

Nocturnal Leg Cramps and Chronic Obstructive Pulmonary Disease



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Abstract

Chronic obstructive pulmonary disease is a health problem with high morbidity and mortality. Long term inactivity, corticosteroid use, insufficient nutrition, decreased anabolic hormone level, hypoxemia and electrolyte imbalance may lead to nocturnal leg cramps through causing peripheral muscle dysfunction. Nocturnal leg cramps impair sleep pattern and quality through causing severe leg pain and fatigue. Impaired structure and quality of sleep increase exacerbations, disease severity and cost, decrease overall wellness and quality of life together with pain and fatigue. Control of nocturnal leg cramps would be effective in management of chronic obstructive pulmonary disease.

Keywords: Nocturnal Leg Cramp; Chronic Obstructive Pulmonary Disease; Sleep; Cramp

Abbreviations: COPD:Chronic Obstructive Pulmonary Disease

Introduction

Chronic obstructive pulmonary disease (COPD) is a common, preventable and treatable disease usually caused by exposure to harmful particles or gases, characterized by airway and/or alveolar anomalies-related permanent airflow restriction and respiratory symptoms [1]. Global Initiative for Chronic Obstructive Lung Disease has reported number of patients with COPD as 384 million and global prevalence as 11.7% in 2010 [1]. COPD prevalence is predicted to increase during next 30 years and number of COPD-related deaths is predicted to exceed 4.5 million until 2030 [2]. Nocturnal leg cramps are defined as "intensive and unintentional contractions which abruptly emerge during night, characterized by sudden pain episodes in thigh, calf of the leg or foot" and among sleep-related movement disorders [3-5]. Leg cramp which is also defined as spasm, contraction, pain, strain, tetany, swelling or muscle paralysis is a painful symptom and may take about nine minutes [6]. National Health and Nutrition Examination Survey has detected that 30% of individuals experience nocturnal leg cramps and nocturnal leg cramps are associated with chronic diseases like emphysema, bronchitis and asthma in a study investigating nocturnal leg cramps in adults between 2005-2006 [7].

Discussion

Nocturnal leg cramps are reported to be associated with many potential etiologic factors [3,6]. Respiration and gas exchange are negatively influenced in COPD patients due to

airway resistance and obstruction, oxygen saturation decreases, hypoxia, hypercapnia develop and inspiration capacity decreases [8,9]. Chronic hypoxia reduces muscle mass and surface area of type I fibers and decreases oxidative capacity of the muscle [10]. Low oxidative capacity increased pro-inflammatory cytokines, systemic inflammation, chronic inactivity, systemic use of corticosteroids, nutritional imbalance, low anabolic hormone level, hypoxemia and electrolyte disorders facilitate peripheral muscle dysfunction which could precipitate nocturnal leg cramps in COPD [10,11]. Albuterol, levabuterol, beta-agonists and steroids are reported to lead to leg cramps [3,6]. In addition, chronic use of steroids precipitate dysfunction through leading to muscle fatigue, necrosis and lactic dehydrogenase level elevation in COPD patients [10,12]. Furosemide, beta-2 agonists and theophylline which are used in COPD treatment contribute to nocturnal leg cramp development by leading to severe side effects like hypo-kalemia, hypo-calcemia and hypomagnesemia [10,13]. Oboler et al. report that 63% of the patients who admit to outpatient clinic due to leg cramps have hypo-kalemia [14]. The imbalance between calorie intake and energy consumption, and malnutrition in COPD is reported to reduce muscle mass through reducing protein synthesis and lead to muscle fatigue [10,11].

Nocturnal leg cramps reduce sleep pattern and sleep quality, impair wellness and quality of life through leading to awakening [5,15]. Acute phase of leg cramps may go with recurrent episodes

of a couple of hours and permanent pain and is accepted as a cause of secondary sleep disorders [6]. In the study of Hawke et al., individuals who experience nocturnal leg cramps are reported to experience sleep disorders more, sleep more at night and less during daytime and have sleepiness during day time [15]. Sleep deprivation leads to impaired pulmonary functions through causing temporal reductions in forced vital capacity and the volume at 1st second of expiration and may lead to exacerbations in COPD [16]. Pain, tenderness and discomfort caused by nocturnal leg cramps which last for several seconds or minutes continue up to a couple of hours and even last until daytime [3,17]. Redmond et al. report that muscle cramps reduce physical role and functioning, overall health and activity level, quality of life and increase pain [18].

Conclusion

Nocturnal leg cramps which could prevent maintenance of a quality sleep that is of vital importance in COPD is evaluated as a challenging nocturnal symptom due to obscure diagnosis and treatment [6,8,9]. It is seen that nocturnal leg cramps which could frequently develop in COPD patients are not addressed sufficiently in literature and thereby proper interventions are not planned. In addition, patients are estimated not to report nocturnal leg cramps enough although they impair daily living activities. Whereas interventions may be made for reduction/elimination of nocturnal leg cramps which develop in COPD patients. Prevention of nocturnal leg cramps which are among the causes which impair quality of sleep, quality of life is of vital importance for disease management.

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