

## Case Report

# MRI Imaging of Simultaneously Developed Endogenous Endophthalmitis and Brain Abscesses

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Endogenous endophthalmitis is rare and refers to an intraocular inflammatory process that may result from exogenous or endogenous causes. Magnetic resonance imaging (MRI) is useful for diagnosing endophthalmitis, and valuable to reach the diagnosis of brain abscess. We report here the MR findings of simultaneously developed endogenous endophthalmitis and brain abscesses.

**Index words :** Endophthalmitis · Brain abscess · Magnetic resonance (MR)

## INTRODUCTION

Endophthalmitis refers to an intraocular inflammatory process that may result from exogenous (primary, postoperative, post-traumatic, infection) or endogenous causes (1). Endogenous endophthalmitis is rare, accounting for 2 to 8% of all case of endophthalmitis and results from hematogenous bacterial spread (1).

*Staphylococcus aureus* is the most common pathogenic cause of bacterial endogenous ophthalmitis in the West (1), while *Klebsiella pneumoniae* is the most common pathogen in the East (2). In the Western literature, the most common non-ocular source of infections are endocarditis, urinary tract infection, meningitis, and wound infection. In contrast, most cases of endogenous endophthalmitis in the East arise from liver abscesses (1-3).

We report a case of simultaneously developed

endogenous endophthalmitis and brain abscesses, especially focused on magnetic resonance imaging (MRI) findings.

## CASE REPORT

A 55-year-old man with poorly controlled diabetes mellitus was admitted to a local hospital for the management of upper respiratory infection symptoms and nonsense talking. His illness was diagnosed as bacterial meningitis by cell count analysis of cerebrospinal fluid (CSF). The patient's symptoms improved during antibiotic treatment. However, three days before transfer to our hospital, the patient developed blurred vision in his right eye, which rapidly progressed to blindness. He was transferred to our hospital, where an MRI scan was performed.

A T2-weighted image (GE Signa EXCITE 1.5T MRI; TR 4,000 ms; TE 106 ms; FOV 210 × 210 mm; slice thickness 5 mm) showed multiple hyperintensities in both cerebral hemispheres, all of which had rim enhancement visible on gadolinium-enhanced T1-weighted images (TR 700 ms; TE 12 ms, Fig. 1a, b). Almost of above-mentioned hyperintensities were observed on diffusion-weighted image (DWI, b value

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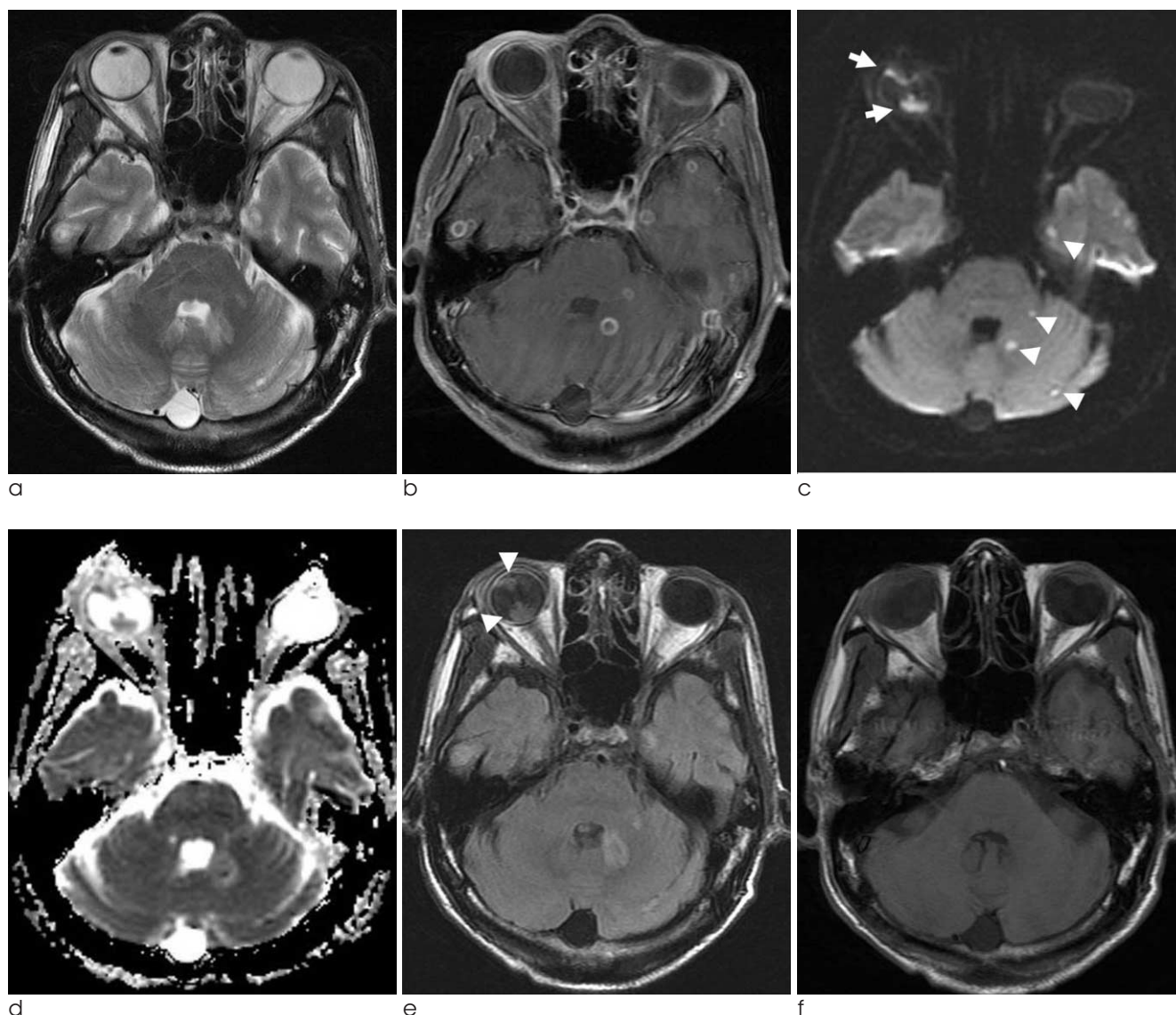
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1000s/mm<sup>2</sup>) with corresponding hypointensity on apparent diffusion coefficient (ADC) mapping (Fig. 1c, d). Hyperintensity was observed in the right globe in DWI and fluid attenuated inversion recovery (FLAIR, TR 8000 ms; TE 140 ms; TI 2500 ms; flip angle 90 degree) images, with corresponding hypointensity on ADC mapping (Fig. 1c, d, e). A T1-weighted image (TR 600 ms; TE 11 ms) showed subtle heterogeneous signal intensity in the right globe (Fig. 1f).

Laboratory tests were negative for CSF and urine cultures; however, a blood culture showed growth of *Klebsiella pneumoniae*. Based on these results, a provisional diagnosis of endogenous endophthalmitis resulting from a *Klebsiella pneumoniae*-induced brain abscess was made. Seven days after aggressive intravenous antibiotics treatment, the patient's condition improved, although the blindness in the right eye persisted. We recommended an abdominal



**Fig. 1.** Endogenous ophthalmitis and brain abscess.

- a. An axial T2-weighted image shows a subtle heterogeneous intensity in the right globe.
- b. A gadolinium-enhanced T1-weighted image reveals multifocal rim enhancements that suggests brain abscess.
- c. Axial DWI shows hyperintensity in the right globe (arrows) and multifocal hyperintensities in both the cerebral and cerebellar hemispheres (arrowheads).
- d. Axial ADC map shows corresponding hypointensities in DWI.
- e. A FLAIR image shows the suppressed signal of the vitreous humor and hyperintensity in the right globe (arrowheads).
- f. A T1-weighted image shows subtle heterogeneous signal in the right globe.

CT for evaluation of a liver abscess, but he refused. The patient was discharged three days after admission.

## DISCUSSION

MRI is a useful imaging modality to diagnose endophthalmitis, with DWI, ADC and FLAIR being particularly effective. Because of globe hyperintensity on DWI and corresponding hypointensity on ADC mapping are suggesting intra-ocular or subretinal abscess formation (4), they are useful factors for the diagnosis of endogenous endophthalmitis, and hyperintensity on FLAIR imaging also suggests endogenous endophthalmitis. Although the best imaging tool for diagnosis of brain abscess (5), gadolinium-enhanced T1-weighted imaging is useless in the diagnosis of endophthalmitis because of the vitreous humor is avascular and an intravitreal abscess may not produce an enhancing wall before the occurrence of inflammatory neovascularization (4, 6). In the current case, as mentioned above, DWI, ADC and FLAIR sequences were useful for diagnosing endophthalmitis, and DWI and ADC were also valuable to reach the diagnosis of brain abscess. To our knowledge, imaging findings of bacterial endophthalmitis with brain abscess have been reported several times in English (7-9). However, this is the first report of imaging findings of simultaneously developed bacterial endophthalmitis with brain

abscess on DWI and ADC. Therefore, this report will be a valuable case to illustrate the usefulness of DWI and ADC sequences for the diagnosis of simultaneously developed bacterial endophthalmitis with brain abscess.

## References

1. Okada AA, Johnson RP, Liles Wc, D'Amico DJ, Baker AS. Endogenous bacterial endophthalmitis: report of a ten-year retrospective study. *Ophthalmology* 1994;101:832-838
2. Wong JS, Chan TK, Lee HM, Chee SP. Endogenous bacterial endophthalmitis: an east asia experience and a reappraisal of a severe ocular affliction. *Ophthalmology* 2000;107:1483-1491
3. Greenwald MJ, Wohl LG, Sell CH. Metastatic bacterial endophthalmitis: a contemporary reappraisal. *Surv Ophthalmol* 1986;31:81-101
4. Seale M, Lee WK, Daffy J, Tan Y, Trost N. Fulminant endogenous Klebsiella pneumoniae endophthalmitis: imaging findings. *Emerg Radiol* 2007;13:209-212
5. Osborn AG. Diagnostic imaging brain. *Amirsys* 2004;I-8:24-27
6. Rumboldt Z, Moses C, Wiczerzynski U, Saini R. Diffusion-weighted imaging, apparent diffusion coefficients, and fluid-attenuated inversion recovery MR imaging in endophthalmitis. *AJNR Am J Neuroradiol* 2005;26:1869-1872
7. Matsushita M, Hajiro K, Okazaki K, Takakuwa M, Nishio A. Endophthalmitis with brain, lung, and liver abscesses associated with an occult colon cancer. *Am J Gastroenterol* 2000;95:3664-3665
8. Yang CS, Tsai HY, Sung CS, Lin KH, Lee FL, Hsu WM. Endogenous Klebsiella endophthalmitis associated with pyogenic liver abscess. *Ophthalmology* 2007;114:876-880
9. Lee CC, Chen CY, Chen FH, Zimmerman RA, Hsiao HS. Septic metastatic endophthalmitis from Klebsiella pneumoniae liver abscess: CT and MR imaging characteristics-report of three cases. *Radiology* 1998;207:411-416

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## 동시에 병발한 내인성안구염과 뇌농양의 자기공명영상

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내인성안구염은 외부 혹은 내부의 원인으로 인한 안구 내의 염증반응으로 생기는 드문 질환이다. 자기공명영상은 안구염의 진단과 뇌농양의 진단에 모두 유용한 것으로 알려져 있다. 저자들은 내인성안구염과 함께 뇌농양이 동시에 병발된 예가 있어 자기공명영상 소견과 함께 보고하고자 한다.