Evaluation of Cardiac Pacing with Closed Loop Stimulation Function for Improvement of Sleep Apnea Syndrome

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Purpose: Patients with sleep apnea syndrome (SAS) often have nocturnal bradycardia and paroxysmal tachyarrhythmias, which can be prevented by atrial pacing. However, the effect of pacing therapy for improvement of SAS is controversial. We report a case with sick sinus syndrome and situational syncope where slight SAS was improved by a cardiac pacemaker (PM) with closed loop stimulation (CLS) function. Methods: The patient was a 70 year old male with sinus bradycardia, sinus arrest, and syncopal symptoms (situational syncope). Implanted PM was a Protos DR (Nihon Kohden, BIOTRONIK), and simple apnea test was performed in DDDR and DDD-CLS modes. Results: Pacing rates between 0:00 a.m. and 3:00 a.m. in DDDR and DDD-CLS modes were 0.4% and 38.4% respectively. Apnea/hypopnea indexes (AHIs) were 8.0 and 4.9% and improved 38.7% in CLS mode. Oxygen desaturation indexes (ODIs) were 10.7 and 4.8 and improved 55.5% in CLS mode. Discussion: When physiological load caused by apnea and hypopnea is applied to the patient, circulatory demands increase and sympathetic activity is predominant during sleep with little body motion. In our patient, CLS function detected intracardiac impedance changes which reflect relative changes in myocardial contractile dynamics enhanced by increased sympathetic activity; this increased pacing rates and suppressed excess parasympathetic activity, and may be yielding improvement in AHIs and ODIs.

Keywords: CLS, SAS, AHI