Respiration and posture influence on the activity of upper and lower esophageal sphincters

Abstract

This work explores the effect of postural respiratory function on pressures in the upper esophageal sphincter (UES) and the lower esophageal sphincter (LES). UES and LES pressures were measured using a high-resolution manometry (HRM). Leg raise in a supine position results in significant pressure increase in the UES and LES. Traction of the cervical spine and chest stabilization maneuver significantly reduces pressure in the UES and significantly increases pressure in the LES. Abdominal wall activity, i.e. intra-abdominal pressure (IAP) affecting UES and LES function, was measured using Ohm Belt sensors. IAP is related to body position, i.e. posture. Using verbal and manual guides, the subject can be instructed to increase abdominal wall activity and thus regulate (increase) IAP. Of the five monitored positions (sitting, lying on the back with leg raise, "bear", squat and hang), the greatest increase in IAP occurred in the bear position, i.e. in the position on all fours with a support on both hands and feet. IAP activation, which is significantly dependent on diaphragm activation, can potentially affect LES pressure and UES pressures. Based on the systematic review, it can be concluded that breathing exercises are effective in the therapy of gastroesophageal reflux disease (GERD) symptoms.