海外招請講演

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Congenital aortic valve repair and fluid dynamics in congenital aortic valve lesions

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[II-IL-07]Congenital aortic valve repair and fluid dynamics in congenital aortic valve lesions

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Aortic valve disease is the by far the most common native and postoperative cardiac valve lesion presenting in children and adults with congenital heart defects. Aside from native valve dysplasia, primarily in the form of bicuspid or unicuspid disease, the population with systemic semilunar valve dysfunction after repair of cono-truncal lesion is steadily growing. Given the young, sometime neonatal, age at onset therapeutic solutions are destined to be palliative in nature. For the very same reason, survival and functional outcome are expected to accommodate growth, education, employment, pregnancy and physical activity. Surgical management of aortic valve disease, native or recurrent, has clearly shifted from replacement to reparative strategies. Due to improved understanding of systemic semilunar valve pathophysiology, repair techniques have matured into reproducible and dependable therapies in aortic regurgitation and in select cases of stenosis or mixed disease. Institutional experience over the last 14 years shows that repair is associated with negligible early and late mortality and satisfactory freedom from cardiac reintervention. Considering the physiological quality of life and the preservation of subsequent replacement strategies (surgical, catheter-based), repair should be considered the gold standard for management of young patients with congenital aortic valve disease. Recently, progress in the field of bioengineering, in particular computational fluid dynamics (CFD), using geometric meshes derived from in vivo imaging techniques (MRI, CT) and finite element mathematical computation, has resulted in further understanding of cardiovascular pathophysiology. This has allowed definition of the complex interaction between congenital aortic or systemic semilunar valve disease and ascending aortic lesions, enhancing the ability to plan repair strategies and to predict late functional outcome.