



Long-term effects of diffuse idiopathic skeletal hyperostosis on physical function: A longitudinal analysis

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論文題目

Long-term effects of diffuse idiopathic skeletal hyperostosis on physical function: A longitudinal analysis

(身体機能におけるびまん性特発性骨増殖症の長期的影響－縦断的研究－)

論文の内容の要旨

[Introduction]

Diffuse idiopathic skeletal hyperostosis (DISH) is a condition that causes abnormal calcification (hardening) and growth of ligaments and tendons in the spine and other joints in the body. Most patients with spinal DISH are asymptomatic, and the diagnosis can be confirmed by imaging (X-ray or computed tomography [CT]) of fused ossification of at least four consecutive vertebrae in the spine. The prevalence of DISH is high, statistically at 10.8% (diagnosed by X-ray) and 19.5% (diagnosed by CT); however, its etiology is unknown.

DISH has been reported to be common in older men and its development is closely associated with metabolic syndromes such as obesity, hypertension, and diabetes mellitus. We had reported before that DISH can affect physical function in the elderly population. However, it was based on a cross-sectional study; thus, the long-term progression of DISH and its impact on physical function remain unknown. This longitudinal cohort study aimed to elucidate the progression of DISH and its effects on physical function, health-related quality of life (HRQOL), and spinopelvic parameters.

[Patients and Methods]

We recruited 255 older adults (87 men and 168 women; average age, 71.3 years in 2014) who attended local health checkups in 2014 and 2020. Height, body weight, body mass index (BMI), blood pressure, grip strength, functional reach, and bone mineral density (BMD) were measured. The prevalence, location, the number of ossified contiguous vertebrae, and spinopelvic parameters were estimated using whole-spine standing X-ray. Spinopelvic parameters included: L1–S1 lumbar lordosis (LL), T5–T12 thoracic kyphosis (TK), sacral slope (SS), pelvic tilt (PT), pelvic incidence (PI), sagittal vertical axis (SVA), and T1 pelvic angle (TPA). For the HRQOL assessment, the Oswestry disability index (ODI) and EuroQol-5D (EQ5D) were obtained. We performed a 1:1 case-control study with age and sex-matched participants with and without DISH and analyzed progression over a 6-year period.

This study design was approved by the appropriate ethics review boards at Hamamatsu University School of Medicine (IRB No. 16-115).

[Results]

In 2014, based on the Resnik criteria, 39 of 255 participants were diagnosed with DISH (24 males and 15 females), and the prevalence of DISH by X-ray was 15.3% (27.6% in males, and 8.9% in females). DISH occurred more frequently in the elderly and males, consistent with previous reports. Compared to the 216 patients without DISH, 39 patients with DISH had significantly heavier body weight, higher BMI, greater grip strength, higher BMD in both the lumbar spine and total hip, and greater SVA in 2014. In 2020, 12 (4.7%) participants were newly diagnosed with DISH, and 28 (71.7%) of 39 patients diagnosed in 2014 showed varying degrees of progression. After age- and sex-matched, patients with the condition had higher BMI and lumbar BMD, and larger SVA compared to participants without DISH. Changes in physical function and spinopelvic parameters during the 6-year period did not differ between the groups. However, patients with DISH tended to have greater changes in body weight, BMI, BMD of the total hip, and spinopelvic parameters of PT, LL, TK, and TPA at 6 years.

[Discussion]

There have been numerous reports on DISH in the past and few studies on its progression. Of our 39 DISH patients, 71.7% showed DISH progression for more than 6 years. Therefore, our study has the advantage of a longitudinal, large cohort sample.

Similar to previous reports, patients with DISH were at a higher risk of developing metabolic syndrome. In addition, we observed increased SVA and TPA parameters in DISH patients, suggesting that DISH patients exhibit more sagittal imbalances than controls. There was no significant correlation between DISH and HRQOL, similar to previous studies.

The results of the longitudinal analysis showed no pathological effects of DISH on the deterioration of physical function and spinopelvic parameters. However, there was a tendency for these spinopelvic parameters to deteriorate over 6 years in patients in the DISH group. Many comorbidities, including osteoarthritis, central nervous system disease, osteoporotic fracture, and mental problems, affect the physical function and HRQOL in the elderly. Thus, DISH had little effect on physical function and HRQOL longitudinally.

DISH is a disease with slow lesion progression and mild clinical symptoms, and its pathology tends to progress more slowly than expected. We are currently conducting a 6-year comparison, and the adequacy of this length of time to explore long-term changes in DISH is worth considering. In addition, we did not include patients with severe DISH with surgical indications in our data, and whether there are long-term changes in the indicators in patients with severe DISH is another aspect that needs to be explored. However, we showed the longitudinal progression of DISH and its relationship with physical function, HRQOL, and spinopelvic parameters in a large

cohort sample. These findings are crucial for clarifying the natural history of DISH and its effect on locomotive disorders.

[Conclusion]

The prevalence of DISH increased by 4.7% over 6 years, and DISH progression was observed in 71.7% of patients. However, DISH had little effect on longitudinal physical function, HRQOL, and spinopelvic parameters in older adults.