CASE REPORT

Cough syncope in a patient with severe chronic obstructive pulmonary disease

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Summary
Cough syncope is a well-known entity which results in loss of consciousness during episodes of cough. It commonly occurs in patients with severe chronic obstructive lung disease (COPD) and asthma. We report a 50-year-old African American male who presented with a syncope episode during vigorous bout of coughing. He was noted to have clonic movements with brief loss of consciousness during this episode. Initially, he was evaluated for seizures but careful history revealed that he had similar episodes in the past with coughing. Physical examination was remarkable for diffuse bilateral wheezing and tachycardia. Chest X-ray showed hyperinflation of the lungs. Transthoracic echocardiogram showed evidence of moderate pulmonary hypertension. EEG and CT scan of the head were unremarkable. His bronchodilator regimen was optimized. He was treated with antitussives for the cough and was advised to exhale before coughing. His syncopal episodes resolved on his follow up visits after the discharge. This case demonstrates that cough syncope is a known presentation of severe COPD. It can often be confused with a seizure episode but a careful history is helpful to differentiate it from seizures. Treatment of underlying COPD and cough is associated with resolution of syncopal episodes.

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Case

A 50-year-old African American male presented to the Emergency Department (ED) with loss of consciousness associated with a vigorous episode of coughing. The loss of consciousness lasted for several seconds and was associated with clonic movements of his extremities. He was initially diagnosed with seizure episode and was evaluated for seizures. On careful history, he gave history of similar episodes of loss of consciousness with coughing episodes. He denied any symptoms consistent with focal neurological disease. He had past history of oxygen dependent severe COPD, Diabetes mellitus and Hepatitis C. His medicines included fluticasone/salmeterol, tiotropium, albuterol, insulin glargine and insulin sliding scale. He had 30 packs year history of smoking and quit smoking 5 year before the presentation.

On physical examination, he was comfortable with oxygen saturations of 94% on 2 l of oxygen per minute. His heart rate was 120 min⁻¹ and respirations were 34 min⁻¹. Other vitals were within normal limits. Chest exam was remarkable for diffuse bilateral wheezing and heart exam revealed tachycardia. Abdomen and neurological exam was unremarkable. His CBC and serum chemistries were unremarkable. ECG was consistent with sinus tachycardia and right axis deviation. Chest X-ray was consistent with hyperinflation of the bilateral lung zones and right costophrenic angle bulla. CT scan of the head was ordered due to initial diagnosis of seizures and it was unremarkable. Transthoracic echocardiogram showed left ventricular ejection fraction of 60%, mild tricuspid insufficiency and moderate pulmonary hypertension with estimated pulmonary artery pressure of 50–55mmHg. EEG during the hospital stay showed no evidence of epileptiform activity with a coughing episode which occurred while performing the EEG. Pulmonary function tests done 1 year prior to his presentation showed FEV₁/FVC of 29%, FEV₁ of 0.78 l, Total lung capacity of 9.5 l (135% of predicted), residual volume of 6.26 l (273% of predicted) and diffusion capacity of 33%.

Patient was admitted to the hospital for observation. He was started on theophylline 300 mg twice daily which was discontinued 2 weeks before his presentation to the ED. He was continued on his other medications. He was advised to exhale before coughing and was started on antitussive Tessalon (benzonatate) for his cough. On subsequent follow up visits, he denied any vigorous coughing or syncopal episodes.

Discussion

Cough syncope is a transient loss of consciousness associated with coughing. Cough syncope was first described in the literature by Charcot in 1876 under the name of laryngeal vertigo. It has been described in the literature under different terms including tussigenic syncope, post-tussive syncope, tussive syncope and cough syndrome.

Cough syncope has been described in male smokers with COPD. Cases of cough syncope are also seen in patient with asthma in the pediatric population. Typical patient with cough syncope tends to be overweight, middle aged patient with underlying COPD. Patients with cough syncope tend to have paroxysms of cough associated with vigorous muscular effort. The syncope episode occurs either suddenly or 3–5 s after coughing. Patients may experience lightheadedness and visual blurring before losing consciousness. Tonic spasms or clonic movements have been noted anywhere from 10% to 47% of the patients. Syncopal episode usually lasts a few seconds with rapid recovery of consciousness. Cough syncope is usually benign and fatalities occur only in 1–2% of the patients primarily in those with underlying cardiovascular disease.

Several mechanisms have been postulated for the explanation of cough syncope in the literature. Peripheral vasodilatation and arterial hypotension was proposed by Sharpay-Schafer. It has also been hypothesized that decreased cardiac output secondary to reduced venous return or severe pulmonary vasoconstriction caused severe cerebral anoxia resulting in syncope. Kerr et al. postulated that coughing was associated with rapid rise in intracranial pressure which resulted in concussion like effect on the brain. McIntosh et al. suggested that coughing resulted in increase in intrathoracic and intraabdominal pressure which is then transmitted to the CSF by the spinal fluid or venous connections. Mattle et al. measured the middle cerebral artery velocities with the Transcranial Doppler monitor. During coughing there was a transient cerebral circulatory arrest which coincided with loss of consciousness. Desser et al. studied the carotid artery blood velocities with Doppler ultrasonic flowmeter catheter and simultaneously measured right atrial pressure by right heart catheterization. Coughing episodes in this study were associated with decrease in carotid artery blood velocity from anywhere between 18% and 62%; but there was a poor correlation between simultaneously measured mean right atrial pressure and the percent decline of carotid blood velocity.

The differential diagnosis of cough syncope includes epilepsy and cataplexy. Cough syncope may present with clonic movements during the syncope episode which might be confused with epilepsy. Careful history is needed to differentiate these two conditions as cough syncope always occurs with a coughing episode. The onset of symptoms in cough syncope is usually at an older age and patients deny any postictal confusion, tongue bite, bladder or bowel incontinence. Cough syncope tends to improve with treatment of underlying pulmonary dysfunction. Cataplexy can also be confused with cough syncope. However, cataplexy is associated with loss of muscle tone but no loss of consciousness.

Workup of cough syncope should include pulmonary function testing (PFTs) to diagnose and assess the severity of the underlying lung disease. Cough syncope might occur in patients while performing PFTs and patients should be closely monitored during maneuvers such as forced vital capacity which increases intrathoracic pressure. EEG might be helpful to differentiate cough syncope from seizures. During cough syncope, EEG shows slowing of background rhythm with progressive loss of normal frequencies.

In patients with cough syncope, it is advisable to avoid driving until the cough and underlying pulmonary disease in optimally controlled and patient notices resolution of symptoms. McCorry et al. reported four cases of serious road traffic accidents in patient with cough syncope after...
coughing episode. Bhatia et al. studied driving safety among patients with vasovagal syncope. The results of the study showed that syncope and injury during driving in patient with vasovagal syncope is rare. The precise reason was unclear but it was thought that it may be related to the posture while driving. It would be unwise to extrapolate the results of the study to patients with cough syncope as it can occur in any position including supine position.

Treatment of cough syncope involves optimal management of underlying pulmonary disease. A follow up review of patients with cough syncope at Mayo clinic showed that smoking cessation and treatment of cough is effective in relieving symptoms of cough syncope.

Conflicts of interest statement

The authors disclose no potential conflict of interest related to this article.

References