A 39-year-old Caucasian female with a diagnosis of allergic rhinitis and asthma for 20 years is referred for evaluation to the allergy clinic. She was on Advair 250/50 bid (fluticasone/salmeterol) for two years, approximately four years ago, and then Advair was stopped by by her pulmonologist because her **pulmonary function tests were normal**. She is here for evaluation of allergic rhinitis by skin prick testing. She has **increased shortness of breath with exercise**. She reports **loss of voice, cough, and shortness of breath when eating or laughing**. The symptoms occur throughout the year. She also reports nasal congestion and for that, she takes Allegra D QAM and Allegra QPM . She rates the nasal symptoms as 5 out of 10 on a zero to 10 scale, when she is off the medication, and down to 1 to 2 out of 10 when she takes Allegra D. She also reports dry cough for 20 years which does not respond to albuterol. She exercises daily and uses albuterol 30 to 60 minutes before exercise, and then during her exercise routine for cough, change in her voice and shortness of breath. Thealbuterol helps, but it does not relieve her symptoms completely. She was on intranasal steroids in the past, but the spray was used inconsistently and she does not recall the effect of this treatment.

Past medical history (PMH):
Asthma, allergic rhinitis.

Medications:
Allegra D in the morning and regular Allegra in the evening. Albuterol prn.

Social history:
Positive exposure to tobacco smoke as a child, but none recently.
Pets: She has two dogs.
Occupation: physical therapist.

Family history:
Mother with allergic rhinitis, daughter with exercise-induced asthma-like symptoms.

Physical examination:
Vital signs stable.
Skin: No rashes.
Eyes: Normal. Ears: Normal. Nose: Pale, boggy mucosa with clear discharge.
Throat: Cobblestoning with posterior nasal drip.
Respiratory system: Clear to auscultation bilaterally, no wheezing, rhonchi (coarse rattling sound somewhat like snoring - usually due to secretion bronchial airways) or crackles.
Cardiovascular system: Clear S1, S2.
Abdomen: Soft, non-tender, non-distended. Extremities: No edema.

Laboratory results:
Spirometry - FVC 100%, FEV1 93%, FEV1/FVC ratio 0.74.
Bronchodilator test - negative. Her FVC improved by 2%, FEV by 4% and she did not feel an improvement in her cough.
Skin prick testing with aeroallergens - all negative.

What is the most likely cause of the patient's symptoms?
Vocal cord dysfunction

What treatment would you suggest?

This is a patient with long-standing history of shortness of breath, dyspnea on exertion, cough, change in her voice and postnasal drip. Currently, there is no convincing evidence of asthma, although she has exercise-induced symptoms. Vocal cord dysfunction (VCD) is strongly suspected and we would like the patient to followup with **ENT for a rhinolaryngoscopic exam of her vocal cords to evaluate for vocal cord dysfunction.** Rhinitis is most likely non-allergic. Skin prick testing is negative.

We advised the patient to **stop Allegra and Allegra D and to use Veramyst two sprays daily.** In order to be completely certain that asthma does not play a major role in her symptoms, she may need to have a methacholine challenge at her followup visit.

Summary
Vocal cord dysfunction (VCD) is an an abnormal adduction of the vocal cords during the respiratory cycle (especially during the inspiratory phase) that produces airflow obstruction at the level of the larynx. Vocal cords should be open during inspiration. Paradoxically, they close during inspiration in patients with VCD.
VCD frequently mimics persistent asthma and is often treated with high-dose inhaled and/or systemic corticosteroids, bronchodilators, and may lead to multiple emergency department visits and hospitalizations.

Helpful hints to the diagnosis of VCD:
- patients reports symptoms in their throat or upper chest rather than in their chest, e.g. the typical chest tightness in asthma
- voice changes during the attack, e.g. hoarseness or loss of voice
- trouble "getting air in" (VCD) rather than getting air out (asthma)
- stridor (VCD) rather than wheezing (asthma)
- no relief with bronchodilator (albuterol) in VCD