Sleep and Gastroesophageal Reflux Disease (GERD)

554

By: Ronnie Fass, M.D., Head, Esophageal and Swallowing Center and Director, Division of Gastroenterology and Hepatology, MetroHealth Medical Center, Cleveland, OH

International Foundation for Gastrointestinal Disorders (www.iffgd.org)

Dr. Fass is the recipient of the 2011 IFFGD Research Award for Senior Investigator in Clinical Science. In addition to researching the relationships of sleep with GERD, he is involved in research projects designed to improve understanding, diagnosis, and treatment of nonerosive reflux disease, functional heartburn, noncardiac chest pain, GERD in patients who do not respond to PPI treatment, and several studies in patients with gastroparesis. Other research areas include the role of the brain in generating esophageal-related symptoms, the impact of stroke on patients' symptoms, and a basic science project seeking to determine specific markers in patients with Barrett's esophagus.

Gastroesophageal reflux disease is a chronic disorder and the most common disease that affects the esophagus. Several studies have estimated that 1 in 5 (20%) of the U.S. adult population experience GERD-related symptoms at least once a week. Studies have also demonstrated that up to 4 in 5 (79%) of GERD patients experience nighttime symptoms. Of those patients with nighttime heartburn, three-quarters (75%) reported that the symptoms affected their sleep and nearly half (40%) stated that symptoms impacted their ability to function the following day.

Effects of Sleep

Sleep is important to your physical, mental, and emotional well-being. Some of the positive effects of sleep include:

- Thinking clearly
- Reacting quickly
- Creating memories
- Focusing on specific tasks
- Building of muscle mass
- Repairing cells and tissue
- Releasing hormones that help the immune system fight infection
- Controlling the body's use of energy
- Coping with pain

It does appear that GERD and sleep have a bi-directional relationship. GERD has been shown to adversely affect sleep by awakening people from sleep during the night. More commonly, people with GERD experience multiple, short arousals that they are unable to recollect which results in sleep fragmentation. At the same time sleep deprivation, per se, can adversely affect GERD by enhancing perception of acid in the esophagus (esophageal hypersensitivity), and potentially by increasing esophageal acid exposure time.

The importance of nighttime reflux is related to the fact that this type of reflux is associated with more aggressive symptoms of GERD (erosive esophagitis or inflammation of the esophagus, complications of GERD, Barrett's esophagus, and cancer of the esophagus). In addition, people with nighttime reflux have a higher prevalence of symptoms in the oral cavities and airways (oropharyngeal, laryngeal and pulmonary manifestations).

Poor quality of sleep and a variety of sleep disturbances have been recently added to the growing list of extraesophageal symptoms of GERD such as hoarseness, throat-clearing, sore throat, wheezing, and chronic cough. Most importantly, the overall quality of life of those with nighttime heartburn appears to be significantly worse than the quality of life of those with daytime heartburn only.

In the last decade, the Neuroenteric Clinical Research Group has been working in the area of GERD and sleep in order to decipher the exact relationship between the two disorders. An advancement that helped us to better understand the impact of GERD on sleep was the incorporation of *actigraphy* (a watch-like device that can determine if patients are asleep or awake) with their pH test measuring acid exposure matched by time. This combined technique allows us to determine the relationship between gastroesophageal reflux events, symptoms, and sleep and awake periods.

In a series of studies that we performed and subsequently published, we have been able to demonstrate that the time spent in bed prior to falling asleep is a vulnerable period for gastroesophageal reflux to occur. The longer the time spent awake in bed the greater the esophageal acid exposure experienced.

In addition, we were able to demonstrate that during sleep people with GERD woke up multiple times. However, only one-half (50%) of the awakenings were associated with gastroesophageal reflux.

Surprisingly, most of the gastroesophageal reflux related awakenings were not associated with symptoms, suggesting

that those with GERD may wake up from sleep during the night with a significant reflux but without symptoms.

We were also able to demonstrate that most acid reflux events during sleep occur after the person awoke from sleep. Furthermore, we were also able to demonstrate that waking up in the morning is also associated with a significant reflux. In other words, transitioning from sleep to awake in the morning is associated with significant reflux in those with GERD. Sleep, especially deep sleep, has been shown in our studies to be suppressive of gastroesophageal reflux.

Different Stages of Sleep

A sleep cycle goes through stages that consist of two basic states: non-rapid eye movement (NREM, stages 1-4) and rapid eye movement (REM, stage 5) sleep. Each stage of the cycle is vital to getting a good night's rest.

- Stage 1
  - This is a brief stage a sleep between being awake and fully asleep. This stage is characterized by slowed muscle activity.
- Stage 2
  - The second stage of sleep is when the body temperature drops, brain waves become slower, and the breathing and heart rate stay regular.
- Stage 3-4
  - The most restorative sleep occurs during these stages. The breathing slows down, the blood pressure drops, and activity stops in the muscles. Energy is restored and repair to tissue occurs. Hormones for growth and development are also released in this stage.
- Stage 5
  - The only stage of REM sleep is stage 5. Breathing becomes rapid and irregular. The heart rate increases and the blood pressure rises. This stage gives energy to the body and the brain as the muscles are even more relaxed. It is in this stage that dreams occur. Studies also suggest that REM sleep stimulates the part of the brain used for learning and memory.

One of the conclusions of our studies was the importance of minimizing the time people with GERD spend in bed awake. As a result, we recently embarked on a study where we assessed the value of a prescription drug that promotes falling asleep, ramelteon (a melatonin receptor agonist), on gastroesophageal reflux related symptoms during sleep. People with GERD received only ramelteon prior to going to sleep during a period of 6 weeks; a comparative group was treated with placebo. The study demonstrated that those who received ramelteon at bedtime for 6 weeks reported significantly less GERD related symptoms during nighttime. The effect was mediated by improving sleep quality, as documented by a questionnaire.

In another recent study, we evaluated the role of naps in bringing about gastroesophageal reflux. Naps are associated with more shallow sleep, which is much more vulnerable for gastroesophageal reflux to occur. The combination of taking a nap after a meal may result in more severe gastroesophageal reflux disease. Our study demonstrated that naps were much more commonly associated with gastroesophageal reflux, as well as GERD related symptoms, when compared with an equivalent sleep time during the nighttime.

Our future direction is to further explore if medications that improve sleep can be an asset for people with GERD that have symptoms during sleep. In particular, our focus will be on combination therapy of an antireflux treatment plus a sleeping pill, like a melatonin receptor agonist, in improving GERD related symptoms.

About IFFGD

The International Foundation for Gastrointestinal Disorders (IFFGD) is a 501(c)(3) nonprofit education and research organization. We work to promote awareness, scientific advancement, and improved care for people affected by chronic digestive conditions. Our mission is to inform, assist, and support people affected by gastrointestinal disorders. Founded in 1991, we rely on donors to carry out our mission. Visit our website at: www.iffgd.org or www.aboutGERD.org.

IFFGD
537 Long Point Road, Suite 101
Mt Pleasant, SC 29464