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## Sleep and vascular disorders.

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It is not surprising that cardiovascular diseases such as congestive heart failure and coronary insufficiency can give rise to varying degrees of sleep impairment; it is less readily appreciated that certain physiologic events occurring during sleep—as well as long-term unsatisfactory sleep—may cause or increase the risk of cardiovascular conditions such as hypertension, atherosclerosis, stroke, and cardiac arrhythmias. Heart rate abnormalities during sleep in normotensive subjects predict later cardiovascular disease, and their early identification alerts the physician to undertake preventive measures. Maneuvers, such as induction of hypoxia, can elicit abnormal blood pressure responses during sleep, and such responses have been used to identify impending cardiovascular problems that could become therapeutic targets. The spontaneously hypertensive rat has been used to examine the effect of sympathetic nervous system (SNS) activity on the heart under a variety of experimental conditions, including quiet and paradoxical sleep. The results have disclosed significant differences between the responses of spontaneously hypertensive rats and normal rats to SNS stimulation. Exploration of other pathophysiologic pathways affected by exposure to light and dark, including those responsive to the cyclic production of melatonin, will improve our understanding of the effect of disruptions of the circadian cycle on cardiovascular function. There is growing evidence that melatonin can influence important processes such as fluid, nitrogen, and acid-base balance. Human subjects whose nocturnal arterial blood pressure fails to show the "normal" decrement during sleep ("nondippers") are also prone to sleep poorly, exhibit increased SNS activity during sleep, and have an increased risk of total and cardiovascular disease mortality. Chronic sleep deficit is now known to be a risk factor for obesity and may contribute to the visceral form of obesity that underlies the metabolic syndrome. The rising prevalence of obstructive sleep apnea and central sleep apnea is linked to the modern-day epidemic of obesity. Obstructive sleep apnea is associated with an enhanced risk of having a new stroke or a transient ischemic attack.

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