CODEN [USA]: IAJPBB ISSN : 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187
http://doi.org/10.5281/zenodo.4394697

Avalable online at: http://www.iajps.com *Research Article*

CYSTATIN C LEVELS IN MIDDLE-AGED PATIENTS WITH OBSTRUCTIVE SLEEP APNEA SYNDROME

[1]Dr Muhammad Nawaz,[2]Dr Muhammad Yousuf Nawaz,[3]Dr Ghulam Mujtaba.

[1]MBBS, Quaid e Azam Medical College, Bahawalpur., [2]MBBS, Rai Medical College, Sargodha., [3]MBBS, North China University of Science and Technology, Tangshan City, Hebei Province, China.

Article Received: October 2020 **Accepted:** November 2020 **Published:** December 2020

Abstract:

Obstructive sleep apnea syndrome (OSAS) relates to the systemic inflammation and higher risk of cardiovascular and chronic kidney disease. Cystatin C (Cyst C) is a unique biological marker of xboth latent renal damage and cardiovascular disease. The purpose of this research was to measure levels of serum of Cyst C, in addition to IL-8 and CRP, in unhealthy OSAS patients.

Methods used for this study includes 82 individuals examined with polysomnography for OSAS symptoms without known comorbidities were recruited tentatively.

The results showed that as per to apnea hypopnea index (AHI) subjects were partitioned in two groups: one was OSAS group (AHI > 5/hour, n=61) and other one was controls (AHI < 5/hour, n=21), which were age- and BMI-matched. Higher Cyst C levels was seen in OSAS group than in control group (1175.12 +/- 350.30 versus 935.60 +/- 242.83 ng/mL, resp.; p= 0.017) however the levels of IL-8 and CRP very almost the same. Cyst V levels was found to have a positive correlation with the respiratory disturbance index (r = 0.239, p = 0038) and the percentage rate of oxygen<89.9% (r = 0.291, p = 0.02), and a negative correlation with the oxygen saturation while sleeping (r = -0.292, p = 0.013). The only independent predictor for Cyst C levels was RDI, when the age and BMI were adjusted (β = 0.256, p = 0.038).

The result concluded that Cyst C levels are higher in the OSAS patients without comorbidities, proposing and expanded renal and cardiovascular disease hazard.

Corresponding author:

Dr Muhammad Nawaz

MBBS,Quaid e Azam Medical College,Bahawalpur.

QR code

Please cite this article in press Muhammad Nawaz et al, ***Cystatin C Levels In Middle-Aged Patients With Obstructive Sleep Apnea Syndrome.,*** *Indo Am. J. P. Sci, 2020; 07(12).*

INTRODUCTION:

Intermittent scenes of upper airway route breakdown, bringing about oxygen desaturation, [1] portray obstructive sleep apnea syndrome (OSAS). It is an exceptionally predominant problem influencing roughly 9.9–16.5% of men and 2.9–9.8% of women; anyway, it regularly stays undiscovered primarily because of absence of mindfulness and restricted admittance to rest labs.[2] OSAS is related with expanded cardiovascular and cerebrovascular dismalness. [3,4] Oxygen desaturation, brought about by apneic occasions, along with feelings of excitement, negative intrathoracic pressure, and rehashed initiation of the thoughtful framework, enacts a progression of neural, humoral, thrombotic, and metabolic reactions that may trigger atherosclerosis. [5,6]

There is expanding proof that inflammation, set off by irregular hypoxia and reoxygenation, assume a significant function in the advancement of cardiovascular infection in OSAS. [7] Likewise, an assortment of serum inflammatory markers were discovered expanded in untreated patients with OSAS, while their levels diminished after nonstop certain airway paths pressure treatment.[8,9] C-receptive protein (CRP) is an inflammatory marker created by the liver due to interleukin-6 and its serum levels increment as a result of injury or contamination. Impressive proof recommends a free relationship between serum CRP levels and OSAS. [10] Interleukin-8 (IL-8) is a chemokine created basically by macrophages and different cells, for example, epithelial cells, aviation route smooth muscle cells, and endothelial cells. [11] Past examinations announced high serum IL-8 levels in patients with OSAS that diminished after treatment with CPAP. [12]

The motivation behind this examination was to research the conceivable danger of inactive renal capacity hindrance and cardiovascular infection in unhealthy OSAS patients. To this reason, we assessed serum Cyst C, interleukin-8 and CRP levels in recently analyzed OSAS patients without other known comorbidities.

METHODS:

Patients:

The patients were sent to the sleep laboratory because of the given symptoms of breathing disorders relating to sleep. Their previous medical history, medications and smoking were recorded. A clinical assessment was performed and anthropometric attributes were estimated. Tallness, weight, neck boundary, hip, and midriff circuit and abdomen/hip outline proportion were estimated utilizing a normalized convention. Weight list (BMI) was determined utilizing the accompanying recipe: BMI = weight (kg)/height2 (m). Circulatory strain was recorded as the normal of three successive estimations in the situated position. Tiredness was assessed utilizing the Greek adaptation of the Epworth Sleepiness Scale (ESS), [13] a self-controlled poll assessing the chance of nodding off in an assortment of circumstances [maximum score: 23; score >10: exorbitant daytime sleepiness]. Pulmonary function testing, blood vessel blood gases examination, and a 12-lead electrocardiogram were additionally performed for the rejection of aspiratory and cardiovascular illness.

Polysomnography:

According to the standard criterion, readings of apneas, hypopneas, and electroencephalogram were manually recorded. The normal number of apneas and hypopneas every hour of PSG-recorded rest time was determined as the apnea-hypopnea file (AHI). [14] The respiratory unsettling influence file (RDI) is characterized as the normal number of respiratory aggravations (apneas, hypopneas, and respiratory occasion related feelings of excitement (RERAs)) every hour of PSG-recorded rest time. [14] Subjects with AHI <5/h of rest were considered as controls. OSAS was characterized as AHI ≥5/h joined by manifestations. OSAS was reviewed as mellow (AHI: 5–15/h), moderate (AHI: 15–30/h), and extreme (AHI > 30/h).

Analysis of blood sampling:

After the 8 hours of overnight fasting, the blood samples were collected from antecubital vein. It was readily centrifuged and cryopreserved at -78 degrees Celsius until the analysis. Many factors of blood were examined. For example, fasting blood glucose, triglycerides, total cholesterol, high and low density lipoprotein, urea, creatinine, and CRP were determined by a simple chemistry analyzer (AU640; Olympus; Hamburg, Germany). IL-8 and Cyst C serum fixations were both estimated by ELISA test utilizing industrially accessible units (Bender MedSystems GmbH, Vienna, Austria, for IL-8 and Biovendor, Czech Republic, for Cyst C) as per maker's specification. GFR was determined utilizing the truncated four-variable version of the alteration of diet in renal disease (MDRD) recipe. [15,16]

RESULTS:

Total 82 subjects (67 men and 15 women) participated in the research. They were divided according to their AHI in the following two groups: OSAS group (AHI

> 5/h) that included 61 patients (50 men and 11 women) and control group (AHI < 5/h) that included 21 individuals (16 men and 5 women). Groups had no age difference (for OSAS patients versus 51.39 +/- 15.29 years for control group, p = 0.9399) and BMI (36.32 +/- 13.12 for OSAS patients versus 33.67 +/- 5.66 kg/m^2 for control group, p = 0.306). Table 1 presents the anthropometric characteristics while Table 2 presents the sleep characteristics.

Table # 1: Comparison of anthropometric characteristics between OSAS patients and controls.

	OSAS patients (AHI > 5/h) n=61	Controls (AHI < 5/h) n=21	P
Gender (male/female)	50/11	16/5	0.680
Age (years)	51.76 ± 11.45	51.39 ± 15.29	0.9399
BMI (kg/m^2)	36.32 ± 13.12	33.67 ± 5.67	0.306
Neck circumference (cm)	44.13 ± 4.14	39.57 ± 4.73	0.071
Waist circumference (cm)	121.54 ± 19.72	110.91 ± 22.29	0.308
Hip circumference (cm)	120.78 ± 14.71	115.13 ± 16.48	0.452
Waist to hip ratio	1.02 ± 0.69	0.94 ± 0.59	0.105
Smoking (%)	32.8	30.2	0.537

BMI: body mass index and OSAS: obstructive sleep apnea syndrome.

Table # 2: Comparison of sleep characteristics between OSAS patients and controls.

	OSAS patients (AHI > 5/h) n = 62	Control group (AHI < 5/h) n = 20	p
Recording time (min)	366.94 ± 62.52	380.99 ± 19.98	0.120
TST (min)	310.24 ± 67.41	290.93 ± 56.00	0.365
N1 (%)	21.50 ± 19.43	23.02 ± 14.96	0.642
N2 (%)	65.60 ± 14.50	53.93 ± 9.049	**0.029**
N3 (%)	6.44 ± 7.26	11.13 ± 8.77	0.132
REM (%)	8.92 ± 6.76	12.01 ± 10.17	0.389
RDI	54.79 ± 29.92	2.53 ± 1.13	**<0.001**
Aver. SpO_2 (%)	89.69 ± 3.23	93.8 ± 2.34	**<0.00**
Min SpO_2 (%)	69.06 ± 11.40	88.50 ± 3.74	**<0.001**
T < 90% (%)	38.42 ± 26.64	0.74 ± 1.53	**<0.001**

Arousal index	40.61 ± 22.49	14.33 ± 10.60	**<0.001**
Sleep efficiency (%)	81.79 ± 15.04	76.55 ± 13.87	0.292
ESS score	11.04 ± 5.59	9.71 ± 4.13	0.376

In first group, it was observed that serum Cys C levels had no significant relation with anthropometric parameters. Serum Cys C levels correlated positively with RDI (r = 0.239, p = 0.038) and percentage of time with oxyhaemoglobin saturation <90% during sleep (r = 0.300, p = 0.01) and related negatively with mean oxyhaemoglobin saturation (r = -0.290, p = 0.012). Correlation analysis results between serum Cys C levels and anthropometric and sleep parameters are presented in Table 4.

Table 4: Correlation analysis between serum cystatin C levels and anthropometric and sleep parameters in OSAS patients.

	Cystatin C	
	r	p
BMI	−0.032	0.776
Age	0.062	0.584
Neck circumference	0.242	0.094
Waist circumference	0.248	0.089
Hip circumference	0.195	0.184
Waist to hip ratio	0.145	0.330
eGFR	−0.170	0.149
Creatinine	0.208	0.076
RDI	0.239	**0.038**
Aver. SpO_2	−0.290	**0.011**
Min SpO_2	−0.221	0.059
T < 90%	0.300	**0.01**

CONCLUSION:

Considering all the limitations, and all the test analysis, we can say that without the known comorbidities, level of serum Cyst C in the middle-aged OSAS patients compared with the non-apneic and BMI- matched controls, there are higher risk of getting chronic kidney and heart disease in the control group. A significant role is played by intermitted hypoxia in the progressions of this process. However, further studies can be helpful in better understanding the relation between Cyst C levels and the chronic Kidney diseases in OSAS patients.

REFERENCES:

1. W. W. Flemons, D. Buysse, S. Redline et al., “Sleep-related breathing disorders in adults: recommendations for syndrome definition and measurement techniques in clinical research,” *Sleep*, vol. 22, no. 5, pp. 667–689, 1999.View at: Google Scholar

2. P. E. Peppard, T. Young, J. H. Barnet, M. Palta, E. W. Hagen, and K. M. Hla, "Increased prevalence of sleep-disordered breathing in adults," *American Journal of Epidemiology*, vol. 177, no. 9, pp. 1006–1014, 2013.View at: Publisher Site | Google Scholar
3. D. J. Durgan and R. M. Bryan Jr., "Cerebrovascular consequences of obstructive sleep apnea," *Journal of the American Heart Association*, vol. 1, no. 4, Article ID e000091, 2012.View at: Publisher Site | Google Scholar
4. K. Pafili, P. Steiropoulos, and N. Papanas, "The relationship between obstructive sleep apnoea and coronary heart disease," *Current Opinion in Cardiology*, vol. 30, no. 4, pp. 439–446, 2015.View at: Publisher Site | Google Scholar
5. S. M. Shamsuzzaman, B. J. Gersh, and V. K. Somers, "Obstructive sleep apnea: implications for cardiac and vascular disease," *The Journal of the American Medical Association*, vol. 290, no. 14, pp. 1906–1914, 2003.View at: Publisher Site | Google Scholar
6. Eisensehr, B. L. Ehrenberg, S. Noachtar et al., "Platelet activation, epinephrine, and blood pressure in obstructive sleep apnea syndrome," *Neurology*, vol. 51, no. 1, pp. 188–195, 1998.View at: Publisher Site | Google Scholar
7. W. T. McNicholas, "Obstructive sleep apnea and inflammation," *Progress in Cardiovascular Diseases*, vol. 51, no. 5, pp. 392–399, 2009.View at: Publisher Site | Google Scholar
8. Archontogeorgis, E. Nena, N. Papanas, and P. Steiropoulos, "Biomarkers to improve diagnosis and monitoring of obstructive sleep apnea syndrome: current status and future perspectives," *Pulmonary Medicine*, vol. 2014, Article ID 930535, 15 pages, 2014.View at: Publisher Site | Google Scholar
9. Archontogeorgis, E. Nena, M. Xanthoudaki, and D. Bouros, "Markers of systemic inflammation in obstructive sleep apnea syndrome," *Current Respiratory Medicine Reviews*, vol. 12, no. 2, pp. 142–151, 2016.View at: Publisher Site | Google Scholar
10. R. Nadeem, J. Molnar, E. M. Madbouly et al., "Serum inflammatory markers in obstructive sleep apnea: a meta-analysis," *Journal of Clinical Sleep Medicine*, vol. 9, no. 10, pp. 1003–1012, 2013.View at: Publisher Site | Google Scholar
11. J. C. Hedges, C. A. Singer, and W. T. Gerthoffer, "Mitogen-activated protein kinases regulate cytokine gene expression in human airway myocytes," *American Journal of Respiratory Cell and Molecular Biology*, vol. 23, no. 1, pp. 86–94, 2000.View at: Publisher Site | Google Scholar
12. E. Ohga, T. Tomita, H. Wada, H. Yamamoto, T. Nagase, and Y. Ouchi, "Effects of obstructive sleep apnea on circulating ICAM-1, IL-8, and MCP-1," *Journal of Applied Physiology*, vol. 94, no. 1, pp. 179–184, 2003.View at: Publisher Site | Google Scholar
13. V. Tsara, E. Serasli, A. Amfilochiou, T. Constantinidis, and P. Christaki, "Greek version of the Epworth sleepiness scale," *Sleep and Breathing*, vol. 8, no. 2, pp. 91–95, 2004.View at: Publisher Site | Google Scholar
14. R. B. Berry, R. Budhiraja, D. J. Gottlieb et al., "Rules for scoring respiratory events in sleep: update of the 2007 AASM manual for the scoring of sleep and associated events. Deliberations of the Sleep Apnea Definitions Task Force of the American Academy of Sleep Medicine," *Journal of Clinical Sleep Medicine*, vol. 8, no. 5, pp. 597–619, 2012.View at: Publisher Site | Google Scholar
15. S. Levey, J. Coresh, T. Greene et al., "Using standardized serum creatinine values in the modification of diet in renal disease study equation for estimating glomerular filtration rate," *Annals of Internal Medicine*, vol. 145, no. 4, pp. 247–254, 2006.View at: Publisher Site | Google Scholar
16. S. Levey, J. P. Bosch, J. B. Lewis, T. Greene, N. Rogers, and D. Roth, "A more accurate method to estimate glomerular filtration rate from serum creatinine: a new prediction equation. Modification of Diet in Renal Disease Study Group," *Annals of Internal Medicine*, vol. 130, no. 6, pp. 461–470, 1999.View at: Publisher Site | Google Scholar