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Interest of three-dimensional echocardiography for the assessment of bicuspid aortic valve in children

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INTRODUCTION: Bicuspid aortic valve (BAV) is the most common congenital heart defect. Children with BAV are more likely to have valve dysfunction and to require intervention during childhood. According to the subtype of BAV, prognosis and treatment may be different.The aim of this study was to assess the accuracy of 3D echocardiography (3DE) in order to diagnose BAV and to depict accurately the leaflets morphology. METHODS: 72 consecutive children with suspicion of BAV were included in a prospective monocentric study. 2DE and 3DE images were analyzed separately by two confirmed pediatric cardiologists in order to assess BAV. We compared 2DE and 3DE for the description of the spatial position of cusps and raphes. The association with aortic aneurysms, aortic coarctation, aortic valve insufficiency or stenosis and other cardiac malformation were also reported. RESULTS: The median age was 6.3 (±5.5) years. Using 3DE, BAV was not found in 11.1 [CI 95%, 5.0-20.7] of suspected patients on 2DE. For 22 patients (34.4%) [CI 95%, 22.9-47.3], 3DE allowed a better visualization of the leaflets morphology leading to a reclassification of the BAV. There was a moderate correlation (κ=0.57) between 2DE and 3DE for the classification of BAV according to the raphe localization. Inter-observer variability is almost null (κ =0.93). Mean time acquisition of 3DE was 2.3 minutes.
CONCLUSION: 3DE is a simple, rapid and reliable method for the diagnosis and the accurate description of BAV in children. This technique may be particularly helpful in order to precise the prognosis or to guide the surgeon.