THE USEFULNESS OF DIFFUSION-WEIGHTED IMAGING (DWI) AND APPARENT DIFFUSION COEFFICIENT (ADC) VALUE FOR THE DIAGNOSIS AND THE ASSESSMENT OF THE THERAPEUTIC EFFECT ON AUTOIMMUNE PANCREATITIS (AIP)

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Problem
It is difficult to differentiate between mass-forming autoimmune pancreatitis (AIP) and pancreatic carcinoma. DWI may be useful for identifying mass-forming AIP and pancreatic carcinoma, and the ADC value of DWI may be a quantitative evaluation method for the differentiation of them and the assessment of the severity of AIP. We retrospectively compared the ADC values of healthy pancreatic parenchyma, IgG4-related AIP, IgG4-negative AIP with normal serum IgG4 levels and pancreatic carcinoma and investigated their usefulness in the follow-up of patients with IgG4-related AIP during steroid therapy.

Methods
We enrolled 35 subjects with normal pancreas, 17 patients with AIP (IgG4-related AIP: 10, IgG4-negative AIP: 7), 27 patients with pancreatic carcinoma and one patient with malignant lymphoma, and we used a 1.5-T MR scanner with an 8-channel phased array body coil. Free-breathing single shot spin-echo based diffusion-weighted images in the axial plane were acquired at TR 6000 ms, TE 74 ms, FOV 280x350 mm, matrix 128x192, slice thickness 6 mm, b-value 1000 s/mm², 6 acquisitions. We computed ADC maps with manufacturer-supplied software and placed regions of interest on the pancreatic parenchyma of normal subjects and on pancreatic lesions. Mean ADC values were compared among normal pancreatic parenchyma, IgG4-related AIP lesions, IgG4-negative AIP lesions, carcinomas and malignant lymphoma. Follow-up analysis using ADC values of AIP lesions and serum IgG4 levels in 6 patients with IgG4-related AIP was performed during steroid therapy.

Results
The median ADC values of healthy pancreatic parenchyma, pancreatic lesions of IgG4-related AIP, IgG4-negative AIP and carcinoma were 1.56x10⁻³ mm²/sec (range, 1.09-2.06x10⁻³), 1.06x10⁻³ mm²/sec (0.92-1.23x10⁻³), 0.99x10⁻³ mm²/sec (0.85-1.25x10⁻³), and 1.20x10⁻³ mm²/sec (0.90-1.72x10⁻³), respectively; they were significantly lower in AIP lesions and carcinomas than normal pancreatic parenchyma (p < 0.001, each). Although the ADC values were significantly lower in IgG4-related AIP, IgG4-negative AIP lesions than carcinoma (p = 0.007 and 0.005, respectively), there was considerable overlap (Fig.1). During steroid therapy, ADC values increased in a week in all 6 patients with IgG4-related AIP (Fig.2) while serum IgG4 decreased in only 3 patients.

Conclusion
ADC values of DWI may be useful for differentiating between AIP and malignant pancreatic tumors and for assessing the effect of steroid therapy in patients with IgG4-related AIP.

References

Fig.1 Comparison of mean ADC values among healthy pancreatic parenchyma, IgG4-related AIP, IgG4-negative AIP, pancreatic carcinoma and malignant lymphoma.

Fig.2 Changes of ADC value in IgG4-related AIP lesions during steroid therapy.