

Efficacy of Pattern Recognition of Early Detect and Late Enhancement in Cardiomyopathy

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Purpose

First pass perfusion and late enhancement is used in MRI as a diagnostic tool in various myocardial pathologies such as fibrosis, edema and inflammation. The purpose was to evaluate the efficacy of pattern recognition of early detect and late enhancement in cardiomyopathy, based on our own cases as well as literary consideration.

Methods

The system used were 1.5T MRI (EXCELART; Toshiba, Tokyo). For the functional assessment, FFE-EPI for cardiac perfusion and IR Segmented FFE for late enhancement were used. And Parallel Imaging method was used to enhance clinical efficacy. Early Defect (ED) and Late Enhancement (LE) images acquired. The subjects were 26 patients with cardiomyopathies such as Dilated Cardiomyopathy (5), Hypertrophic Cardiomyopathy (6), Sarcoidosis (3), Non-compaction of the ventricular myocardium (4), Tako-tsubo Cardiomyopathy (8) and 14 patients with myocardial infarction. Pharmacological stress and rest perfusion MRI and late enhancement were performed.

Results

Pattern was recognized as below; 1) Early Defect(Fig.1): Mid-Wall(DCM,HCM), Epicardial(Sarcoidosis), Subendocardial-Endocardial(Sarcoidosis,Non-compaction,HCM, Tako-tsubo), 2) Late Enhancement(Fig.2): Mid-wall(DCM,HCM,Sarcoidosis,Tako-tsubo), Epicardial(Sarcoidosis), Subendocardial-Endocardial(Sarcoidosis,Non-compaction)

Discussion

Rest and pharmacological stressed perfusion MRI is a very useful tool to assess the intramural microvascular circulation. Furthermore late enhancement is useful to assess the fibrosis, edema, granulation tissue and inflammation of cardiac muscle. First pass perfusion and late enhancement may provide important information for cardiomyopathy. By perfusion MRI, transmural microvascular circulation impairment was suggested in various kinds of cardiomyopathies. Heart muscle tissues that lost viability such as fibrosis are considered intensely stained by late enhancement imaging. Although there has been no report on the histopathological meaning of late enhancement seen in cardiomyopathy investigated by direct comparison with the pathological tissue, its clinical meaning was presented in several reports, and the meaning may become clearer in the near future. Ischemic heart disease and non-ischemic cardiomyopathies are distinguished by recognizing the pattern of early defect and late enhancement. Shah and Mahrholdt et al have already reported the pattern of late enhancement in cardiomyopathies. Combination of early defect and late enhancement pattern recognition is more useful for the diagnosis of cardiomyopathies.

Conclusion

Pattern recognition of perfusion MRI and late enhancement is considered to be very useful for diagnosis and follow-up of cardiomyopathy, and predicting the prognosis.

References

- [1] Mahrholdt H et al. Delayed enhancement cardiovascular magnetic resonance assessment of non-ischaemic cardiomyopathies. *Eur Heart J*, 26: 1461-1474, 2005., [2] Shah *et al.* In: Edelman RR, *et al.*, eds. *Clinical Magnetic Resonance Imaging*, 3rd ed. New York: Elsevier Press; 2005. [3] J.Bogaert and A.M.Taylor, *Clinical Cardiac MRI*, Springer-Verlag Berlin Heidelberg 2005, pp218

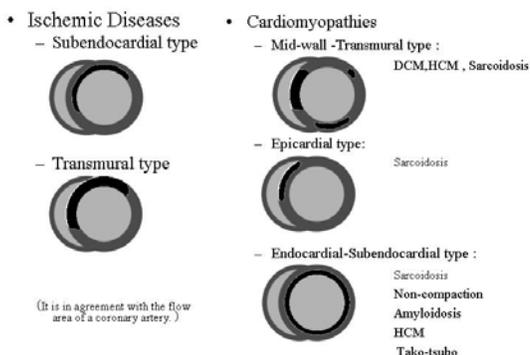


Fig.1. Early Defect Patterns During First-pass Perfusion

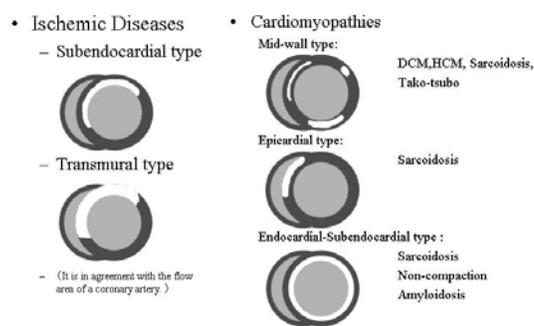


Fig.2. Late Enhancement Patterns