Management of Gastroesophageal Reflux Disease: Lifestyle Modification and Alternative Approaches

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Key Words

Lifestyle management · Breath training · Abdominal breathing · Crura of the diaphragm · Reflux in opera choristers

Abstract

The first step in the management of gastroesophageal reflux disease (GERD) is lifestyle modification, with dietary recommendations such as increasing fiber intake and lowering dietary fat. While there is some physiological evidence that various foods as well as alcohol and tobacco affect the pressure of the lower esophageal sphincter (LES), targeted interventions have not shown any benefit in clinical trials. The general recommendation is for the patient to avoid foods and beverages that in his or her experience trigger GERD symptoms. The only measures that have been shown with some degree of scientific evidence to be beneficial are weight loss on the part of obese patients and elevation of the head of the bed. We, in contrast, developed a training program that induces a change from thoracic to abdominal breathing. We hypothesized that this change in breathing actively trains the diaphragm, and so potentially strengthens the LES. In a randomized trial using breathing exercises as the intervention, we found an improvement in gastroesophageal reflux symptoms, assessed by quality of life, pH-metry and proton pump inhibitor use. Most patients would

prefer to take proton pump inhibitors than to do exercises, but at least for a subgroup of highly motivated patients who would prefer an alternative to medication, structured physical exercises could offer new help with their GERD.

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With gastroesophageal reflux disease (GERD) as with many other diseases, lifestyle is a major issue in prevention or treatment, and suitable modification is generally recommended as the first step in treating the disease [1]. When we first see a patient, we caution against eating before bedtime or wearing tight clothes, and suggest that patients change their eating or other habits when they notice that these tend to exacerbate GERD. This is the standard approach, but there is little solid research to back it up. Kaltenbach et al. [2] collected studies on non-pharmaceutical treatments and graded them for their scientific impact. Physiological studies have never had randomized controlled protocols; many studies were simple reports or an investigator's personal experience. Elevation of the head of the bed, left lateral decubitus position and weight loss have, however, been associated with improvement in GERD variables in case-control studies. Despite the scarcity of scientific data, lifestyle interventions still continue to be recommended routinely [1].

Fig. 1. Effect of different breathing techniques on the LES in healthy subjects on high-resolution manometry.

In a recent prospective cohort study, Singh et al. [3] showed that overweight persons who underwent a structured weight loss program (phone call-based and traditional face-to-face clinical program) combined with increased physical activity not only lost weight, but also improved their GERD scores. This report, like previous mostly epidemiologic studies, emphasizes the importance of weight control for GERD.

We often forget that not only the lower esophageal sphincter (LES) by itself, but also the adjacent diaphragm with its crura is part of the reflux protective mechanism. Both the LES and diaphragm collaborate as a functional unit. The crura compensate when the LES relaxes [4]. Manometry cannot discriminate the respective contributions of the LES and diaphragm to the total pressure. The striated muscle of the diaphragm would have to be paralyzed to measure only the LES; this could only be done under anesthesia and is therefore not suitable for functional studies. During inspiration, the intercostal muscles help to contract the diaphragm and increase the volume of the thorax. The type of breathing depends on how much of the work is done by the ribs and how much by the diaphragm. Depending on which component predominates, we speak of abdominal or thoracic breathing. With normal abdominal breathing, the muscles of the abdominal wall relax and abdominal pressure does not increase upon inspiration. Professional singers have to specifically train breathing and then concentrate on it; theoretically at least, they should be better protected against reflux. Surprisingly, the study by Cammarota et al. [5],

however, showed that professional opera singers suffered from significantly more GERD symptoms than age- and sex-matched nonsingers. The debate is still ongoing as to whether singing and breathing training worsen reflux protective mechanisms or if the specific lifestyle of singers, especially opera singers, is to blame.

After discussing the paper by Cammarota et al. [5] with professional singers and voice coaches, we decided to perform a randomized controlled study on the effect of breathing training in patients with GERD [6]. We developed a training program to increase patients' consciousness of their breathing. They learned to shift from thoracic movements to abdominal wall movements, passively stretching the lower thoracic aperture but avoiding an increase in abdominal pressure. The exercises were designed to be performed in a sitting, supine or standing position.

With endoscopy we excluded patients with anatomical abnormalities like larger hiatal hernias and active esophagitis, or other conditions for which on-demand drug therapy was contraindicated. We instructed our patients on how to use on-demand drug therapy to determine the minimal drug dosage to minimize symptoms. We then looked at their quality of life scores and the amounts of drugs they were taking. After a subsequent week of abstinence from drugs and washout of acid-blocking agents, the patients underwent manometry and pH-metry and were randomized to one group with training and one without. Each patient in the study group had a 1-hour individual training session with our physiotherapist; this was repeated after 1 week to correct any mistakes. Then the training patients were asked to perform their exercises every day for at least 30 min. They also received a CD we had made with clear verbal instructions for the exercises followed by calm, relaxing music (e.g. Bach's cello suites) to indicate how long each exercise should be continued.

Patients in our training group had significantly better pH-metry scores after 1 month, while those in the control group did not improve. The symptom scores also improved in the study group. To obtain their consent to participate, we promised all of the patients that they would receive training. After the controlled period of our study, we offered our training to the patients who had been in the control group and continued to observe all the patients in an open-label manner for at least 9 months. Then we compared those patients who had continued with the training to those who had not. Patients who stayed with the program further reduced their proton pump inhibitor dosages and sustained their lower symptom scores.

Unfortunately, our study did not allow us to define any mechanism whereby breathing alters reflux. We measured LES basal pressure and gastric-to-esophageal pressure differences obtained with certain maneuvers. We also induced transient LES relaxations by insufflation of air into the stomach, but without finding any difference between the groups. With high-resolution manometry, however, we could compare the effect of different breathing techniques on the LES in healthy subjects (fig. 1). During thoracic maneuvers, LES pressure was around 30 mm Hg. During abdominal breathing, the forces were stronger; the pressure zone showed more up and down movement with amplitudes of around 50 mm Hg. Then we continued with what we call 'forced abdominal breathing'. The subject not only hindered breathing by squeez-

ing one nostril shut but also moved one arm up in inspiration and down in expiration. Pressure rose up to 100 mm Hg, an absolutely unexpected high value. The findings were reproducible. We believe that these experiments prove that different types of breathing directly alter the reflux protective pressure zone of the LES and explain how suitable exercises can cause a long-lasting training effect that prevents reflux. The next step will be to optimize this program for introduction into clinical practice.

Disclosure Statement

The author has no sponsorship or funding arrangements relating to this research to disclose, and there are no conflicts of interest.

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