

노인재활

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Comorbidities in patients with end-stage knee OA : prevalence and impact on physical function

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Objective

This study was undertaken to investigate the prevalence of comorbidities and its association with physical function, quality of life and pain in patients with end-stage knee osteoarthritis.

Methods

In this cross-sectional study, we assessed a total of 557 patients (74 males and 503 females; average age 71.4±5.8 years) who were diagnosed with end-stage knee osteoarthritis (OA). Comorbidities were classified into osteoporosis, presarcopenia (defined as a loss of skeletal muscle mass by Bioelectrical Impedance Analysis), degenerative spine disease, diabetes, and hypertension. All patients completed performance-based physical function tests including stair climbing test (SCT), 6-minute walk test (6MWT), timed up and go test (TUG), instrumental gait analysis for spatio-temporal parameters. Self-reported physical function and pain were measured using the Western Ontario McMaster Universities Osteoarthritis Index (WOMAC) and Visual Analog Scale (VAS), and self-reported quality of life was measured using the EuroQOL five dimensions (EQ-5D) questionnaire.

Results

The prevalence of osteoporosis was 35.4 % (204 of 577) of patients, presarcopenia in 6.1 % (35 of 577), degenerative spine disease in 14.9 % (86 of 577), diabetes in 17.7 % (102 of 577), and hypertension in 65.5 % (378 of 577). In the univariate analyses, patients with osteoporosis exhibited significantly higher scores in SCT-ascent, SCT-descent, TUG, WOMAC-pain and lower scores in 6MWT, gait speed, cadence. Patients with presarcopenia showed significantly higher scores in SCT-ascent, TUG, and lower scores in 6MWT, EQ-5D, gait speed. Patients with degenerative spine disease exhibited significantly higher scores in WOMAC-pain and lower scores in gait speed. Patients with diabetes showed significantly higher scores in SCT-ascent, and patients with hypertension showed significantly lower scores in 6MWT. After adjusting for age, sex, BMI by the

logistic regression, SCT-descent remained significantly associated with patients with osteoporosis (OR=1.040, 95% CI 1.010-1.071, p=0.010) and SCT-ascent score was independently associated with patients with presarcopenia (OR=1.120, 95% CI 1.053-1.191, p<0.001) and diabetes (OR=1.042, 95% CI 1.002-1.084, p=0.040). In patients with degenerative spine disease, WOMAC-pain showed a significant association (OR=1.081, 95% CI 1.002-1.166, p=0.043).

Conclusions

This study confirmed the prevalence of several important comorbidities, which could be associated with the performance-based and self-reported physical function, and quality of life in patients with end-stage knee OA. In addition, these Results may be an importance consideration in determining various preoperative and/or rehabilitation strategies.

Table 1. Demographic and Disease-Related Characteristics of the Subjects (N=577)

Variables	Values
Age (years)	71.4±5.8
Sex, males/females	74 (12.8) / 503 (87.2)
BMI (kg/m ²)	26.6± 3.4
K-L grades	
Grade 3	127 (22.0)
Grade 4	450 (78.0)
Comorbidities	
Osteoporosis	204 (35.4)
Presarcopenia	35 (6.1)
Degenerative spine disease	86 (14.9)
Diabetes mellitus	102 (17.7)
Hypertension	378 (65.5)

Values represent mean ± standard deviation or number (%) of cases

Abbreviations: BMI, Body Mass Index, K-L, Kellgren-Lawrence

Table 2. The Comparison of Performance-based Physical Function, Self-reported Physical Function, Quality of Life and Pain according to Comorbidities in Patients with End-stage Knee Osteoarthritis[Ⓢ]

Variable	Osteoporosis (+)	Osteoporosis (-)	Sarcopenia (+)	Sarcopenia (-)	Degenerative spine disease (+)	Degenerative spine disease (-)	Diabetes (+)	Diabetes (-)	Hypertension (+)	Hypertension (-)
SCT-ascent (sec)	14.45±5.64 [*]	13.40±5.41 [*]	16.43±7.34 [*]	13.51±5.32 [*]	14.43±5.77 [*]	13.66±5.47 [*]	15.14±7.10 [*]	13.47±5.06 [*]	14.06±5.81 [*]	13.18±4.83 [*]
SCT-descent (sec)	17.59±6.68 [*]	15.84±6.05 [*]	18.91±8.84 [*]	16.18±6.10 [*]	17.50±7.15 [*]	16.29±6.18 [*]	17.60±6.76 [*]	16.20±6.21 [*]	16.82±6.71 [*]	15.72±5.44 [*]
6MWT (m)	302.24±101.41 [*]	320.59±104.07 [*]	259.80±106.66 [*]	318.57±102.23 [*]	299.59±115.37 [*]	316.68±101.07 [*]	298.66±104.81 [*]	317.43±102.93 [*]	307.57±103.39 [*]	326.56±102.60 [*]
TUG (sec)	12.74±5.66 [*]	11.66±3.27 [*]	13.63±6.11 [*]	11.92±4.17 [*]	12.72±4.88 [*]	11.93±4.18 [*]	12.69±6.36 [*]	11.91±3.70 [*]	12.24±4.51 [*]	11.67±3.84 [*]
VAS	7.06±1.56 [*]	6.92±1.74 [*]	7.29±1.30 [*]	6.94±1.70 [*]	7.16±1.73 [*]	6.94±1.67 [*]	6.95±1.72 [*]	6.98±1.67 [*]	7.00±1.72 [*]	6.92±1.61 [*]
Gait Speed (m/sec)	0.86±0.17 [*]	0.91±0.17 [*]	0.82±0.19 [*]	0.90±0.17 [*]	0.86±0.19 [*]	0.90±0.17 [*]	0.91±0.19 [*]	0.89±0.17 [*]	0.89±0.17 [*]	0.90±0.18 [*]
Cadence (steps/min)	101.92±16.34 [*]	105.22±14.02 [*]	97.37±20.24 [*]	104.44±14.54 [*]	101.36±21.42 [*]	104.53±13.46 [*]	103.39±15.32 [*]	104.20±14.88 [*]	103.64±15.14 [*]	104.85±14.58 [*]
Stride length (cm)	102.46±14.88 [*]	102.93±14.81 [*]	100.21±18.93 [*]	103.09±14.46 [*]	100.01±17.94 [*]	103.25±14.17 [*]	105.39±16.26 [*]	102.20±14.45 [*]	102.82±14.11 [*]	102.65±16.11 [*]
Gait cycle duration (sec)	1.15±0.31 [*]	1.14±0.50 [*]	1.12±0.39 [*]	1.15±0.45 [*]	1.19±1.02 [*]	1.14±0.22 [*]	1.16±0.31 [*]	1.14±0.47 [*]	1.17±0.51 [*]	1.10±0.27 [*]
Stance phase duration (% of gait cycle)	65.26±2.73 [*]	65.08±2.45 [*]	64.31±4.12 [*]	65.18±2.40 [*]	65.37±3.92 [*]	65.10±2.23 [*]	64.91±2.23 [*]	65.19±2.61 [*]	65.15±2.57 [*]	65.14±2.53 [*]
Swing phase duration (% of gait cycle)	34.94±3.68 [*]	34.88±2.58 [*]	35.69±4.12 [*]	34.82±2.40 [*]	34.64±3.92 [*]	34.95±2.83 [*]	35.10±2.23 [*]	34.86±3.16 [*]	34.89±3.23 [*]	34.93±2.56 [*]
Double support duration (% of gait cycle)	30.12±5.55 [*]	29.89±5.43 [*]	28.96±7.22 [*]	34.87±2.93 [*]	30.85±7.19 [*]	29.82±5.10 [*]	29.45±4.53 [*]	30.09±5.65 [*]	30.09±5.26 [*]	29.76±5.86 [*]
Single support duration (% of gait cycle)	34.77±3.33 [*]	34.91±3.35 [*]	35.62±3.43 [*]	34.85±3.34 [*]	35.09±5.84 [*]	34.82±2.68 [*]	35.35±3.67 [*]	34.75±3.26 [*]	34.77±2.96 [*]	35.02±3.96 [*]
EQ-5D	0.57±0.17 [*]	0.59±0.17 [*]	0.59±0.16 [*]	0.50±0.21 [*]	0.55±0.20 [*]	0.58±0.16 [*]	0.58±0.16 [*]	0.57±0.17 [*]	0.57±0.17 [*]	0.59±0.17 [*]
WOMAC-pain	9.79±3.15 [*]	9.22±3.05 [*]	9.80±2.97 [*]	9.38±3.10 [*]	10.15±3.41 [*]	9.29±3.02 [*]	9.51±3.10 [*]	9.40±3.10 [*]	9.42±3.20 [*]	9.41±2.90 [*]
WOMAC-Stiffness	2.85±1.27 [*]	2.81±1.37 [*]	2.69±1.57 [*]	2.83±1.33 [*]	2.92±1.54 [*]	2.81±1.30 [*]	2.62±1.26 [*]	2.87±1.36 [*]	2.78±1.33 [*]	2.91±1.36 [*]
WOMAC-Function	29.51±9.22 [*]	28.72±8.99 [*]	31.80±10.09 [*]	28.82±8.91 [*]	30.06±10.46 [*]	28.81±8.80 [*]	29.11±8.88 [*]	28.98±9.12 [*]	28.93±9.19 [*]	29.13±8.87 [*]

^{*}Values represent mean ± standard deviation.

Table 3. Factors of Performance-based Physical Function, Self-reported Physical Function, Quality of Life and Pain associated with Comorbidities in Patients with End-stage Knee Osteoarthritis[Ⓢ]

Outcome/Independent predictor	Standardized (B)	p-value	Adjusted R ²
Osteoporosis			
SCT – descent	1.040	0.010	0.090
Sarcopenia			
SCT – ascent	1.120	<0.001	0.330
Degenerative spine disease			
WOMAC pain	1.082	0.043	0.027
Diabetes			
SCT – ascent	1.042	0.044	0.029

The Logistic Regression Analyses adjusting for age, sex, BMI[Ⓢ]