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Derek B. Johnson, Mathew J. Tierney and Parvis J. Sadighi

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A Case Report

Derek B. Johnson, MD; Mathew J. Tierney, DO; and Parvis J. Sadighi, MD

Spontaneous pneumothorax is the most common cause of pneumothorax. We report a case of a 29-year-old healthy woman who presented to the emergency department with a spontaneous pneumothorax caused by a yoga breathing technique called *Kapalabhati pranayama*, or *breath of fire*. Yoga breathing exercises are commonly practiced, and a limited number of studies have shown various physiologic benefits of yoga breathing. This is the only known report of spontaneous pneumothorax caused by pranayama, but some other rare causes are noted. This case should illustrate that adverse side effects can occur when one pushes the body to physiologic extremes. ***(CHEST 2004; 125:1951–1952)***

Key words: pneumothorax; pranayama; spontaneous pneumothorax; yoga

Pneumothorax is defined as the presence of free air in the pleural cavity, with secondary lung collapse. The types of pneumothorax are divided into spontaneous, traumatic, and iatrogenic pneumothorax. Spontaneous pneumothorax is the most common type, and is further divided into primary and secondary forms.[1] The typical presentation of a patient with primary pneumothorax is a tall, thin smoker with no known history of pulmonary disease who presents with shortness of breath and chest pain. The common underlying pathology in these patients is usually attributed to ruptured blebs.

Case Report

We present the case of a nonsmoking 29-year-old woman, who presented to the emergency department with the chief complaint of left-sided chest pain and shortness of breath. She was of average height and weight, and was in good physical condition. She had no significant medical history and no family history of pneumothorax. She was brought to the emergency department from a local center for yoga and holistic health where she was attending yoga instructor training sessions. The night prior to presentation she was practicing a breathing technique called *Kapalabhati pranayama*, or the *breath of fire*. She awoke with pain in her left chest and shortness of breath, which worsened until her arrival at the hospital.

Her vital signs on presentation were as follows: heart rate, 80 beats/min; BP, 118/70 mmHg; and oxygen saturation, 97% while receiving oxygen with a 2-L nasal cannula. Lung sounds on the left side were diminished. A chest radiograph showed a $> 50\%$ pneumothorax on the left side with a mild mediastinal shift to the right. A chest tube was inserted with immediate resolution of the symptoms, and the patient was admitted to the hospital. A CT scan of the chest during hospital admission did not show blebs or any other thoracic pathology. The patient was discharged to home after the cessation of air leakage, with subsequent removal of the chest tube on hospital day 7.

Discussion

Kapalabhati pranayama, also known as the *breath of fire* or the *skull shining breath*, is used as a "cleansing" breathing exercise. The technique uses a forced exhalation with the premise of ridding the lower lungs of "stale" air, allowing the intake of oxygen-rich air, thereby purifying the body.[2] As described by the Yoga Basics Web site,[3] a passive inhalation is followed by forceful exhalation through the nostrils as if attempting to blow out a candle through one's nose. It is recommended that one should gradually increase to an active breath at a rate of 45 to 60 exhalations per 30 s.

Several small studies in the Indian medical literature

*From the Department of Surgery, Berkshire Medical Center, Pittsfield, MA.
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Correspondence to: Derek B. Johnson, MD, 725 North St, BMC Department of Surgery, Pittsfield, MA 01201; e-mail: dakotaderek@yahoo.com

have shown a correlation between yoga breathing exercises and various physiologic improvements. These improvements include the following: increased exercise tolerance[4]; lowering of serum glucose and cholesterol levels[5]; decrease in urea levels[6]; as well as the slowing of the heart rate and the lowering of BP.[7]

Other studies on yoga breathing have demonstrated positive effects on patients with asthma. Two studies by Nagendra and Nagarathna[8,9] showed the beneficial effects of yoga breathing exercises for asthmatic patients. In the first study, peak expiratory flow rate values improved after yoga, and a majority of the patients were able to stop receiving or reduce their cortisone medications. The second study showed overall decrease in asthma attacks and medication usage in patients using yoga breathing. Singh et al[10] used a Pink City Lung Exerciser (Pulmotech; Jaipur, India) to mimic pranayama breathing. That study demonstrated an improvement in the measured breathing parameters of all patients over baseline. It also showed a statistically significant increase in the dose of histamine needed to cause a 20% reduction in FEV_1 during pranayama.

A literature search showed no other reports of spontaneous pneumothorax attributed to yoga breathing. Other case reports of unusual causes of pneumothorax include acupuncture,[11] cardiopulmonary resuscitation training,[12] molar extraction,[13] grass head (seed) aspiration,[14] paraquat intoxication,[15] cocaine use in pregnancy,[16] and a sewing needle injury.[17]

Conclusion

Yoga exercises have been practiced for hundreds of years. Now, an increasing number of Americans are turning to yoga and other alternative holistic methods to improve their health. Although further studies are needed to show their effect on health, many physicians may be asked to counsel their patients about the benefits and risks of these techniques. This case should illustrate that adverse side effects can occur when one pushes the body to physiologic extremes.

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Z α_1-Antitrypsin Polymerizes in the Lung and Acts as a Neutrophil Chemoattractant*

Alan T. Mulgrew, MB, BCh, BAO; Clifford C. Taggart, PhD; Matthew W. Lawless, BSc; Catherine M. Greene, PhD; Mark L. Brantly, MD; Shane J. O'Neill, MD; and Noel G. McElvaney, MD

Background: **α_1-antitrypsin (A1AT) is an abundant protein that is synthesized in the liver and is secreted into the plasma. From the plasma, A1AT diffuses into various body compartments, including the lung where it provides much of the antiprotease protection. The current understanding of the pathogenesis**

*From the Department of Medicine (Drs. Mulgrew, Taggart, Greene, O'Neill, and McElvaney, and Mr. Lawless), Respiratory Research Division, Royal College of Surgeons in Ireland, Beaumont Hospital, Dublin, Ireland; and the Pulmonary and Critical Care Medicine Division (Dr. Brantly), University of Florida School of Medicine, Gainesville, FL.

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Correspondence to: Noel G. McElvaney, MD, Department of Medicine, Royal College of Surgeons in Ireland, Beaumont Hospital, Dublin 9, Ireland; e-mail: gmcelvaney@rcsi.ie

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