

Prevalence of Nocturnal Hypoxemia in a Cohort of Adult Fontan Patients Living at Altitude

Background:

Chronic mild hypoxemia is common in many Fontan patients. The prevalence and effect of nocturnal hypoxemia is not well studied in this patient population and may lead to additional stress on the fragile Fontan cardiac physiology. It is recognized that sleep disordered breathing is common at very high elevations, but its prevalence at elevations such as Denver's at 5,280 feet (1600 m) is less clear. We aimed to evaluate the prevalence of sleep disordered breathing, defined as nocturnal hypoxemia or apnea during sleep, in a population of adult Fontan patients living at altitude.

Methods:

We performed a retrospective chart review of adult Fontan patients living at altitude followed in our ACHD program (n=47). All charts were first evaluated for documentation of a polysomnography. For patients who had polysomnography, we evaluated Apnea Hypopnea Index (AHI, events/hour), baseline oxygen (O₂) saturation, sleep time spent below 88% O₂ saturation, and lowest O₂ desaturation.

Results:

In our Fontan patient population living in Colorado, only 12 of the 47 patients had assessment for sleep disordered breathing (26%). There was significant hypoxia in 9 of the 12 patients (75%), with an average drop in saturation of 8.1%. Half of the patients spent more than 5% of sleep time with oxygen saturations below 88%. A minority of patients tested (17%) had sleep apnea (defined as AHI>5).

Conclusions:

Significant nocturnal hypoxia was present in 75% of our Fontan cohort who had screening studies. Sleep disordered breathing can lead to elevated pulmonary vascular resistance, which is poorly tolerated in this population. The high prevalence of oxygen desaturation within our study population suggests that screening for sleep disordered breathing should be considered for all Fontan patients living at altitude. However, further research is necessary to determine whether the apparently high prevalence of nocturnal hypoxia in Fontan patients living at altitude is associated with increased morbidity and mortality, as well as if a similarly high prevalence of nocturnal hypoxemia exists for patients with Fontan physiology living at lower elevations.