

ABSTRACT

Correlation Between Serum Tumor Necrosis Factor- α Levels and Muscle Weakness in Patients with Chronic Obstructive Pulmonary Disease

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Background

Chronic Obstructive Pulmonary Disease (COPD) is a major cause of morbidity and mortality worldwide, it is characterized by persistent airflow limitation that is usually progressive and associated with chronic inflammatory responses in the airways and/alveolar to noxious particles or gases. TNF- α is an inflammatory cytokine that can affect the working of macrophages, neutrophils, increased adhesion molecules on the endothelial wall, inducing *growth factor* and affect fibroblast. An increased level of TNF- α has been found in serum, induced sputum and lung biopsy of COPD patients. Muscle weakness is a common features of systemic manifestation reported in COPD patients, and it is related to systemic inflammation. This study aims to determine the correlation between serum TNF- α Levels and muscle weakness in COPD patients.

Methods

This study was an observasional analytical with cross sectional design conducted in outpatient clinic RS Universitas Airlangga Surabaya. In total, we found 35 COPD patients who qualified the inclusion and exclusion criteria as the research samples. Spirometry test, muscle weakness measured and serum TNF- α levels were measured by using Sandwich ELISA method.

Results

In this study, 29 samples (82,9%) with increased serum TNF- α levels, mean levels of serum TNF- α is $8,8898 \pm 4,978$ pg/ml. There was 26 samples (74,3%) with muscle weakness, mean value of muscle weakness test is $24,32 \pm 4,86$ kg. Statistical analysis showed significant correlation between serum TNF- α levels and muscle weakness ($C = 0,514$, $p\text{-value} = <0,001$). There was no correlation between serum TNF- α levels and muscle weakness with the degree of airways obstruction ($r = -0,298$, $p = 0,082$; $r = -0,009$, $p = 0,961$). There was no correlation between serum TNF- α levels and muscle weakness with the severity of disease ($r = 0,039$, $p = 0,823$; $r = -0,071$, $p = 0,685$).

Conclusion

There was significant correlation between serum TNF- α levels and muscle weakness in COPD patients.

Keywords : Chronic Obstructive Pulmonary Disease, serum TNF- α levels, muscle weakness

ABSTRAK

HUBUNGAN KADAR TNF- α SERUM DAN KELEMAHAN OTOT PADA PENDERITA PENYAKIT PARU OBSTRUKTIF KRONIK

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Latar Belakang

Penyakit Paru Obstruktif Kronik (PPOK) adalah penyebab utama morbiditas dan mortalitas di seluruh dunia, dengan karakteristik obstruksi saluran napas persisten biasanya progresif dan berhubungan dengan respons inflamasi kronik pada saluran napas dan/alveolar akibat dari pajanan partikel atau gas berbahaya. Peningkatan kadar TNF- α dilaporkan di sirkulasi, sputum induksi dan biopsi paru penderita PPOK. TNF- α adalah sitokin inflamasi yang dapat mempengaruhi kerja makrofag, neutrofil, peningkatan adhesi molekul di dinding endotel, menginduksi *growth factor* dan mempengaruhi fibroblast. Kelemahan otot adalah salah satu manifestasi sistemik yang sering ditemukan pada penderita PPOK dan hal ini berhubungan dengan inflamasi sistemik. Tujuan penelitian ini adalah untuk mengetahui hubungan kadar TNF- α serum dan kelemahan otot pada penderita PPOK.

Metode

Penelitian ini merupakan penelitian analitik observasional dengan rancangan *cross sectional* di Poli Paru RS Universitas Airlangga Surabaya. Sampel penelitian sebanyak 35 orang adalah penderita PPOK yang memenuhi kriteria inklusi dan eksklusi. Dilakukan pemeriksaan spirometri, pengukuran kelemahan otot dan pengambilan darah vena untuk kadar TNF- α serum dengan metode Sandwich ELISA.

Hasil

Pada penelitian ini 29 orang (82,9%) memiliki kadar TNF- α serum tinggi dengan rerata kadar TNF- α serum sebesar $8,8898 \pm 4,978$ pg/ml. Subjek penelitian dengan kelemahan otot sebanyak 26 orang (74,3%) dengan rerata nilai uji kelemahan otot sebesar $24,32 \pm 4,86$ kg. Hasil analisis statistik menunjukkan terdapat hubungan yang bermakna antara kadar TNF- α serum dan kelemahan otot ($C = 0,514$, $p\text{-value} = <0,001$). Tidak didapatkan hubungan yang bermakna antara kadar TNF- α serum dan kelemahan otot terhadap derajat obstruksi saluran napas ($r = -0,298$, $p = 0,082$; $r = -0,009$, $p = 0,961$). Tidak didapatkan hubungan yang bermakna antara kadar TNF- α serum dan kelemahan otot terhadap derajat keparahan penyakit ($r = 0,039$, $p = 0,823$; $r = -0,071$, $p = 0,685$).

Kesimpulan

Terdapat hubungan yang bermakna antara kadar TNF- α serum dan kelemahan otot pada penderita PPOK.

Kata kunci : Penyakit Paru Obstruktif Kronik, kadar TNF- α serum, kelemahan otot