The usefulness of gadolinium-enhanced MRI in acute invasive fungal rhinosinusitis

Ji Heui Kim¹, Byung Chul Kang¹, Jung-Hyun Lee², Yong Ju Jang¹, Bong-Jae Lee¹, Yoo-Sam Chung¹

¹Department of Otolaryngology, Asan Medical Center, University of Ulsan College of Medicine, 88 Olympic-ro 43-gil, Songpa-gu, Seoul 138-736, Republic of Korea
²Department of Radiology, Asan Medical Center, University of Ulsan College of Medicine, 88 Olympic-ro 43-gil, Songpa-gu, Seoul 138-736, Republic of Korea

Objectives: This study aimed to assess the usefulness of gadolinium (Gd)-enhanced magnetic resonance imaging (MRI) in acute invasive fungal rhinosinusitis (AIFRS) and offer recommendations for determining surgical extent based on loss of contrast enhancement (LoCE), which reveals tissue ischemia from fungal invasion.

Methods: Preoperative and postoperative Gd-enhanced MRI was evaluated in 21 patients with confirmed AIFRS who underwent wide debridement and antifungal therapy. Patients were subdivided by AIFRS-specific survival. LoCE and contrast enhancement (CE) of intrasinonasal and extrasinonasal sites in preoperative and postoperative MRI were compared between the two groups.

Results: All patients had preoperative intrasinonasal LoCE and CE lesions, which did not differ between survivors and non-survivors. Bone destruction on CT was detected in 8 of 16 survivors (50%) and 4 of 5 non-survivors (80%). Intrasinonasal LoCE lesions were completely removed by surgery in all cases. Postoperative extrasinonasal LoCE lesions were found in all non-survivors but no survivors (p < 0.001). However, postoperative intrasinonasal and extrasinonasal CE lesions were detected in both survivors and non-survivors (p = 0.119 and p = 0.111, respectively). In addition, remission of hematologic diseases at the time of diagnosis of AIFRS and blood sugar control in diabetic patients were significantly associated with AIFRS-specific survival (p = 0.028 and p = 0.023, respectively).

Conclusions: LoCE lesions, which have to be surgically removed, should be screened using Gd-enhanced MRI for an earlier diagnosis of AIFRS, determination of surgical extent, and management of follow-up. Remnant LoCE lesions after surgery, active hematologic diseases, and poorly controlled blood sugar adversely affect the AIFRS-survival.