

An Approach for Management of Patients with Repeated Choking Attacks

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2. Key words

Choking-gastric; Reflux-obstructive; Sleep; Apnea

1. Abstract

1.1. Objective: To develop an approach for diagnosis and treatment of patients with repeated choking attacks.

1.2. Design: Case series.

1.3. Setting: Suez Canal university hospital, Ismailia, Egypt.

1.4. Patients: 70 patients with repeated choking attacks for more than one month.

1.5. Intervention: Diagnostic approach included history taking, clinical examination, and laryngoscopy in the clinic. Treatment options included stopping or changing culprit medications, life style modifications and proton pump inhibitors for gastric reflux, laser palatoplasty for snoring and n-CPAP and weight reduction for obstructive sleep apnea. Some patients needed referral to other disciplines.

1.6. Results: Repeated choking attacks were caused by medications in 7 patients (10%), bad dietary habits in 17 patients (24%), reflux in 24 patients (34%), and obstructive sleep apnea in 20 patients (28.5%). Fifty-eight patients (82%) were treated solely by ENT discipline. Out of this group, 54 patients (76%) were relieved of choking and 4 patients (6%) continued to have milder and less frequent symptom. Twelve patients (17%) were referred to other specialties.

1.7. Conclusion: Etiology of repeated choking attacks can be made in most patients through detailed medical history, careful clinical examination and targeted investigations. Successful management is achieved in 76% of patients by otorhinolaryngologists with the rest referred to other disciplines e.g. gastroenterology, cardiothoracic surgery and neuropsychiatry.

3. Introduction

Various extrinsic and intrinsic factors can trigger laryngeal stimulation and lower the threshold for laryngeal irritability. This leads to repeated choking episodes and cough during sleep and wakefulness. Pathophysiology of these events may be difficult to document because of their infrequency and short duration [1]. Dynamic long term monitoring of patient respiration at home may be the solution but in practice, understanding the culprit mechanism rests upon a systematic diagnostic approach [2].

Nocturnal choking is a much more annoyance for the patient and his family than diurnal choking. It leads to awakening from sleep with temporary stridor, tachycardia and panic followed by

generalized body exhaustion. It has been polysomnographically documented and it is usually of short duration (< 60 seconds) [3].

Causes of repeated choking attacks cited by different authors include Obstructive Sleep Apnea (OSA) [4], gastroesophageal reflux [5] and medications including ACE inhibitors [6], aspirin [7] and non-steroidal anti-inflammatory drugs. Other differential diagnoses include cough variant asthma [8] and epilepsy manifesting as laryngospasm [9].

Management of these choking episodes, whether medical or surgical, needs detailed history, careful examination and targeted investigations so that the patient can be trafficked in the

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right direction. In this study, we report our diagnostic approach and treatment results in managing these patients.

4. Materials and Methods

This study was carried out in Suez Canal University Hospital from November 2012 till October 2015. Patients with repeated choking attacks for more than one month were included in this series. We excluded patients with laryngeal incompetence e.g. vocal cord paralysis, those with neurological disease e.g. cerebrovascular stroke, those with history of head and neck surgery or bariatric surgery and those already diagnosed with chest or heart disease.

All patients were subjected to full history taking, including drugs, food habits (type of food and time of meal intake), full ENT examination including rigid laryngoscopy. Clinical assessment for predictors of OSA was done through: Body Mass Index (BMI), neck circumference and modified Malla Mapati Index (MMI) [10].

Depending on the clinical data, patient was trafficked into one of the following categories:

1. Patients on medications known to cause pharyngeal edema (e.g. ACE inhibitors) were advised to communicate with their physicians to change their medications. Patients on medications known to cause hyperacidity and gastritis such as acetyl salicylate and other Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) were given Proton Pump Inhibitors (PPI) for at least two weeks. They were also referred to their physician to change their medications.

2. Patient with bad dietary habits were given instructions to decrease nocturnal choking e.g. avoidance of certain foods (fatty and spicy foods, chocolate and steamed beverages), avoidance of food intake at least two hours before bed time, and head elevation during sleep 10-15°.

3. Patients with symptoms and/or laryngoscopic signs of laryngopharyngeal reflux [11] (posterior laryngeal hyperemia and edema) were given the same instructions cited above. In addition, they were given omeprazole 40 mg per day for 4 weeks. In severe case, the dose was doubled and coughs sedative (e.g. dextromethorphan 10 mg) given three times daily was added to stop the cough- reflux- cough cycle. For patients with long history of diabetes mellitus; prokinetics (e.g. domperidone) were also added.

Patients who still had choking attacks after one month had [12,13] C- urea breath test. If the test was positive test, they were treated with triple therapy (amoxicillin 1000, omeprazole 40 mg and clarithromycin 500 mg bid) for two weeks. Patients who failed to respond to the latter treatment were sent for esophago-

gastrosocopy.

4. Patients with snoring but no witnessed apnea during sleep who had redundant soft palate and normal body weight (BMI <25) were treated with laser palatoplasty as outpatient procedure. Patients with witnessed apnea and clinical predictors of OSA (BMI >25, MMI grade 3 and 4 and neck circumference > 45cm) were advised to reduce their weight and were given n-CPAP. Severe cases with BMI >40 were sent for bariatric surgery.

4.1. Ethical consideration

Written consents were obtained from all patients before the study. Local ethics committee approved the study.

4.2. Statistical methods

Descriptive statistics (on EXCEL® Microsoft Inc. USA for windows) was used to present the results. Chi square test was used to compare variables in subgroups with p value set at 0.05.

5. Results

Seventy patients (42 males and 28 females) were included in this study. Mean age was 45 ± 14 years. Mean BMI for the whole group was 29 ± 8 but for patients with OSA, BMI was 33 ± 9 and this was statistically different from the whole group ($p < 0.05$).

The causes of choking episodes in the study group were presented in **Figure 1**.

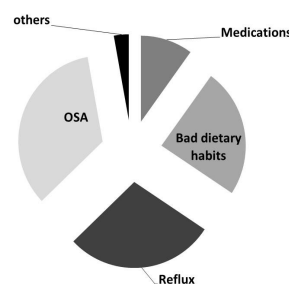


Figure 1: Etiology of repeated choking attacks in the study group.

In 7 patients (10%), medications (ACE inhibitors, aspirin, NSAIDs) were found to be the cause of choking attacks. Stopping the culprit medication for one week was followed by marked improvement in 6 patients (85%). One patient continued his ACE and chose to tolerate the infrequent choking episodes. Seventeen patients (24%) had inappropriate dietary habits: (fatty or spicy foods, nuts, dinner before bedtime). Fifteen of them (88%) improved when they stopped these habits. Two of them were not compliant and they were given proton pump inhibitor (**Table 1**).

Figure 1: Diagnostic modalities used in patients with repeated choking attacks before referral to other specialties.

Diagnostic modality
History taking with stress on dietary habits
drugs: snoring & apnea
Clinical examination
laryngoscopy
Body Mass Index (BMI)
modified Mallampati index
neck circumference
Urea breath test

Twenty patients (28 %) who had history and/ or laryngoscopic view suggestive of reflux disease were given PPI for one month. Sixteen of them (80%) had improvement of their choking. The other four (20 %) who failed to improve had positive urea breath test and were given triple therapy for H.pylori for 2 weeks. One patient (5%) who failed to improve was sent for upper GI endoscopy.

Twenty patients (28.5%) had OSA. Four of them (20 %) had redundant soft palate but normal body weight. Laser palatoplasty was done for them. Seven patients had witnessed apnea and they were given n-CPAP and advised to reduce their weight. Nine of this group (45%) had BMI >40 and they were advised to reduce their weight and were referred to bariatric surgery. All patients treated had significant improvement in their choking attacks and those on n -CPAP showed high level of compliance.

Two patients (3%) were referred directly to other specialties. One of them was diagnosed as focal epilepsy and the other proved to have panic attacks manifesting as nocturnal choking.

Overall, Fifty-eight patients (82%) were treated solely by ENT discipline. Out of this group, 54 patients (76%) were relieved of choking and 4 patients (6%) continued to have milder and less frequent symptom. Twelve patients (17%) were referred to other specialties.

6. Discussion

Using our diagnostic approach and management, we successfully diagnosed the cause of choking in 97 % of our patients and treating 76% of them. The etiology of repeated choking attacks may be clarified from patient history e.g. medications. In our study this represented 10 % of patients. Prompt recognition of drug related cough can prevent unnecessary diagnostic testing and treatment. One important category is the ACE inhibitors. Choking attacks and even laryngeal edema have been reported [12]. It happens in 5 to 20 percent of patients and is usually not dose related, and the cough may begin one week to six months after therapy is initiated [6]. This is through release of inflammatory mediators e.g. bradykinin and substance b. Even the use of angiotensin receptor blockers does not eliminate this potentially fatal side effect [13]. Choking may happen any time during the

day and in contrast to reflux, are not related to body position. A 4-day trial of withdrawal of the ACE inhibitor or temporary substitution of another class of antihypertensive agent easily ascertains if the ACE inhibitor caused the problem.

Aspirin and NSAIDs are known to induce gastritis and hyperacidity through inhibition of cyclo-oxygenase [7]. Patients are usually cross sensitive to all non-steroidal anti-inflammatory drugs and even foods containing salicylates can trigger the symptoms. They start 30 minutes to three hours after intake in the form of choking attacks, coughing, wheezes and chest tightness. Stopping the medication can improve the gastritis and choking [14].

After exclusion of a culprit medication, the two diagnoses to consider in patients with repeated choking attacks are OSA and reflux disease. They constituted nearly 64% of our patients. Reflux can be diagnosed from patient symptoms and laryngoscopic signs but subclinical reflux has also been proved to be the explanation of sleep related choking in patients who denied heart burn. Moreover, the relation of choking to reflux may remain undiagnosed even with ambulatory 24-hour pH monitoring [15]. This is due to the rarity of the sleep related choking episodes. Therefore, empiric treatment is justified in this patient [16].

Some patients with reflux may be resistant to usual therapeutic doses [17] and the dose should be doubled. Cough sedatives particularly codeine like derivatives are also essential in the treatment of these choking attacks to stop cough - reflux - cough cycle i.e. cough that perpetuates itself [18]. In diabetics, prokinetics help in treating reflux as gastric paresis is not uncommon [19]. In the senior author experience (DMH), calcium supplementation had remarkable effect in treating persistent choking due to gastric reflux. Although exact mechanism is unknown; it is most probably related to increased vagus nerve excitability [20].

The second cause to consider in patients with nocturnal choking is OSA. It was present in 30 % of our patients. During apneic episode, the strong respiratory effort against closed airway may increase the chance of aspiration of the patient own secretions. This causes strong cough reflex and laryngeal spasm that takes several minutes before breathing returned to normal [21]. To relieve these patients of their apnea and choking attacks, a decision based on body weight, oropharyngeal anatomy, and severity of apnea should be made.

Although patients with neurological disorders were excluded in this study, one laryngeal disease that causes repeating choking attacks needs to be considered i.e. laryngeal dyskinesia [22]. It usually causes recurrent choking episodes recurring over months or years, of sudden onset with complete obstruction to respiration followed by dyspnoea with loud inspiratory stridor

lasting two to five minutes. Attacks occurred during wakefulness and/or sleep. If laryngoscopy could be done during the episode, false vocal cords can be seen open, but the vocal cords remained adducted causing inspiratory stridor [1].

Finally, recurrent choking could be due to some serious problems e.g. aortic aneurysm [23] and other mediastinal lesions. These patients are to be referred directly to cardiothoracic surgery. Psychiatric help may also be sought if all investigations proved to be normal.

In conclusion, etiology of repeated choking attacks can be made in most of patients through detailed medical history, careful clinical examination and targeted investigations. Successful management by otolaryngologist is achieved in 76% of patients with the rest referred to other disciplines e.g. gastroenterology, cardiothoracic surgery and neuropsychiatry.

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