Compression stockings may reduce OSA in some patients

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Wearing compression stockings may be a simple low-tech way to improve obstructive sleep apnea in patients with chronic venous insufficiency, according to French researchers.

"We found that in patients with chronic venous insufficiency, compression stockings reduced daytime fluid accumulation in the legs, which in turn reduced the amount of fluid flowing into the neck at night, thereby reducing the number of apneas and hypopnea by more than a third," said Stefania Redolfi, MD, of the University of Brescia in Italy, who led the research.

CVI occurs when a patient's veins cannot pump enough oxygen-depleted blood back to the heart. It occurs most often in the veins of the legs.

The findings appear online ahead of the final publication of the American Thoracic Society's American Journal of Respiratory and Critical Care Medicine.

Continuous positive airway pressure machines, known as CPAP, are one of the only treatment options currently recommended for people with OSA. However, many find wearing a mask all night prohibitively uncomfortable, and compliance is low, resulting in many patients living with untreated OSA and its serious health consequences. Finding a more effective means of treating OSA, therefore, is a high priority.

Dr. Redolfi and colleagues sought to determine whether a simple

intervention like wearing compression stockings might be effective in some OSA patients.

In active people, fluid accumulation in the legs is counteracted by leg muscle contractions that squeeze the veins. However, prolonged sitting can prevent this process, and the accumulated fluid in the legs then shifts rostrally overnight. This shift results in fluid accumulation in neck tissue and is thought to increase apneic events by increasing the volume of the tissue, leading to repetitive collapse of the pharynx during night breathing. In otherwise healthy subjects who have heart failure or hypertension, the amount of this overnight rostral fluid shift is strongly correlated with the degree of overnight increase in neck circumference and the number of apneas and hypopnea per hour of sleep.

"We hypothesized that the fluid accumulation that occurs in the legs of people with chronic venous insufficiency would be reduced by wearing compression stockings, and that the reduction in the fluid would also reduce the shift of that fluid to the neck during the night," said Dr. Redolfi. "There is strong evidence linking that rostral shift of fluid overnight to apnea. If we could reduce that, we would expect that apneic events would likewise be reduced."

To investigate whether compression stockings could alleviate this problem, the researchers recruited subjects from the chronic venous insufficiency clinic at La Pitié-Salpêtrière hospital in Paris. Twelve patients were randomly assigned to one week of wearing the compression stockings or to a one-week control period without compression stockings. At the end of the first week, they crossed over to the other arm of the study. Each subject underwent polysomnography and overnight changes in leg fluid volume and neck circumference were measured at baseline and at the end of the compression stockings and control periods.

At the end of the compression stocking period, subjects had an average of a 62 percent reduction in overnight leg fluid volume change as compared to when they did not wear the stockings. Patients also had a 60 percent reduction in neck circumference increase, which the researchers used as a proxy measurement to estimate fluid shift into the neck and a 36 percent reduction in the number of apneas and hypopnea per hour of sleep.

"Our findings provide proof-of-concept that among subjects with CVI, overnight rostral fluid displacement is a mechanism of disease for OSA. The effect of compression stockings on OSA is based on counteracting this fluid displacement. Prevention of dependent fluid accumulation could constitute a new therapeutic approach to OSA," said Dr. Redolfi.

"These findings are what we expected," she continued, "but the extent to which simply wearing compression stockings reduced apnea in just one week was not expected. It would be very interesting to see whether the wearing of the stockings over longer periods would have an even greater effect.

"Whether prevention of overnight rostral fluid displacement can attenuate OSA in other patient populations is an important issue that remains to be addressed in future studies," she added.

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