Evaluation of the association between locomotive syndrome and depressive states: a cross-sectional study

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ABSTRACT

The Japanese Orthopaedic Association has proposed the term “locomotive syndrome” to designate a condition that places a person at high risk for long-term care. However, in daily clinical practice, even when a diagnosis of locomotive syndrome is made, exercise therapy often cannot be successfully performed in some patients owing to their lack of motivation. We speculated that locomotive syndrome and depressive states co-exist in elderly people. The purpose of this study was to determine the presence or absence of depressive states in older patients aged ≥ 65 years who were diagnosed with locomotive syndrome. A questionnaire survey, the 25-Question Geriatric Locomotive Function Scale and Self-Rating Questionnaire for Depression was conducted. The items of the interview survey were sex, age, and history of treatment for hypertension or diabetes mellitus. For somatometry, height and body weight were measured. Patients diagnosed with locomotive syndrome (LS group) were compared with those without locomotive syndrome (non-LS group). The LS group included 99 patients, mean age was 79.4 years old, while the non-LS group included 101 patients, mean age was 76.3 years old. The number of patients with depressive states and number of females were significantly higher in the LS group. In addition, the LS group was significantly older and shorter. Multivariate analysis revealed depressive states and age to be independent factors. Therapy for patients with LS should include evaluation and, if necessary, treatment for concomitant depression.

Key Words: locomotive syndrome, depressive states

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INTRODUCTION

In recent years, Japan has become a super-aging society and the number of persons certified as requiring long-term care has increased. With further increases in the number of persons with this certification, the financial situations of local governments are expected to become strained. To minimize such increases, it is important to maximize the number of elderly people who can walk and perform activities of daily living without assistance. To accomplish this, before the elderly require long-term care, disorders that impair their movement and independence should be diagnosed and treated early. The Japanese Orthopaedic Association has proposed the term “locomotive syndrome” to designate a condition that places a person at high risk for long-term care.
care. However, in daily clinical practice, even when a diagnosis of locomotive syndrome is made, exercise therapy often cannot be successfully performed in some patients due to their lack of motivation. Ikemoto et al. reported the association between locomotive syndrome and degree of depression. We also speculated that patients diagnosed with locomotive syndrome have a psychological reason for their lack of motivation to undergo exercise therapy, namely, a depressive state. We performed a prospective study to determine the presence or absence of depressive states in older patients aged ≥ 65 years who were diagnosed with locomotive syndrome in a local clinic.

SUBJECTS AND METHODS

The study design was cross-sectional study. Patients were informed about study and their written consent was obtained. This study was carried out with the approval of Human Studies Ethics Committee of Jichi medical university. The subjects consisted of 220 outpatients (50 males and 170 females) aged 65–91 years (mean, 78.1 years) who visited the Houjyo municipal clinic between October and December 2012, and who could walk unassisted and perform activities of daily life without assistance. Patients who could not walk without assistance, or had visual/hearing impairment, decreased cognitive function, or motor paralysis were excluded. In this study, cognitive function was investigated only by the examination of an internist without any formal testing. In addition, patients who had a history of spinal/lower limb fracture within 6 months before our questionnaire survey or who were in the acute stage of being treated for trauma were excluded.

A questionnaire survey, interview survey by nurses, and somatometry were performed when the subjects visited the outpatient clinic. The 25-Question Geriatric Locomotive Function Scale (GLSF-25) and Self-Rating Questionnaire for Depression (SRQ-D) were used. The items of the interview survey were sex, age, and history of treatment for hypertension or diabetes mellitus. For somatometry, height and body weight were measured. The GLSF-25 is a questionnaire for the diagnosis of locomotive syndrome, and a score ≥ 16 on this scale defines the subjects as having locomotive syndrome. This questionnaire is a useful tool for the early diagnosis of locomotive syndrome, and its usefulness has been confirmed by at least two studies. The SRQ-D is a questionnaire for the diagnosis of masked depression, and a score of ≤ 10 is defined as normal, of 11–15 as borderline, and of ≥ 16 as suspected depression. In this study, a score ≥ 11 was regarded as indicating a depressive state. There were no patients being treated with anti-depressants. Patients diagnosed with locomotive syndrome (LS group) were compared with those without locomotive syndrome (non-LS group).

Statistical analysis was performed using SPSS for Windows Version 20.0 (SPSS, Chicago, IL, USA). Pearson’s chi-square test was used for the comparison of SRQ-D, sex, hypertension, and diabetes mellitus, and the unpaired t-test for the comparison of age, height, and body weight. For multivariate analysis, multiple logistic regression analysis was performed. The all data were entered into the multivariate analysis. P < 0.05 was regarded as significant.

RESULTS

Although responses were obtained from 220 patients, 20 patients did not fulfill the questionnaires, we excluded them. 200 patients, consisting of 45 males and 155 females aged 65–91 years (77.7 years), were analyzed. The LS group included 99 patients (14 males and 85 females) aged 65–91 years (mean, 79.4 years), while the non-LS group included 101 patients (31 males and 70
Locomotive syndrome and depressive states

The number of patients with depressive states and number of females were significantly higher in the LS group (p = 0.01 and 0.03, respectively). In addition, the LS group was significantly older and shorter (p = 0.01 for both). There were no significant differences in body weight, hypertension, and diabetes mellitus between the two groups (p = 0.2, 0.23, and 0.78, respectively) (Table 1). Multivariate analysis for depressive states, sex, hypertension, diabetes mellitus, age, height, and body weight revealed depressive states and age to be independent factors (p = 0.01, odds ratio = 4; and p = 0.01, odds ratio = 1.1, respectively) (Table 2).

### DISCUSSION

This study showed associations between locomotive syndrome and depressive states, advanced age, females gender, and short stature. Multivariate analysis revealed depressive states and age as independent factors, and their odds ratios were 4 and 1.1, respectively. Pennix et al. performed a prospective cohort study involving 1,286 older subjects aged ≥ 71, and reported that the presence of depressive symptoms was a high risk factor for a decline in physical performance, and remitting these symptoms may play a role in improving physical performance in the elderly. Szczepanska-Gieracha et al. compared the effects of rehabilitation given soon after coronary bypass operation between patients with and without depressive symptoms, and observed significantly lower physical performance in the former group, suggesting the importance of the early detection and treatment of depressive states for successful early rehabilitation. In addition, Bienvenu et al. performed a 2-year prospective cohort study involving 186 survivors of acute lung injury, and reported long ICU stays and depressive symptoms as risk factors for the persistence of physical impairment. They stated that interventions targeting depressive symptoms should be evaluated for improving long-term outcomes in survivors of acute lung injury. Based on the results of the present and previous studies, not only exercise therapy but also psychological

| Table 1  | Background |
|----------|------------|
| Loc (n=99) | Non-Loc (n=101) | P |
| Age      | 79.3±5.5 | 76.3±6.0 | 0.01 |
| Sex(men:women) | 14:85 | 27:74 | 0.03 |
| Height(m) | 1.48±0.07 | 1.52±0.08 | 0.01 |
| Weight(kg) | 52.1±11.2 | 54.1±10.6 | 0.2 |
| Hypertension | 77 | 71 | 0.23 |
| Diabetes  | 20 | 22 | 0.78 |
| Depression state | 22 | 8 | 0.01 |

Loc: locomotive syndrome

| Table 2  | Multiple logistic regression analysis |
|----------|-------------------------------------|
| Odds ratio | 95% CI | P |
| Depressive state | 4.0 | 1.63–10.0 | 0.01 |
| Age | 1.1 | 1.05–1.16 | 0.01 |
treatment for depressive states may be necessary in patients diagnosed with locomotive syndrome. We intend to perform further studies to determine whether locomotive syndrome patients with depressive symptoms show additional improvement after exercise therapy given in conjunction with interventions to reduce their depressive states.

The limitations of this study are that only a questionnaire survey was performed and no interventions to test these associations were administered; also, the subjects were patients from only 1 institution. In the GLSF-25 question items and the S-RQD, there may be some overlap in the question items.

CONCLUSION

Locomotive syndrome is associated with depressive states and with age, which are independent factors. In particular, the association with depressive states was marked. Therefore, therapy for patients with LS should also include evaluation and, if necessary, treatment for concomitant depression.

CONFLICTS OF INTEREST

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