

Supplement 3

Additional Narrative Results of Factors Associated with Balance Impairment in COPD

Inspiratory muscle strength

One study reported an association of increased ankle strategy use with weaker inspiratory muscle strength in people with COPD(1).

Dyspnoea

One study reported worse BBS in people with COPD was not associated with dyspnoea measured by Medical Research Council dyspnoea scale(2). Another study reported that BBS scores were associated with dyspnoea measured by Modified Borg Scale ($r=0.42$)(3). Associations were reported on posturography measures Medical Research Council dyspnoea scale and increased sway on foam tasks in those with AECOPD ($r=0.53$ and 0.50 $p< 0.05$)(2).

Anxiety and Depression

Significant correlations were reported in one study between anxiety and depression scores and balance outcomes; SLS (anxiety $r=-0.058$, depression $r=-0.591$), TUG (anxiety $r=0.722$, depression $r=0.509$) and BBS (anxiety $r=-0.500$, depression $r=-0.473$)(4).

Inflammation

Two studies investigated the relationship between inflammatory markers erythrocyte sedimentation rate (ESR), C-reactive protein (hs-CRP) and fibrinogen and reported various correlations. TUG was correlated with hs-CRP ($r=0.378$ and 0.455 respectively) and fibrinogen ($r=0.449$ and 0.494 respectively) in both studies (4, 5). SLS was correlated with hs-CRP in one study(5) ($r=0.423$) and ESR the other (4). Finally, BBS was correlated with ESR and non-significantly with hs-CRP(4).

COPD Phenotype and BMI

Bronchitic COPD phenotype was reported to have worse balance scores on SLS and TUG ($p < 0.001$) but not BBS(6). In this study percentage of fat free mass (%ffm) and BMI were positively associated with SLS times (%ffm $r = 0.472$, $p < 0.01$, BMI $r = 0.621$ $p < 0.01$) and negatively with TUG times (%ffm $r = 0.408$, $p < 0.01$, BMI $r = -0.681$, $p < 0.01$) and a subgroup analysis of participants unable to complete a SLS in another study reported they had a higher BMI(7).

Vitamin D

A study investigating the relationship of vitamin D and balance in COPD reported people with COPD scored worse on TUG ($p = 0.000$) and functional reach test ($p \leq 0.001$), but there was no difference in balance between people with COPD who were vitamin D deficient and those who weren't(8).

Sex

One study reported that women performed worse in TUG compared with men ($p = 0.03$), whereas men performed worse in SLS during posturography ($p = 0.005$). However, there were differences in age, height and absolute isometric quadriceps maximal voluntary contraction of men and women in the COPD group that were not observed in the control group. These differences were not adjusted for and height differences alone could explain the variance in both balance outcomes(7).

Gait quality

Gait and postural sway were linked in one study(9) whereby increased postural sway was associated with a progressive increase in duration of double support time ($y = 4.6x + 16.3\%GC$, $R^2 = 0.20$, $p < 0.005$) and shortening of single support time ($y = -2.1x + 41.6\%GC$, $R^2 = 0.19$, $p < 0.005$) during the gait cycle in people with COPD but not healthy controls.

References

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