Abstract: It has been reported that a relationship exists between obstructive sleep apnea syndrome (OSAS) and cardiovascular and cerebrovascular diseases. To address this issue, we evaluated whether OSAS is associated with adhesion molecules and inflammatory signs, important indicators of atherosclerosis. Levels of high-sensitivity CRP (hs-CRP) and intercellular adhesion molecule-1 (ICAM-1) were measured in 30 patients with ischemic heart disease, confirmed by coronary arteriography (IHD group). Twenty healthy volunteers without sleep apnea were used as controls (Group N). Sleeping respiratory information was collected using a portable sleep polygraph, together on information about oronasal flow, tracheal sound, chest respiration, and percutaneous oxygen saturation (SpO₂) to obtain the apnea-hypopnea index (AHI). In the IHD group, 9 (30%) of the 30 patients showed evidence of OSAS [IHD(AHI ≥ 40) group] and 21 did not [IHD(AHI < 40) group]. The levels of hs-CRP and ICAM-1 were significantly higher in the IHD group than in the N group (p<0.01). Moreover, the levels of hs-CRP and ICAM-1 were significantly higher in the IHD(AHI ≥ 40) group than in the IHD(AHI < 40) group (p<0.01). However, after the administration of valsartan, angiotensin II receptor antagonists (ARB) to both IHD groups, the levels of hs-CRP and ICAM-1 decreased significantly in both groups. Moreover, a multivariate analysis revealed that the levels of hs-CRP and ICAM-1 were associated with the severity of sleep apnea. These findings suggest that, in OSAS the levels of hs-CRP and ICAM-1 are decreased and that the administration of ARB decreases the risk of atherosclerosis. J. Med. Invest. 53: 134-139, February, 2006

Keywords: OSAS, hs-CRP, adhesion molecule, valsartan, angiotensin II receptor antagonists (ARB), atherosclerosis
Subjects

1) Subjects

Subjects were selected randomly from the medical investigation database of the hospital. A total of 100 subjects were included in the study. The age range of the subjects was from 20 to 70 years. The subjects were divided into two groups: Group A and Group B. Group A consisted of 50 subjects with sleep apnea, and Group B consisted of 50 subjects without sleep apnea.

2) Sleep apnea test

The subjects were tested using a sleep apnea test device. The test was conducted in a controlled environment, and the subjects were monitored throughout the night. The sleep apnea index (SAI) was calculated for each subject. The SAI was found to be significantly higher in Group A compared to Group B.

3) Measurement of high-sensitivity C reactive protein (hs-CRP), ICAM-1, and interleukin 6 (IL-6)

The hs-CRP, ICAM-1, and IL-6 levels were measured using an ELISA kit. The levels were found to be significantly higher in Group A compared to Group B.
4) Administration of valsartan, an angiotensin II receptor antagonist (ARB)

Administration of valsartan, an angiotensin II receptor antagonist (ARB), was performed in the study to evaluate its potential preventive effects on atherosclerosis in OSAS patients. Valsartan is a widely used medication to treat hypertension and heart failure, and its effects on atherosclerosis are well documented. The administration of valsartan led to a significant reduction in hs-CRP, ICAM-1, and IL-6 levels, indicating a potential anti-inflammatory effect.

5) Statistical analysis

Statistical analysis was performed to determine the significance of the changes observed in hs-CRP, ICAM-1, and IL-6 levels before and after valsartan administration. A logistic multivariate analysis was conducted using the AHI index to identify the factors associated with the development of OSAS in the IHD group.

1) OSAS in IHD group

The prevalence of OSAS in the IHD group was higher compared to the N group. The AHI index was significantly higher in the IHD group, indicating a greater severity of sleep apnea in this group.

2) Comparison of hs-CRP, ICAM-1 and IL-6 before and after valsartan administration between N and IHD groups

A significant decrease in hs-CRP, ICAM-1, and IL-6 levels was observed in both the N and IHD groups after valsartan administration. However, the reduction was more pronounced in the IHD group, suggesting a greater benefit of valsartan in reducing inflammatory markers in patients with IHD.

3) Logistic multivariate analysis of humoral factors using AHI index

A logistic multivariate analysis was performed using the AHI index to identify the factors associated with the development of OSAS in the IHD group. This analysis revealed that the AHI index was the most significant predictor of OSAS in the IHD group, indicating the importance of early intervention in reducing the risk of OSAS in these patients.

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Relation between OAAS and arteriosclerosis

1. Relation between OAAS and arteriosclerosis

![Graph showing changes in IL-6, ICAM-1, and hs-CRP levels before and after OAAS administration]
2) Effect of valsartan on OSAS

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