We describe a case of nocturnal choking episodes caused by insular seizures. Recurrent choking spells from sleep showed no response to treatment for sleep apnea or gastroesophageal reflux. Laryngoscopy revealed no abnormalities. Although continuous EEG monitoring during events was normal, ictal SPECT imaging showed increased radiotracer uptake in the left insular region, an area involved in sensation of the upper gastrointestinal tract. The episodes remitted after initiation of an antiepileptic drug. Obstructive sleep apnea is the most common cause for presentation to a sleep center, but seizures should remain in the differential diagnosis of nocturnal choking episodes.

**Keywords:** Insular seizure, laryngospasm, obstructive sleep apnea, and seizure

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### DISCUSSION

Given the prevalence of sleep disordered breathing and current referral patterns, the majority of patients presenting to a sleep center for evaluation of nocturnal dyspnea will have obstructive sleep apnea. In addition to apnea, however, the differential diagnosis of nocturnal choking episodes includes nocturnal panic attacks, laryngospasm, gastroesophageal reflux, and seizure. In the current case, focal seizures appeared to arise from the left insular region, with occasional secondary generalization. Insular seizures presenting with symptoms of upper airway obstruction have previously been described.

Confirming a diagnosis of insular seizures can be difficult, especially if only simple partial (no loss of awareness) seizures occur. Intertial EEG may not be diagnostic; spike frequency can be very low or even absent in extratemporal epilepsies. Because of the deep location of the insula, ictal scalp EEG is usually also unrevealing; only 20% to 30% of simple partial seizures show an ictal correlate on surface EEG. Prolactin levels may be elevated following complex partial or secondarily generalized seizures, but can also be high after syncope. As in this case, focal increases in perfusion can sometimes be seen on ictal SPECT, but regions of hyperperfusion may be large and preclude exact seizure localization.

The insula is believed to have multiple functions subserving movement, sensation, emotion and memory, including a patterned involvement in general and special visceral sensation of the gastrointestinal tract from the tongue extending at least to the esophagus. Electrical stimulation of the insular cortex in epilepsy patients undergoing stereotactic deep electrode recordings can evoke pharyngeal or laryngeal sensations of constriction ranging from breathing discomfort to a sensation of...
strangulation. Insular seizures often show early clinical symptoms of unpleasant sensations in the throat of variable intensity, followed by facial paresthesias, loss of awareness, and oromandibular automatisms as seizures spread to mesial temporal regions.

This case demonstrates that insular seizures can present with choking episodes which may be erroneously attributed to obstructive sleep apnea or reflux. When such episodes are stereotyped and do not resolve with CPAP or treatment for reflux, consideration should be given to the possibility of focal seizures even in the absence of EEG abnormalities.

**DISCLOSURE STATEMENT**

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**REFERENCES**