Clinical Implication of Mitral Valve Geometry Alterations in Children with Dilated Cardiomyopathy

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Introduction:
Functional mitral regurgitation (MR) severity is associated with poor prognosis in children with dilated cardiomyopathy (DCM), and surgical intervention for severe functional MR has been reported. In adult patients, preoperative assessment of mitral valve geometry predicts mitral valve durability after annuloplasty and valvuloplasty. However, few studies have described mitral valve geometry alteration in children with DCM. We aimed to elucidate the relationship between mitral valve geometry and clinical characteristics in children with DCM.

Methods:
The medical records of 14 children with DCM were reviewed. Mitral valve geometry was evaluated by measuring coaptation depth (CD) using echocardiographic images of apical four-chamber view at the initial presentation. The patients were grouped into the DCM with moderate or severe functional MR (DCM group A, n = 5) and DCM with less than moderate functional MR (DCM group B, n = 9) groups. Measurements of 44 healthy children were used as normal controls. Analysis of covariance (ANCOVA) was performed to evaluate mitral valve geometry differences between groups.

Results:
The median age of the patients with DCM was 1.2 years (range, 0.4–12.3 years). The figure shows the scatter plots of CD according to log-transformed body surface area (BSA). Both DCM groups showed significantly increased CD compared to the control group (p < 0.0001, ANCOVA). In addition, there was a significant difference in CD between DCM group A and DCM group B (p < 0.001, ANCOVA). Mitral repair was performed in three of the patients in DCM group A at a median 15 days (range, 13–113 days) after the initial presentation. The mitral repair led to the improved MR in two patients who were discharged on postoperative days 75 and 109. In the other patient, who showed the largest CD, the mitral repair failed to alleviate the MR, so mitral valve replacement was subsequently performed.

Conclusions:
There was a significant mitral valve geometry alteration in children with DCM. The BSA-adjusted assessment of CD might be predictive of mitral repair efficacy and useful in determining the need for mitral valve replacement.