

Malignant lymphoma with the MRI findings mimicking inflammatory disease: a case report

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Abstract

Malignant lymphomas of the paranasal sinuses, which have a minimal tendency for invasion but considerable necrosis, may be misdiagnosed as an inflammatory disease, based on MRI and clinical findings. In cases where a thorough physical examination does not rule out a malignant lymphoma, an endoscopic biopsy should be immediately considered.

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RUNNING TITLE Lymphoma mimicking inflammatory disease

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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CONFLICTS OF INTEREST

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KEYWORDS

malignant lymphoma, paranasal tumor, magnetic resonance imaging, computed tomography, apparent diffusion coefficient

KEY CLINICAL MESSAGE

Malignant lymphomas of the paranasal sinuses, which have a minimal tendency for invasion but considerable necrosis, may be misdiagnosed as an inflammatory disease, based on MRI and clinical findings. In cases where a thorough physical examination does not rule out a malignant lymphoma, an endoscopic biopsy should be immediately considered.

INTRODUCTION

Malignant lymphomas of the paranasal sinuses present with few symptoms during the early stages. Thus, imaging studies are beneficial for their diagnosis. Magnetic resonance imaging (MRI), which has a higher density resolution than that of computed tomography (CT), is useful for diagnosing paranasal tumors.

We encountered a case of malignant lymphoma of the maxillary sinus in which CT findings suggested malignancy but MRI findings suggested an inflammatory disease.

CASE REPORT

Ethical approval for this case report was obtained from the institutional review board of the Tokai University Hospital (approval number 21R-269). The study was conducted in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki). The institutional review board was responsible for anonymizing the patients, and the requirement for informed consent was waived.

A 51-year-old man visited our clinic with the chief complaint of right cheek pain. The right middle meatus was edematous and closed, and bloody rhinorrhea was observed (Fig. 1). The Papanicolaou classification of nasal cytology was Class III (Cytology suggestive of, but not conclusive for, malignancy) and CT revealed a right maxillary sinus shadow with a partial bony defect, suggesting a malignant disease (Fig. 2ab). However, MRI revealed an internally homogeneous lesion without contrast effect. It exhibited low signal intensity on T1 and T2, and no invasion outside the maxillary sinus, thus suggesting an inflammatory disease (Fig. 2cd). Endoscopic right sinus surgery was performed under local anesthesia to improve the right buccal pain via decompression and to confirm the diagnosis. The right maxillary sinus contained a highly viscous mucus reservoir and a large amount of yellowish-white debris. Allergic fungal rhinosinusitis was suspected (Fig. 3ab). The histopathological diagnosis was diffuse large B-cell lymphoma, based on the mucous accumulation and debris from the sinus and its mucosa (Fig. 3cd). The patient underwent radiochemotherapy, attaining disease remission.

DISCUSSION

We reported a case of malignant lymphoma of the paranasal sinuses. Due to its minimally invasive tendency outside the paranasal sinuses and the predominance of necrosis, it can be misdiagnosed as an inflammatory disease based on the clinical and MRI findings.

MRI is beneficial for diagnosing nasal sinus tumors because of its higher-density resolution than that of CT.¹ Moreover, imaging tests are useful for diagnosing early-stage malignant lymphomas of the paranasal sinuses because they present with few symptoms. The CT findings of malignant lymphoma include a geographic or moth-eaten pattern of bone destruction with permeative bone processes.² On MRI, it exhibits internal homogeneity, low- to isointensity on T1, iso- to high-intensity on T2, and faint contrast.³ Additionally, low apparent diffusion coefficient (ADC) values on diffusion-weighted imaging are characteristic of malignant lymphoma.⁴ In this case, CT revealed a moth-eaten pattern of bone destruction; therefore, a malignancy was suspected. However, MRI exhibited nonspecific findings of a malignant lymphoma, and the lesion was confined to the maxillary sinus without mass formation or contrast effect. Therefore, the patient was diagnosed with an inflammatory disease. A radiologist specializing in head and neck regional imaging reinterpreted the MRI retrospectively but did not suspect neoplastic lesions. The lesion had a high ADC value (1.4×10^{-3}

mm²/s). The mucous reservoirs and debris in the maxillary sinus obtained intraoperatively exhibited necrotic findings on histopathology (Fig. 3cd). Malignant lymphoma is typically characterized by diffuse tissue necrosis.⁵ Since the maxillary sinus lesion was predominantly necrotic, the MRI findings were interpreted as manifestations of an inflammatory disease.

Malignant lymphomas of the paranasal sinuses have a minimal tendency for invasion outside the sinuses but have predominant necrosis, and may therefore be misdiagnosed as inflammatory diseases based on the clinical and MRI findings.

CONCLUSION

MRI is generally useful for diagnosing a malignant lymphoma of the paranasal sinuses. However, in cases with severe necrosis, it may result in the misdiagnosis of these lymphomas as an inflammatory disease; therefore, the imaging results should be interpreted carefully. An endoscopic biopsy should be considered during the early stages in cases where a malignant lymphoma cannot be definitively ruled out.

AUTHOR CONTRIBUTION

All authors revised the manuscript, approved the manuscript to be published, and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of the work are appropriately investigated and resolved.

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CONFLICTS OF INTEREST

The authors have no funding, financial relationships, or conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in [repository name e.g “figshare”] at [http://doi.org/\[doi\]](http://doi.org/[doi]), reference number [reference number].

REFERENCES

1. Ikeda K, Tanno N, Suzuki H, Oshima T, Kano S, Takasaka T. Unilateral sinonasal disease without bone destruction. Differential diagnosis using diagnostic imaging and endonasal endoscopic biopsy. *Arch Otolaryngol Head Neck Surg.* 1997;123(2):198-200.
2. Madewell JE, Ragsdale BD, Sweet DE. Radiologic and pathologic analysis of solitary bone lesions. Part 1: internal margins⁷. *Radiol Clin North Am.* 1981;19(4):715-48.
3. Gufler H, Laubenberger J, Gerling J, Nesbitt E, Kommerell G, Langer M. MRI of lymphomas of the orbits and the paranasal sinuses. *J Comput Assist Tomogr.* 1997;21(6):887-91. doi:10.1097/00004728-199711000-00007.
4. Maeda M, Kato H, Sakuma H, Maier SE, Takeda K. Usefulness of the apparent diffusion coefficient in line scan diffusion-weighted imaging for distinguishing between squamous cell carcinomas and malignant lymphomas of the head and neck. *AJNR Am J Neuroradiol.* 2005;26(5):1186-92.
5. Kojya S, Itokazu T, Maeshiro N, et al. Lethal midline granuloma in Okinawa with special emphasis on polymorphic reticulosis. *Jpn J Cancer Res.* 1994;85(4):384-88. doi:10.1111/j.1349-7006.1994.tb02371.x.

FIGURE LEGENDS

Figure 1.

Initial endoscopic examination revealed edematous obstruction of the right middle meatus, and bloody rhinorrhea.

UP, unciate process; MT, middle turbinate; IT, inferior turbinate; NS, nasal septum

Figure 2.

Initial computed tomography revealed a right maxillary sinus shadow with moth-eaten pattern of bone destruction (a, b; yellow arrows).

Gadolinium-enhanced, T1-weighted magnetic resonance imaging revealed an internally homogeneous low lesion without contrast effect and no invasion outside the maxillary sinus, predominantly indicative of an inflammatory disease (c, d; *).

Figure 3.

a, b: Intraoperative findings

A large amount of yellowish-white debris was found in the right maxillary sinus (ab: yellow arrow), and part of the maxillary sinus mucosa exhibited pathological edema (a: white triangle).

c: Photomicrograph of the biopsy specimen of the maxillary sinus mucosa (a: white triangle, hematoxylin and eosin, $\times 2$)

Most tissue exhibited granulomatous changes and necrosis, with some atypically large lymphocytes.

d: Photomicrograph of the biopsy specimen of mucous accumulation and debris obtained from the maxillary sinus (ab: yellow arrow, hematoxylin and eosin, $\times 10$)

The tissue was predominantly necrotic. Some of it contained large transformed lymphoid cells with vesicular nuclei and prominent nucleoli, suggestive of diffuse large B-cell lymphoma.

MS, maxillary sinus; IT, inferior turbinate; NS, nasal septum; HE, hematoxylin and eosin.



