

SLEEP APNEA AND HYPERTENSION

Robert G. Hooper, MD (Sept 2003)

BACKGROUND

Systemic hypertension was recognized in early descriptions of the disease as a common feature of the sleep apnea syndrome.(1)

The exact role of sleep apnea syndrome in the hypertensive patient remains under study.

EFFECTS OF APNEA AND HYPOXEMIA

There is significant elevation of sympathetic activity with apnea.(2)

Patients with upper airway obstruction have elevated sympathetic activity.
Patients with sleep apnea have elevated sympathetic activity while sleeping and while awake.

Sleep apnea patients have blunted baroreceptor sensitivity.(3)

Patients with sleep apnea have an exacerbated blood pressure response to hypoxemia when compared to non-sleep apneic controls.(4)

Animal models studies have demonstrated that repetitive airway obstruction produces sustained hypertension.(5)

WISCONSIN SLEEP COHORT STUDY (6)

Risk of hypertension is increased when sleep apnea present.

If Apnea Hypopnea Index of >15 at baseline (apnea index = number of apneas and hypopneas occurring per hour) then
At four year follow-up evaluation the risk for hypertension was **three times** higher than those with <15 per hour.

Individuals with apnea hypopnea index of >5 had significantly elevated blood pressure when compared with those with and index of <5.

JOINT NATIONAL COMMITTEE ON PREVENTION, DETECTION, EVALUATION AND TREATMENT OF HIGH BLOOD PRESSURE - 2003 (7)

Reports sleep apnea syndrome first on the list of identifiable causes of hypertension.

EFFECTS OF TREATMENT

Successful treatment with Nasal CPAP will may lower blood pressure in hypertensive patients with sleep apnea syndrome. (8)

CONCLUSIONS

Sleep apnea syndrome is major contributing factor in many patients with hypertension

(Scottsdale Sleep Center - Sept 2003)

Sleep Apnea and Hypertension - References

1. Guilleminault C, Tilkian A, Dement WC. The sleep apnea syndromes. *Annu Rev Med.* 1976;27:465-484.
2. Hedner J, Ejnell H, Sellgren J, et al. Is high and fluctuating muscle nerve sympathetic activity in the sleep apnoea syndrome of pathogenic importance for the development of hypertension? *J Hypertens Suppl.* 1998;6:S529-531.
3. Carlson JT, Hedner JA, Sellgren J, et al. Depressed baroreflex sensitivity in patients with obstructive sleep apnea. *Am J Respir Crit Care Med.* 1996;154:1490-1496.
4. Carlson JT, Rangemark C, Hedner JA. Attenuated endothelium dependent vascular relaxation in patients with sleep apnoea. *J Hypertens.* 1996;14:577-584.
5. Fletcher EC, Lesske J, Behm R, et al. Carotid chemoreceptors, systemic blood pressure, and chronic episodic hypoxia mimicking sleep apnea. *J Appl Physiol.* 1992;72:1978-1984.
6. Hla KM, Young TB, Bidwell T, et al. Sleep apnea and hypertension: a population-based study. *Ann Intern Med.* 1994;120:382-388.
7. Chobanian AV, Bakris GL, Black HR, et al. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. *JAMA.* 2003;289:2560-2572.
8. Becker HF, Jerrentrup A, Ploch T, et al. Effect of nasal continuous positive airway pressure treatment on blood pressure in patients with obstructive sleep apnea. *Circulation.* 2003;107:68-73.

Sleep Apnea and Cardiovascular Diseases - Other references of interest

1. Shamsuzzaman AS, Gersh BJ, Somers VK. Obstructive Sleep Apnea, Implications for Cardiac and Vascular disease. *JAMA* 2003;290:1906-1914.
2. Kaneko Y, Floras JS, Phil D, et al. Cardiovascular Effects of Continuous Positive Airway Pressure in Patients with Heart Failure and Obstructive Sleep Apnea. *N Engl J Med* 2003;248:1233-41.
3. Bixler EO, Vgontzas AN, Lin HM, et al. Association of hypertension and sleep-disordered breathing. *Arch Intern Med.* 2000;160:2289-2295.
4. Faccenda JF, Mackay TW, Boon NA, Douglas NJ. Randomized placebo-controlled trial of continuous positive airway pressure on blood pressure in the sleep apnea-hypopnea syndrome. *Am J Respir Crit Care Med* 2001;163:344-348.

(Scottsdale Sleep Center - Sept 2003)