A 68-year-old man with paroxysmal atrial fibrillation (AF) was admitted due to sleep disordered breathing (SDB). Transthoracic echocardiography revealed left ventricular diastolic dysfunction (the ratio of early transmitral velocity to early diastolic velocity of the mitral annulus: E/E' = 10.0) but well-preserved systolic function (left ventricular ejection fraction = 64%). Overnight polysomnography (PSG) analysis was undergone for diagnosing SDB. Overnight PSG analysis revealed that this patient experienced severe SDB with an apnea-hypopnea index score of 47.3 events/h. Immediately after patient’s sleep, repetitive non-sustained AF was observed following sustained hypopnea events. Repetitive hypoxemia, autonomic nervous system imbalance and fluctuations in intrathoracic pressure may serve as a trigger for AF. Sustained AF was observed after non-sustained AF, indicating that AF begets AF. After sustained AF occurred, various kinds of repetitive SDB events were shown. These results suggest that AF causes respiratory instability. In summary, AF episodes of this patient could be induced by the respiratory instability and AF could induce respiratory instability. Sustained AF could cause circulation delay such as heart failure, resulting in the occurrence of various kinds of SDB. Therefore, both AF itself and respiratory instability could be a therapeutic target for improving patient’s morbidity. We report on a patient, showing the causative relationship between the pulse instability and the respiratory instability.

Keywords: atrial fibrillation, sleep apnea syndrome, polysomnography