‘Breath Stacking’ Reported to Make Swallowing Safer in ALS

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ARTICLE IN BRIEF

Breath stacking was found to help ALS patients cough, clear mucus or food stuck in throat, and to swallow safely.

ORLANDO, FL—A simple breathing technique that takes only minutes to learn can help most patients with amyotrophic lateral sclerosis (ALS) not only cough more effectively but also swallow more safely. The technique, called “breath stacking,” has been known to improve cough for almost two decades. A new study has shown that it also increases the patient’s ability to protect the airway during swallowing, lowering the risk of aspiration and choking.

“This is a very important approach to therapy that can make a big difference to our patients in terms of both quality of life and length of life,” said Robert G. Miller, MD, director of the Forbes Norris MDA/ALS Research Clinic at California Pacific Medical Center in San Francisco, who was not involved in the study. “Unfortunately, relatively few neurologists are familiar with it.”

Study investigator Stuart Cleary, PhD, assistant professor of speech pathology and audiology at the University of Alberta in Edmonton, described the findings here at the ALS-MND Society meeting here in December.

Breath stacking is meant to interrupt a cycle of poor airway maintenance that is typical in ALS. As breathing muscles weaken, the ability to cough is impaired, leading to accumulation of mucus plugs in the smaller airways. At the same time, poor airway protection during swallowing increases the risk of aspiration.

The breath stacking maneuver is simple, Dr. Cleary explained. The patient uses a resuscitation bag equipped with a one-way valve and mouthpiece to take a series of breaths without exhaling, expanding the lungs beyond what he or she can accomplish with a single breath. The resulting stretching of the lungs and chest wall opens clogged airways and increases chest compliance, leading to reduced airway resistance to airflow. “This translates to improved lung volumes, higher peak cough flows and improved airway clearance,” he said.

“As a swallowing therapist, I am interested in protecting the airway during mealtime,” Dr. Cleary said. Ancedotal reports from ALS centers in Canada, where the practice is somewhat more common, indicated the technique seemed to improve swallowing safety, so he set out to test that in a rigorous fashion.

Dr. Cleary enrolled 29 ALS patients with a mean age of 65 years, a median ALS Functional Rating Scale score of 28 out of 48, a mean forced vital capacity (FVC) of 58 percent of predicted, and a mean peak cough flow (PCF) of 245 L/min. Participants performed five trials of breath stacking, each separated by about 20 seconds. Respiratory and swallowing tests were performed before treatment, and at 15 and 30 minutes afterward. Patients served as their own controls, performing the same tests on different days without breath stacking.

Consistent with previous studies, peak cough flow improved following breath stacking, rising approximately 50 L/min following treatment, an increase which lasted 30 minutes after treatment. The difference was significant for both time points versus baseline and versus the control value.

Dr. Cleary also found that breath stacking improved patients’ ability to perform other airway-clearing techniques, such as throat clearing and “hawking,” as well as the supraglottic swallowing maneuver, which consists of holding one’s breath while swallowing, closing the vocal cords and protecting the airway.

The combined effect, Dr. Cleary said, is that for up to 30 minutes after breath stacking, ALS patients were better able to cough, to clear mucus or food stuck in throat, and to swallow safely.

EXPERT COMMENTARY

“This was not a good study. It was a great study,” said Dr. Miller, of San Francisco. “Breathing and swallowing difficulty are two of the key issues for patients with ALS. Anything that would improve breathing and swallowing function would be very important for our patients.”

“Breath stacking was designed to combat atelectasis, but it never occurred to me that there could be any lasting benefit, and it never occurred to me that there could be a beneficial effect on swallowing. The results were rather surprising,” Dr. Miller said. “The very thought that they studied this in a systematic way was exciting to me. There have been very few systematic controlled trials of any symptomatic therapy in ALS.”

“Breath stacking is not widely practiced, and many neurologists are not familiar with the technique. When asked how to change that, Dr. Miller laughed ruefully.

“It’s very hard to change the way people do things when they’ve been doing it for years. Change comes slowly.” In 1999, he noted, the AAN released its first evidence-based Practice Parameter for ALS, recommending feeding tubes and noninvasive ventilation with BiPAP— bilevel positive airway pressure, “and we just assumed that immediately everyone would change their practice.”

“BiPAP is probably the most effective treatment we have for ALS, but only twenty percent of appropriate patients are utilizing it.” This is “a shockingly low figure,” he said.

“We know that, for riluzole, when the clinician is excited and positive, the percent of patients using it is very high, and when the clinician is pessimistic, it is low. And we have some data saying that is true for BiPAP as well. I think it is fair to say the same about breath stacking—patients are much more likely to try it if the physician is familiar with it and enthusiastic about trying it.”

Having opinion leaders meet face to face with other neurologists to talk about the value of these practices can help, he said.

In the clinic, Dr. Cleary and colleagues introduce the technique very early in the disease. They monitor FVC and PCF every three months, and introduce breath stacking when FVC is less than 75 percent of predicted, and PCF is less than 300 liters per minute. “We tell patients this is the first of a series of interventions aimed at minimizing the symptoms of respiratory insufficiency. Our goal is to have this treatment in place before patient have their first pneumonia, to give them a simple means of coping with shortness of breath, to avoid emergency intubation.” They recommend performing the maneuver as a series of five repetitions, three times per day.

Some of his patients also use an in-essuflation machine, which promotes coughing. “Patients work out their own routine. They might take the bagger with them to the mall,” Dr. Cleary said, confident they can handle dyspnea if it occurs. Using the technique gets the patient “used to putting a mouthpiece in, instilling this philosophy that there is something therapeutic we can do. It’s a mindset as much as it is a daily hands-on task.”

The equipment used for breath stacking with a patient showing how it is used.

Resuscitation bag, labeled “Not for CPR”

50 cc corrugated tube

One-way valve (non-latex for latex allergy patients)

One-way valve with the non-latex valve removed (closest to patient)

Mask

Nose clip (optional)

Mouthpiece (used in place of mask)