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Association of MRI-defined lumbar paraspinal muscle mass and slip percentage in degenerative and isthmic spondylolisthesis

The objective of this study was to investigate the role of lumbar paraspinal muscles (PSMs) in the progression of different types of spondylolisthesis by examining the correlation between lumbar PSM cross-sectional area (CSA) and slip percentage (SP) in degenerative spondylolisthesis (DS) and isthmic spondylolisthesis (IS). A multicenter retrospective analysis was carried out including 219 subjects diagnosed with lumbar spondylolisthesis. The DS group had 125 subjects and the IS group had 94 subjects. Using T2-weighted axial MRI images, CSAs of the psoas major (PM), multifidus (MU), and erector spinae (ES) were measured and divided by L5 vertebral body (VB) CSA to eliminate biases arising from the physical build of subjects. SP was measured using sagittal T2 weighted images. Correlations between muscle CSA ratio and SP were calculated in each group. Regression analysis was performed to predict the influence of each muscle CSA/VB CSA ratio on SP. No significant correlation was found in the DS group between any of the muscle CSA ratios and SP. Both PM/VB ratio ($r=-0.24$, $p=0.021$) and MU/VB ratio ($r=-0.26$, $p=0.012$) were negatively correlated with SP in the IS group. MU had more influence on SP than PM in the IS group (regression coefficient MU/VB: -8.08, PM/VB: -4.34). Both PM and MU muscle CSA ratios were negatively correlated with SP in the isthmic group. MU had more influence on SP than PM. No muscles had any correlations with SP in the degenerative group. This discrepancy between the two groups suggests exercise programs or interventions intended to prevent progression of IS and DS should be distinguished in clinical practice.

Biography

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