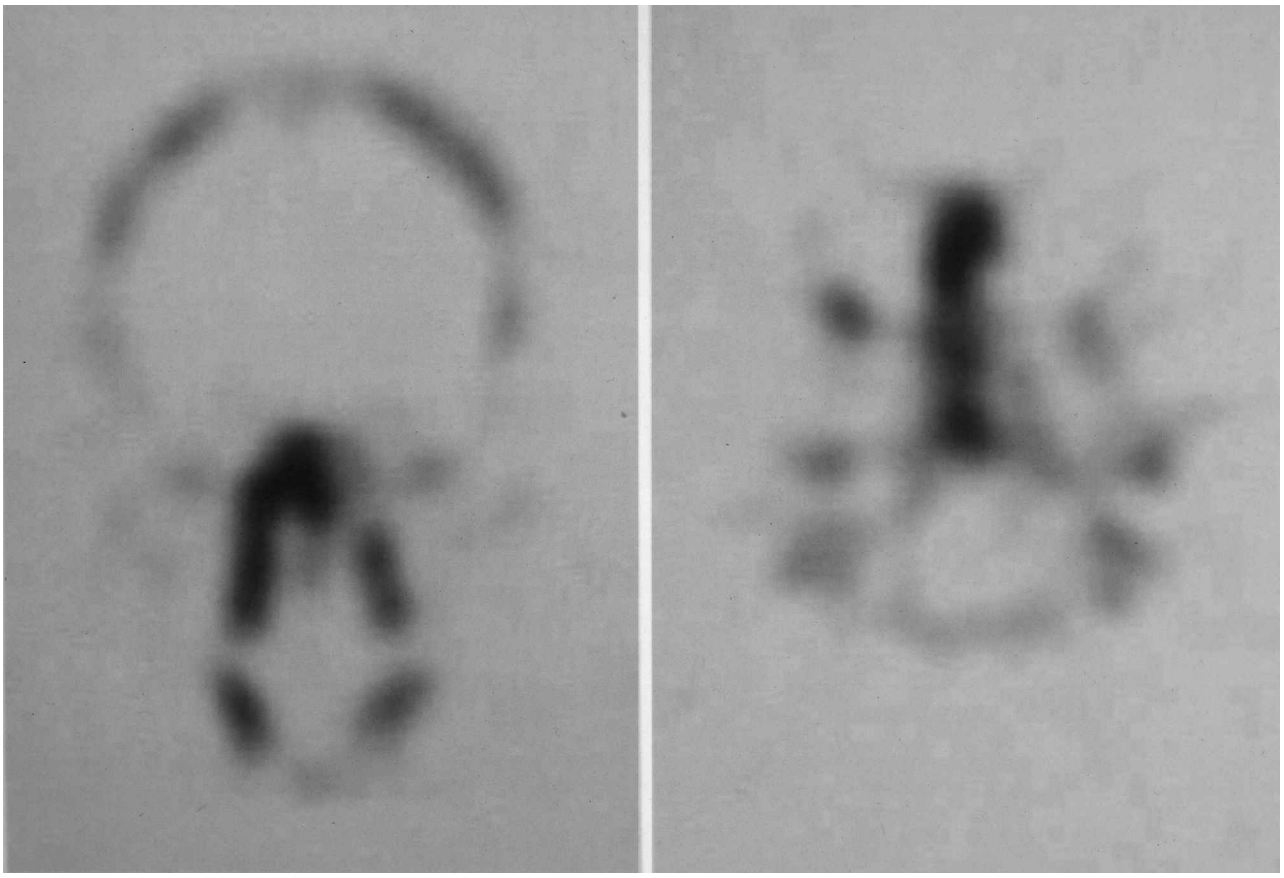

FIG. 3
99mTc-MDP bone single photon emission CT scan. Uptake of radioisotope was increased in the right nasal cavity, maxillary sinus, ethmoid sinus, and sphenoid sinus.

The case presented in our report is unique in that it presented with a definitive bony involvement and cervical lymphadenopathy, masquerading as a tumorous condition. In our present case, the involvement of the bone by tuberculosis was demonstrated by ^{99m}Tc-MDP bone SPECT and histological examination of the ethmoid bone. Use of bone SPECT for imaging diagnosis of the sinonasal tuberculosis has not been described previously. The bone SPECT image demonstrated osteomyelitis in the right maxillary and ethmoid. Our result indicated that osteomyelitis associated with sinusitis can be demonstrated by SPECT, and nuclear scintigraphy is applicable as a useful diagnostic tool for the diagnosis of osteomyelitis associated with paranasal sinusitis. The identification of osteomyelitis associated with sinonasal tuberculosis may warrant the more aggressive removal of the infected bone at the time of operation.[4]

To our knowledge, CT and MRI findings of sinonasal tuberculosis have not been described in previous reports.[8] In our case, CT showed soft tissue filling densities in the right maxillary and ethmoid sinuses. It also revealed the destroyed right middle turbinate and partial defect in the right lamina papyracea. MRI further demonstrated hyperintense filling signals in the right nasal cavity, maxillary, ethmoid, and sphenoid sinuses with focal bony destruction and necrotic cervical lymph nodes. From the imaging point of view, these findings must be differentiated from those of fungal sinusitis or a cancerous lesion with neck metastasis. However, the tissue diagnosis was confirmed as sinonasal tuberculosis with cervical lymphadenopathy. Thus, although nasal tuberculosis is rare, it can be suggested that sinonasal tuberculosis must be considered when a unilateral sinus lesion combined with cervical lymphadenopathy is found in an imaging study. Moreover, with the increasing incidence of tuberculosis, particularly in an HIV epidemic area, we should put nasal tuberculosis higher on our list of differential diagnosis of all granulomatous nasal lesions.

References

1 Butt AA. Nasal tuberculosis in the 20th century. *Am J Med Sci* 1997;**313**:332–5
2 Johnson IJM, Soames JV, Marshall HF. Nasal tuberculosis – an increasing problem? *J Laryngol Otol* 1995;**109**:326–7
3 Wadman SR, Levine HL, Sebek BA, Parker W, Tucker HM. Nasal tuberculosis: a forgotten entity. *Laryngoscope* 1981;**91**:11–6
4 Mahindra S, Bais AS, Sohail MA, Maheshwari HB. Granulomatous osteomyelitis of the maxillary sinus. *J Otolaryngol* 1979;**8**:255–8
5 Cleary K, Baksakis JG. Mycobacterial disease of the head and neck: current perspective. *Ann Otol Rhinol Laryngol* 1996;**104**:830–3
6 Cantwell MF, Snider DE, Cauther GM, Onrato IM. Epidemiology of tuberculosis in the United States, 1985 through 1992. *Am Med Assoc* 1994;**272**:535–9
7 Choi YC, Park YS, Jeon EJ, Song SH. The disappeared disease: tuberculosis of the nasal septum. *Rhinology* 2000;**38**:90–2
8 Baril L, Caumes E, Truffot-Pernot C, Bricaire F, Grosset J, Gentilini M. Tuberculosis caused by *Mycobacterium africanum* associated with involvement of the upper and lower respiratory tract, skin, and mucosa. *Clin Infect Dis* 1995;**21**:653–5

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