

Segmental Hypoplasia of the Vertebral Body : Classification and Patterns of Associated Disc Degeneration

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Purpose: We wish to classify the type of vertebral hypoplasia and investigate the prevalence and the patterns of associated disc degeneration.

Materials and Method: We retrospectively reviewed the sagittal and axial MR images of spine in 34 young adults under 35yrs with vertebral hypoplasia(8 women: 26 men, mean age: 27.1, age range: 17- 35years, exclude older age group to reduce bias). Using our definition of vertebral hypoplasia(smaller AP diameter of lower vertebral body than that of upper on sagittal MR image), four distinct entities were recognized based on radiography so that we can classify the vertebral hypoplasia into 2 major types and 2 minor subtypes(type I; hypoplasia involving single vertebral body, type II; hypoplasia involving serial lower segmental vertebral bodies, subtype a; hypoplastic body located anteriorly along anterior spinal line, b; hypoplastic body located posteriorly along posterior spinal line). We investigate pattern of associated disc degeneration (prevalence, location of disc degeneration; anterior, posterior or diffuse and direction of disc herniation; anteriorly, posteriorly or bilaterally).

Results: Among 34 patients, three different types were observed. Those were type IIa(hypoplasia involving serial lower vertebral bodies and hypoplastic bodies located anteriorly along anterior spinal line, n= 29), type Ia(hypoplasia involving single vertebral body and hypoplastic body located anteriorly along anterior spinal line, n= 3) and type IIb(hypoplasia involving serial lower vertebral bodies and hypoplastic bodies located posteriorly along posterior spinal line, n= 2). Of the 29 patients of type IIa, anterior disc degeneration was found in 0/29, posterior disc degeneration in 8/29, diffuse disc degeneration in 21/29 and all patients(29/29) showed posterior disc herniation. Among the 3 patients of type Ia, diffuse disc degeneration were found both upper and lower disc level(3/3) and all(3/3) showed posterior disc herniation. In 2 patients of type IIb, diffuse disc degeneration and both direction of disc herniation were found.

Conclusion: Vertebral hypoplasia can be a causative factor of early onset degenerative disc disease. Identifying the exact pattern of vertebral hypoplasia, we can predict vulnerable portion of disc for degeneration. The efforts of the clinician may be focused on those areas susceptible to disc degeneration.