
APST

Asia-Pacific Journal of Science and Technology
<https://www.tci-thaijo.org/index.php/APST/index>

 Published by the Faculty of Engineering, Khon Kaen University, Thailand

Does hypertensive crisis worsen the quality of life in hypertensive patients caused by OSA? - pilot study

Chalongchai Phitsanuwong¹, Sukanda Ariyanuchitkul², Somchit Chumjan², Aonchuma Domthong³, Songkwan Silaruks³, Vichai Senthong^{3,*}

¹ Department of Paediatrics, College of Medicine, University of Chicago, Chicago, USA

² Hypertension clinic, Outpatient department, Srinagarind hospital, Khon Kaen University, Khon Kaen, Thailand

³ Department of Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand

*Corresponding author: vichaisenthong@gmail.com

Abstract

Obstructive sleep apnea (OSA) is a common cause of hypertension and hypertensive crisis. Quality of life (QOL) of OSA patients is generally poor. This study aimed to evaluate if hypertensive crisis in OSA patients worsen their QOL. Newly diagnosed OSA associated hypertension patients treated at Hypertension/sleep clinic, Srinagarind Hospital, Khon Kaen University were enrolled. The SF-36 questionnaire was distributed to all eligible patients. Patients were categorized into two groups; with and without hypertensive crisis. All domains of QOL were compared between both groups by using the Wilcoxon Rank Sum test. There were 12 patients who were eligible and completed the study protocol. The median age of all patients was 51.5 years with median BMI of 33.59 kg/m². Seven patients were male (58.33%). Three patients had history of hypertensive crisis (25.00%). Baseline characteristics in terms of OSA symptoms and risk factors were comparable between those with and without hypertensive crisis. All domains of QOL by the SF-36 were not statistically significant between both groups.

Conclusion: The QOL in OSA patients with and without hypertensive crisis were comparable.

Keywords: Hypertensive crisis; Obstructive sleep apnea; Quality of life

1. Introduction

Obstructive sleep apnea (OSA) is a common disease and causes several cardiovascular consequences such as sudden death, hypertension, stroke, or cardiac arrhythmia [1]. It is the most common secondary cause of hypertension [2]. The prevalence of OSA in hypertension varies between 30-80% in hypertensive patients [3]; 70.8% in patients with hypertensive crisis [4]; and 82.2% in resistant hypertensive patients [5].

If left untreated, OSA patients may have poor quality of life; daytime somnolence, mood instability, poor judgment, motor vehicle crashes, and also hypertensive crisis [6] & [7]. Patients with OSA had lower quality of life in five dimension by the SF-36 compared with non-OSA patients including social functioning, role physical, role emotional, mental health, and vitality [8]. There is limited data on quality of life in patients with hypertension caused by OSA; particularly in hypertensive crisis, an emergent condition. This study aimed to evaluate if the quality of life are different between OSA patients with hypertension vs with hypertensive crisis.

2. Methods

This study conducted at hypertension/sleep clinic, Srinagarind Hospital, Khon Kaen University were enrolled. We enrolled newly diagnosed hypertensive patients caused by OSA who completed the SF-36 questionnaire (Thai version). The diagnosis of OSA induced hypertension was based on the evidence of an apnea-hypopnea index

(AHI) more than five times/hour by polysomnography [9]. Other secondary causes of hypertension were also excluded [10].

The Thai version of SF-36 questionnaire used in this study was firstly developed in 2000 [11]. It is a reliable tool to assess the quality of life in Thai subjects who are healthy or having cardiac diseases [11] & [12]. There are two main categories; physical and mental health. Both categories have four scales. The physical health category comprised of physical functioning (PF), role-physical (RP), bodily pain (BP), and general health (GH), while the mental health has vitality (VT), social functioning (SF), role-emotional (RE), and mental health (MH). Each scale has the total score of 100; 0 indicates poor quality of life [13].

Baseline characteristics of all patients were also recorded. Patients were categorized into two groups; with and without hypertensive crisis. A definition for hypertensive crisis is presence of blood pressure more than 180/110 mmHg with or without acute target organ damage [10]. Presence of acute target organ damage indicates hypertensive emergency, whereas hypertensive urgency does not have any acute target organ damage. The score in each domain of the SF-36 and clinical features were compared between both groups by using Wilcoxon Rank Sum test. All analyses were performed by using STATA software (College station, Texas, USA). A significant p values was defined if less than 0.05.

3. Results

There were 12 patients who eligible and completed the study protocol. The median age of all patients was 51.5 years with median BMI of 33.59 kg/m². Seven patients were male (58.33%). Three patients had history of hypertensive crisis (25.00%); all of them were hypertensive urgency. Baseline characteristics in terms of OSA symptoms and risk factors were comparable between those with and without hypertensive crisis (Table 1). All patients in hypertensive crisis group had daytime somnolence, reflux esophagitis, and macroglossia.

All domains of QOL by the SF-36 were not statistically significant between both groups. OSA patients with history of hypertensive crisis had lower score than those without history of hypertensive crisis in three dimensions including physical functioning (50 vs 70); role-physical (25 vs 75); and social functioning (63 vs 75).

4. Discussion

This study showed that hypertensive crisis condition did not significantly lower the quality of life in hypertensive patients secondary from OSA. Note that patients with hypertensive crisis had lower quality of life in three scales though namely physical functioning (50 vs 70), role physical (25 vs 75), and social functioning (63 vs 75) as shown in table 1. Patients with hypertensive crisis had quite low role-physical scale (25/100) indicated that limitation of physical aspect is quite large. In other words, the effect of hypertensive crisis may be mainly on physical performance.

We compared our results with three other populations; normal population, hypertensive patients, and OSA patients. Comparing with general population [14], hypertensive patients caused by OSA had lower quality of life in all scales regardless of presence of hypertensive crisis (Table 3). Comparing with patients with hypertension [15] & [16], our study population had lower quality of life in role-physical (hypertensive crisis group), bodily pain, general health, vitality, and mental health than two previous studies. Hypertensive patients from OSA in this study had lower scores in five scales than Thai OSA patients [13] including bodily pain, general health, vitality, role-emotional, and mental health. From these three comparisons indicated that hypertensive patients caused by OSA had poor quality of life in both physical and mental aspects. These findings simply explained by additive effects of both OSA and hypertension. When OSA patients have hypertension as a consequence, the quality of life will definitely lower than patients with OSA alone or hypertension alone [13], [15] & [16]. And, mental health was the lowest score among eight scales. This finding indicated that hypertensive patients from OSA had substantial effect on mentality.

To our knowledge, this study is among the first study to show the quality of life score in hypertensive patients caused by OSA. However, there are some limitations. First, the study population was quite small. Significant statistical differences may not be declared such as the role-physical scale (Table 1). Second, we did not study the association of the AHI or other factors with the quality of life. Third, the SF-36 indicated the overall quality of life; not specific to any particular quality of life aspect. Finally, the study population was from hypertension/sleep clinic. The analysis was not performed with the time of hypertensive crisis event. Those patients with hypertensive crisis answered the questionnaire after they experienced the hypertensive crisis. The score therefore may be higher than expected.

In conclusion, the QOL in OSA patients with and without hypertensive crisis were comparable. Further prospective studies are needed

Table 1 Clinical features of hypertensive patients caused by obstructive sleep apnea and categorized by history of hypertensive crisis.

Factors	No hypertensive crisis n = 9	Hypertensive crisis n = 3	p value
Age, years	47 (34-59)	56 (37-56)	0.926
Male gender	6 (66.67)	1 (33.33)	0.523
Body mass index, kg/m ²	34.80 (27.30-45.58)	30.60 (27.36-37.32)	0.681
Nocturia, times	2.5 (4-4)	2 (2-8)	0.999
Witnessed apnea	3 (33.33)	0	0.509
Headache	4 (44.44)	0	0.491
Daytime somnolence	8 (88.89)	3 (100)	0.999
Reflux esophagitis	4 (50.00)	3 (100)	0.236
Diabetes	4 (44.44)	1 (33.33)	0.999
Mallampati class 3 and 4	6 (66.67)	1 (33.33)	0.659
Macroglossia	5 (55.56)	3 (100)	0.491
Torus	1 (11.11)	0	0.999
Retrognathia	1 (11.11)	0	0.999
Apnea-hypopnea index, times/hour	34 (12-73)	33 (31-34)	0.881
Lowest oxygen, %	79 (71-80)	80 (78-81)	0.699

Note. Data presented as number (percentage) or median (1st-3rd quartile range).

Table 2 Quality of life by the SF-36 questionnaire categorized by history of hypertensive crisis.

Scales	No hypertensive crisis n = 9	Hypertensive crisis n = 3	p value
Physical functioning	70 (38-85)	50 (40-60)	0.410
Role-physical	75 (50-75)	25 (0-100)	0.570
Bodily pain	38 (25-58)	50 (0-50)	0.639
General health	40 (30-45)	45 (5-45)	0.999
Vitality	37 (29-46)	42 (33-46)	0.568
Social functioning	75 (63-75)	63 (13-63)	0.151
Role-emotional	67 (33-67)	67 (0-100)	0.923
Mental health	20 (14-25)	33 (19-43)	0.152

Table 3 Summary of quality of life score in each scale by the SF-36 in three different populations.

Scales	USA (14) (healthy)	Brazil (15) (hypertension) n = 100	Nigeria (16) (hypertension) n = 265	Thai (13) (OSA) n = 108
Physical functioning	84.2	58.7	33.53	70.0
Role-physical	80.9	47.3	54.66	69.9
Bodily pain	75.2	60.4	76.28	69.3
General health	71.9	60.7	Not available	50.7
Vitality	90.9	57.4	79.85	57.2
Social functioning	83.3	78.0	75.19	75.3
Role-emotional	81.3	58.0	51.14	66.7
Mental health	74.7	66.9	70.65	68.3

5. References

- [1] Bauters, F., Rietzschel, E.R., Hertegonne, K.B., Chirinos, J.A., 2016. The Link Between Obstructive Sleep Apnea and Cardiovascular Disease. *Current Atherosclerosis Reports* 18, 1.
- [2] Pedrosa, R.P., Drager, L.F., Gonzaga, C.C., Sousa, M.G., de Paula, L.K.G., Amaro, A.C.S., Amodeo, C., Bortolotto, L.A., Krieger, E.M., Bradley, T.D., Lorenzi-Filho, G., 2011. Obstructive sleep apnea: the most common secondary cause of hypertension associated with resistant hypertension. *Hypertension (Dallas, Tex.: 1979)* 58, 811–817.
- [3] Silverberg, D.S., Oksenberg, A., 2001. Are sleep-related breathing disorders important contributing factors to the production of essential hypertension? *Current Hypertension Reports* 3, 209-215.
- [4] Börgel, J., Springer, S., Ghafoor, J., Arndt, D., Duchna, H.-W., Barthel, A., Werner, S., Van Helden, J., Hanefeld, C., Neubauer, H., Bulut, D., Mügge, A., 2010. Unrecognized secondary causes of hypertension in

- patients with hypertensive urgency/emergency: prevalence and co-prevalence. *Clinical Research in Cardiology: Official Journal of the German Cardiac Society* 99, 499–506.
- [5] Muxfeldt, E.S., Margallo, V.S., Guimarães, G.M., Salles, G.F., 2014. Prevalence and associated factors of obstructive sleep apnea in patients with resistant hypertension. *American Journal of Hypertension* 27, 1069–1078.
 - [6] Batool-Anwar, S., Goodwin, J.L., Kushida, C.A., Walsh, J.A., Simon, R.D., Nichols, D.A., Quan, S.F., 2016. Impact of continuous positive airway pressure (CPAP) on quality of life in patients with obstructive sleep apnea (OSA). *Journal of Sleep Research* 25, 731–738.
 - [7] Flemons, W.W., Tsai, W., 1997. Quality of life consequences of sleep-disordered breathing. *The Journal of Allergy and Clinical Immunology* 99, S750–756.
 - [8] Gall, R., Isaac, L., Kryger, M., 1993. Quality of life in mild obstructive sleep apnea. *Sleep* 16, S59–61.
 - [9] Sawanyawisuth, K., Chindapasirt, J., Senthong, V., Makarawate, P., Limpawattana, P., Domthong, A., Silaruks, S., Chumjan, S., 2013. Lower BMI is a predictor of obstructive sleep apnea in elderly Thai hypertensive patients. *Sleep & Breathing = Schlaf & Atmung* 17, 1215–1219.
 - [10] Chobanian, A.V., Bakris, G.L., Black, H.R., Cushman, W.C., Green, L.A., Izzo, J.L., Jones, D.W., Materson, B.J., Oparil, S., Wright, J.T., Roccella, E.J., National Heart, Lung, and Blood Institute Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure, National High Blood Pressure Education Program Coordinating Committee, 2003. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. *JAMA* 289, 2560–2572.
 - [11] Krittayaphong, R., Bhuripanyo, K., Raungratanaamporn, O., Chotinaiwatarakul, C., Chaowalit, N., Punlee, K., Kangkagate, C., Chaithiraphan, S., 2000. Reliability of Thai version of SF-36 questionnaire for the evaluation of quality of life in cardiac patients. *Journal of the Medical Association of Thailand = Chotmaihet Thangphaet* 83 Suppl 2, S130–136.
 - [12] Lim, L.L., Seubsman, S.A., Sleight, A., 2008. Thai SF-36 health survey: tests of data quality, scaling assumptions, reliability and validity in healthy men and women. *Health and Quality of Life Outcomes* 6, 52.
 - [13] Banhiran, W., Assanasen, P., Metheetrairut, C., Chotinaiwatarakul, W., 2013. Health-related quality of life in Thai patients with obstructive sleep disordered breathing. *Journal of the Medical Association of Thailand* 96, 209–216.
 - [14] Obidoa, C.A., Reisine, S.L., Cheniack, M., 2010. How does the SF-36 perform in healthy populations? A structured review of longitudinal studies. *Journal of Social, Behavioral, and Health Sciences* 4, 30–48.
 - [15] Carvalho, M.A., Silva, I.B., Ramos, S.B., Coelho, L.F., Gonçalves, I.D., Figueiredo Neto, J.A., 2012. Quality of life of hypertensive patients and comparison of two instruments of HRQOL measure. *Arquivos Brasileiros De Cardiologia* 98, 442–451.
 - [16] Ogunlana, M.O., Adedokun, B., Dairo, M.D., Odunaiya, N.A., 2009. Profile and predictor of health-related quality of life among hypertensive patients in south-western Nigeria. *BMC Cardiovascular Disorders* 9, 25.