Editorial

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Commentary on "Growth plate extracellular matrix defects and short stature in children"

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A growth plate is a location of linear growth.[1] The pathophysiology of impaired chondrogenesis and differentiation in osteocyte alignment of children with short stature were revealed by recent studies focused on the abnormal function of the growth plate cartilage.[2] Growth plate dysfunction has been linked to generalized systemic illness, systemic corticosteroid use, endocrine disorders, or various genetic dysmorphisms including mild to severe skeletal dysplasias.[3,4]

This study mentioned International Classification of Pediatric Endocrine Diagnosis of short stature into 1A, 1B, and 1C.[5] Of these, 1A is a primary growth failure that consists of clinically defined syndromes (1A.1), small for gestational age with failure of catch-up growth (1A.2), and skeletal dysplasias (1A.3).[6] 1B is secondary growth failure due to insufficient nutrient intake (1B.1), disorders in organ systems other than skeletal (1B.2), growth hormone deficiency (1B.3), other disorders of the growth hormone-IGF axis (1B.4), other endocrine disorders associated with short stature (1B.5), metabolic disorders (1B.6), psychosocial disorders (1B.7), and iatrogenic causes of short stature (1B.8). 1C is idiopathic short stature also called normal variant short stature, or non-GH-deficient short stature. 1C is composed of familial idiopathic short stature and nonfamilial idiopathic short stature. However, technically, we are seeing increased reports in variants of genetic mutations causing growth failure in children with idiopathic short stature who are not syndromic.[7] Children have been misdiagnosed with idiopathic short stature, although it is uncommon. They could having genetic mutations because of technological breakthroughs for the diagnosis of molecular genetic abnormalities.[8]

Many factors may cause growth failure resulting in short stature.[9] Among these, factors that influence chondrogenesis in the cartilaginous structure between the metaphysis and epiphysis (growth plate) are main determinants of linear growth.[2] Cartilage extracellular matrix is important in the growth plate because of its critical structural support of chondrocytes. Also, this extracellular matrix is a medium in which signaling molecules and growth factors spread to a target. In addition, mutations in intracellular signaling have been identified to markedly affect the growth plate.[2] Single-nucleotide polymorphisms leading to mild abnormalities can cause height variation, while mutations causing more serious abnormalities in the same gene might cause crucial growth disorders.[10,11] Combined polymorphisms in these genes could be distinct oligo/polygenic causes of growth failure.

For these reasons, clinicians should identify causative genes of children with growth failure to allow individualized diagnosis and management.

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