Correlation between Optic Nerve Involvement and Chronic Obstuctive Pulmonary Disease

Thesis

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List of Abbreviations

ABG .....Arterial Blood Gases

ATS.....American Thoracic Society

BOLD.....the Burden of Obstructive Lung Disease

CAT .....COPD Assessment Test

CF.....Counting Fingers

COPD.....Chronic Obstructive Pulmonary Disease

CT.....Computed Tomography

EGFR.....Epidermal Growth Factor Receptor

ELVR .....Endoscopic Lung Volume Reduction

ERS .....European Respiratory Society

ETS.....Environmental Tobacco Smoker

FACT .....Freiburg Visual Acuity and Contrast Test

FEV_1 .....Forced Expiratory Volume in One Second

FVC .....Forced Vital Capacity

GOLD.....Global Initiative Obstructive Lung Disease

HIV .....Human Immunodeficiency Virus

HM.....Hand Movement

IOP .....Intra Ocular Pressure

KPa.....Kilopascal

LLN.....Lower Limit of Normal

LP .....Light Perception

LVRS .....Lung Volume Reduction Surgery

M Sec .....Milliseconds

List of Abbreviations

mmhg.....Millimeter of Mercury

MMP12 .....Gene Encoding Matrix Metalloproteinase 12

mMRC .....modified British Medical Research Council

NETT .....National Emphysema Treatment Trial

NIV .....Non-Invasive Ventilation

Pao2 .....Arterial Oxygen Tension

PLATINO.....the Latino American Project for the Investigation of Obstructive Lung Disease

RF.....Respiratory failure

Sao2 .....Arterial Oxygen Saturation

SGRQ.....ST. George Respiratory Questionnaire

Va\Q.....Ventilation\Perfusion Mismatching

VC.....Vital Capacity

VECP .....Visual Evoked Cortical Potential

VEP.....Visual Evoked Potential

VER .....Visual Evoked Response

WHO .....World Health Organization

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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a main cause of mortality in both developed and developing countries. COPD is a respiratory disease characterized by progressive and partially reversible airflow limitation, which results from an emphysematous destruction of the lung parenchyma and increased airway resistance due to inflammation, bronchospasm, and increased mucous production ***(Anthonisen, 2007).***

There is an increasing need for awareness regarding COPD and to help the thousands of people who suffer from this disease and die prematurely from COPD or its associated complication(s). As a result, a committed group of scientists encouraged the US National Heart, Lung, and Blood Institute and the World Health Organization to form a Global initiative for chronic Obstructive Lung Disease (GOLD)***(Jindal et al., 2004).***

Cardiovascular problems (eg, coronary heart disease), neurological impairments (eg, polyneuropathy), and metabolic disorders (eg, osteoporosis) are also commonly associated with COPD as are psychological alterations such as depression and anxiety. While the presentation, development, and manifestations of COPD are highly variable, as the patient ages, the disease typically gets more severe ***(Mikaeili et al., 2015).***

Many studies have shown peripheral neuropathy as an extra pulmonary manifestation of COPD. Many patients

with COPD suffer subclinical neuropathy, and this type of neuropathy is correlated with cigarette consumption ***(Oncel et al., 2010).***

Visual evoked potential (VEP, the electrical potential difference generated in response to visual stimuli, provide a functional measurement of optical pathway. Moreover, this evaluation can provide valuable evidence of optic nerve involvement in the primary stages of ophthalmic disease ***(Göçmen et al., 2014).***

It has been recently declared that COPD may cause considerable retinal and optic nerve damage ***(Demir et al., 2012).*** Furthermore, non-arteritic anterior ischemic optic neuropathy in middle-aged people is associated with high prevalence of COPD. Therefore we aimed to study the rate of optic neuropathy in COPD patients by VEP evaluations ***(Mikaeili et al., 2015).***

Aim of the Work

The aim of this study is to evaluate optic nerve involvement in chronic obstructive pulmonary disease in relation to disease severity .To determine how often neurophysiological changes is encountered in COPD patients by assessing VEP and to evaluate for any relations to spirometric-indices and ABG-values.

CHAPTER (I): COPD REVIEW

Definitions

Chronic Obstructive Pulmonary Disease (COPD), a common preventable and treatable disease, is characterized by persistent airflow limitation that is progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases. Exacerbations and co morbidities contribute to the overall severity in individual patients ***(GOLD, 2013).***

The chronic airflow restriction characteristic of COPD is caused by a mixture of small airways disease (obstructive bronchiolitis) and parenchyma destruction (emphysema), the relative contributions of which vary from one person to another chronic inflammation causes structural changes and narrowing of the small airways. Destruction of the lung parenchyma, also by inflammatory processes leads to the loss of alveolar attachments to the small airways and diminished lung elastic recoil: in turn, these changes diminish the ability of the airways to remain open during expiration. Airflow limitation is best measured by spirometer, as this is the most widely available, reproducible test of pulmonary function.

Many previous definitions of chronic obstructive pulmonary disease have emphasized the terms "emphysema" and "chronic bronchitis", which are not included in the definition used in this or earlier GOLD reports. Emphysema which is destruction of the gas-

exchanging surfaces of the lung (alveoli), is a pathological term that is often (but incorrectly) used clinically and describes only one of several structural abnormalities present in patients with COPD. Chronic bronchitis which is the presence of cough and sputum production for at least 3 months in each of two consecutive years remains a clinically and epidemiologically useful term. However, it is important-to identify that chronic cough and sputum production (chronic bronchitis) is an independent disease entity that may precede or follow the development of airflow restriction and may be associated with development and/or acceleration of fixed airflow limitation. Chronic bronchitis also exists in patients with normal spirometer ***(GOLD, 2013).***

Chronic obstructive pulmonary disease (COPD) is a general name for the chronic airflow occlusion that develops most often as a result of chronic tobacco smoking for many years (COPD) was defined as "a disease that is characterized by the presence of airflow obstruction due to chronic bronchitis or emphysema; the airflow obstruction is generally progressive, may be accompanied by airway hyper reactivity, and may be viewed as partially reversible". In the past few years a new definition has been presented by the Global Initiative on Obstructive Lung Disease (GOLD) and by a Task Force of the European Respiratory Society (ERS) and the American Thoracic Society (ATS). Both GOLD and ATS/ERS state that "COPD is a disease state characterized by airflow limitation that is not fully