



How is degenerative lumbar scoliosis associated with spinopelvic and lower-extremity alignments in elderly volunteers?

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博士（医学） Jili Wang

論文題目

How is degenerative lumbar scoliosis associated with spinopelvic and lower-extremity alignments in elderly volunteers?

（高齢ボランティアにおいて変性側弯症と脊柱・骨盤および下肢アライメントはどのように関連しているか？）

論文の内容の要旨

[Introduction]

Degenerative lumbar scoliosis (DLS) is the most prevalent three-dimensional deformity and is common among older adults. The alignment of the knee joint is important for lower extremity alignment, and abnormal knee alignment potentially triggers the onset and development of knee osteoarthritis and leads to lower extremity deformity. However, it is still unclear whether the lower extremity alignment compensates for sagittal spinopelvic malalignment associated with DLS. We aimed to clarify the relationship between DLS and whole-body alignment, including spinopelvic and lower extremity alignments.

[Materials and Methods]

The study was approved by Hamamatsu University School of Medicine hospital's institutional review board (IRB No.16-115).

A total of 279 adult volunteers participated in the 2018 Health Screening Program in Toei (Aichi, Japan). The health-related quality of life (HRQOL) was evaluated, including Oswestry Disability Index (ODI), the 25-question Geriatric Locomotive Function Scale (GLFS-25), low back pain, and knee pain were evaluated. And the following radiographic parameters were assessed in the radiographs: C2-sagittal vertical axis (C2-SVA), C7-SVA, T1 pelvic angle (TPA), cervical lordosis (CL), thoracic kyphosis (TK), lumbar lordosis (LL), pelvic incidence (PI), pelvic tilt (PT), sacral slope (SS), PI minus LL (PI-LL), knee angle (KA), ankle angle (AA), and pelvic shift (PS), C7-center sacral vertical line (C7-CSVL); Cobb angle of DLS; L4 tilt; pelvic oblique angle (POA); functional leg-length discrepancy (FLD); femur-tibia angle (FTA); the hip-knee-ankle angle (HKA angle), mechanical lateral distal femoral angle (mLDFA), the mechanical medial proximal tibia angle (mMPTA), the mechanical lateral distal tibia angle (mLDTA), and discrepancy of leg length (DLL). DLS group (Cobb angle of DLS $>10^{\circ}$) and non-DLS group (Cobb angle of DLS $\leq 10^{\circ}$)

[Results]

The radiographic parameters showed that the C2-SVA, C7-SVA, TPA, PI, PT, PI-LL, KA, AA, PS, C7-CSVL, Cobb angle of DLS, L4 tilt, FTA, and HKA in the DLS cases were significantly higher than in the non-DLS cases (all $p < 0.05$). And the DLS cases had significantly lower values of LL and SS ($p < 0.001$ and $p = 0.004$, respectively). The HRQOL and pain scores showed that the ODI and GLFS-25 scores were significantly higher in the DLS cases than in the non-DLS cases ($p = 0.038$ and $p = 0.046$, respectively). After adjustment of baseline data (sex and age) using one-to-one propensity score-matched analysis, DLS group had significantly higher values of C2-SVA, TPA, PI, PT, PI-LL, Cobb angle of DLS, and L4 tilt compared to the non-DLS group (all $p < 0.05$). However, there was no significant difference between the two groups in terms of lower extremity parameters, HRQOL, and pain scores.

[Discussion]

In this study, the prevalence of DLS was 28.7% among community-dwelling adult volunteers, similar to the previous study. However, the prevalence of DLS in our result was higher than in other regions or ethnic (13.3%). Previous reports showed that patients with DLS had poor sagittal and coronal alignment. In this study, our results were consistent with those findings. Moreover, DLS was not associated with the coronal and sagittal lower extremity alignment in elderly volunteers after the one-to-one propensity score-matched analysis. Age and sex might be the main reasons that significantly affect the coronal lower extremity alignment. Furthermore, there was no relationship between DLS and HRQOL or pain scores after the one-to-one propensity score-matched analysis. The DLS cases in this study were all volunteers, and there was no severe coronal malalignment in the DLS group. HRQOL is affected not by DLS but mainly by sagittal spinopelvic malalignment. Therefore, DLS cases with worsened HRQOL need to give priority to the assessment of sagittal spinopelvic alignment among whole-body alignment in daily clinical practice. If surgery is required, the surgeons should perform primarily sagittal spinopelvic alignment correction to improve HRQOL in DLS patients with sagittal spinopelvic malalignment.

[Conclusion]

The etiology of DLS is a significant concern in spinal deformity. Using propensity score-matched analysis, this study showed an important relationship between DLS and sagittal spinal deformity. However, DLS was not associated with the sagittal and coronal lower extremity alignments, HRQOL, and pain scores.