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Infrequently diagnosed common gait disorder in outpatients with cervical spinal stenosis: A retrospective cohort study

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ABSTRACT

Background. Degenerative cervical myelopathy (DCM) is poorly recognized and infrequently diagnosed.

Objectives. To identify symptoms or signs in the lower extremities physically and radiologically in outpatients with DCM.

Methods. In 2023, a retrospective cohort study was performed to review the medical records from 2016 to 2020. A total of 28 (24 women) patients were included. All patients were physically examined. Sagittal magnetic resonance imaging (MRI) of the cervical spinal canal was performed and its anteroposterior diameter was calculated in patients with hyperreflexia and/or gait disorder.

Results. Sixteen (13 women) patients presented with symptoms or signs in the lower extremities only (group A) and 12 patients (11 women) presented with those in the upper and lower extremities (group B). The mean [SD] ages were 70.06 [17.49] and 58.67 [11.80] years, respectively. Pseudo-polyneuropathic patterns of sensory dysfunction in the lower extremities were identified in 14 patients (88%) of group A and 11 patients (92%) of group B. Also, 16 patients (100%) of group A and 11 patients (92%) of group B presented with hyperreflexia of the triceps and/or patellar tendons. Sagittal MRI showed a minimum value of stenosis at the C5-6 level in 9 patients (56%) of group A and 7 patients (58%) of group B. The mean [SD] anteroposterior diameters at the most stenotic level in patients of groups A and B were 9.63 [2.02] and 10.17 [1.23] mm, respectively.

Conclusion. Hyperreflexia of the triceps and/or patellar tendons is one of the most important neurological findings to suspect DCM.

Keywords: degenerative cervical myelopathy, gait disorder, lower extremities, hyperreflexia, women of older age

INTRODUCTION

The possibility of cervical spondylosis should be considered even when the patient presents with symptoms or signs in the lower extremities only. However, degenerative cervical myelopathy (DCM) is poorly recognized and infrequently diagnosed [1].

The prevalence of gait disorders increases to more than 60% in community-dwelling subjects aged over 80 years [2]. Neurological gait disorders are associated with recurrent falls, a lower cognitive function, depressed mood, and diminished quality of life [3]. The prevalence of asymptomatic cervical spinal cord compression was estimated as 24.2% in a healthy population, with a significantly higher prevalence in older populations [4].

In this study, outpatients with DCM who presented with symptoms or signs in the lower extremities were identified physically and radiologically.

METHODS

In 2023, a retrospective cohort study was performed to review the medical records from 2016 to 2020. An outpatient clinic was provided for half-day a week in the Department of Internal Medicine by a neurologist. From January 2016 to March 2020, 28 new patients presented with symptoms or signs in the lower extremities.

The personal and family medical histories were obtained. Laboratory screening tests were carried out.

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Sagittal magnetic resonance imaging (MRI) of the cervical spinal canal was performed and its anteroposterior diameter was calculated in patients with hyperreflexia and/or gait disorder. Furthermore, brain MRI was carried out when risks of brain atrophy and/or white matter hyperintensity were identified.

RESULTS

A total of 28 (24 women) patients aged 41 to 88 years presented with gait instability. The pedal artery could be palpated in all patients. They had no history of diabetes mellitus or collagen disease. Among them, 16 (13 women) patients presented with symptoms or signs in the lower extremities only (group A) and 12 patients (11 women) presented with those in the upper and lower extremities (group B). The mean [SD] ages were 70.06 [17.49] and 58.67 [11.80] years, respectively. Levene's test showed equal variances between the mean age of groups (P=0.092). A two-sided Student's t-test showed no significant difference between the mean age of groups (P=0.063).

Neurological findings among the patients of group A (number of patients) were paresthesia and/or pain in the feet (7), paresthesia in the legs (4; one patient showed bi-lateral Babinski sign), that or pain in the foot (2), that in the feet and absent sense of vibration in the legs (1), weakness in the left leg and falls (1), and unstable gait (1). Those among the patients of group B were paresthesia and/or pain in the feet and hands (8), paresthesia in the leg and arm (2), that in the foot and hand (1), and that in the arms and weakness in the legs (1). Sixteen patients (100%) of group A showed bi- or uni-lateral hyperreflexia of the triceps tendon and/or bi-lateral hyperreflexia of the patellar tendon. Eleven patients (92%) of group B showed bi- or uni-lateral hyperreflexia of the triceps tendon and/or bi- or uni-lateral hyperreflexia of the patellar tendon.

Radiologically, the vertebral levels of stenosis in patients of group A (number of patients) were C3-5 (3), C3-6 (3), C3-7 (1), C4-6 (5), C4-7 (3), and C5-7 (1). The most stenotic level was C5-6 (9), followed by C4-5 (3), C3-4 (3), and C6-7 (1). The mean [SD] anteroposterior diameter at the most stenotic level was 9.63 [2.02] mm. The vertebral levels of stenosis in patients of group B were C2-6 (1), C3-5 (1), C3-6 (4), C3-7 (1), C4-6 (2), C4-7 (1), C5-6 (1), and C5-7 (1). The most stenotic level was C5-6 (7), followed by C4-5 (2), C6-7 (2), and C3-4(1). The mean [SD] anteroposterior diameter at the most stenotic level was 10.17 [1.23] mm. Levene's test showed no equal variances between the diameters of groups A and B (P=0.017). Welch's t-test showed no significant difference between them (P= 0.39).

DISCUSSION

The prevalence of a symptomatic cervical spinal cord compression due to degenerative changes of the spine was estimated as 24.2% in a healthy population, with a higher prevalence in older populations. The prevalence of DCM was estimated as 2.3% in a healthy population [4]. In the United Kingdom, the peak prevalence of DCM derived from spinal cord compression data was estimated as 4.16% in patients over 79 years old [1].

Among 28 patients with DCM, 16 presented with symptoms or signs in the lower extremities only. During the same period, 8 new patients were diagnosed with Parkinson's disease. In this study, the total number of patients with DCM was estimated as higher than that of patients with Parkinson's disease.

Sagittal MRI showed a minimum value of stenosis at the C5-6 level in 9 patients (56%) of group A and 7 patients (58%) of group B [5]. Among the patients under 60 years old, these values were 80.0 and 85.7% at the lower levels (C5-6 and C6-7), respectively [6]. The mean [SD] anteroposterior diameters at the most stenotic level in patients of groups A and B were 9.63 [2.02] and 10.17 [1.23] mm, respectively. A diameter smaller than 12 mm at the responsible segment was identified by a dynamic study of 7 young male Japanese patients with degenerative cervical spondylotic myelopathy [7].

In patients with cervical spondylotic myelopathy (CSM), prominent atrophy of white matter and tract-specific degeneration were identified. The degeneration was demonstrated far above the site of cord compression [8]. Also, volume loss in the descending spinal cord tracts was identified [9]. Both inflammation and axonal loss were suggested to contribute to neurological impairment [10]. Evidence of whole cord myelin damage was provided in patients with CSM [11].

In this study, pseudo-polyneuropathic patterns of sensory dysfunction in the lower extremities were identified in 14 patients (88%) of group A and 11 patients (92%) of group B [12,24]. The spinothalamic tract ascends in the ventrolateral aspect of the spinal white matter. The anatomical location may have caused the changes of the sensory tract in the beginning. Also, 16 patients (100%) of group A and 11 patients (92%) of group B presented with hyperreflexia of the triceps and/or patellar tendons [13]. The most common neurological findings were characterized by pseudo-polyneuropathic patterns of sensory dysfunction without a clearly decreased sense of vibration in the lower extremities and ataxia, hyperreflexia of the triceps and patellar tendons, and negative for Romberg's sign.

The previous diagnoses were lumbar spinal canal stenosis, sciatic nerve pain, osteoporosis, depression, and neurosis. The possibility of cervical spinal cord

disease must be considered when a patient presents solely with complaints involving the lower extremities [14], especially in women.

Treatment of mild forms of DCM is controversial [15-19]. In this study, the symptoms or signs had persisted over the past few years without progression in older patients. Conservative treatment reduced sensory symptoms in some patients. The rate of complications in patients with cervical compressive myelopathy treated surgically were estimated as 20.1% [20]. This is not low. It is necessary to predict factors for DCM and treat patients with mild forms of DCM conservatively as much as possible, especially in women of older age. Vitamin D affects motor coordination and locomotion [21] and may be involved in gait stability. One good prognostic factor is a normal central motor conduction time and larger transverse area of the spinal cord in older patients [22,23].

CONCLUSIONS

DCM is an infrequently diagnosed common gait disorder in women of older age. Hyperreflexia of the triceps and/or patellar tendons is one of the most important neurological findings to suspect DCM. Conservative treatment of mild forms of DCM should be considered as much as possible.

Ethics approval statement:
This retrospective cohort study was approved by the Ethics Committee of Kanazawa Seirei Hospital (Number: 5-1/2023). The requirement to obtain informed consent was waved.

Conflict of interest: none declared
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