Chronic Cough in Otorhinolaryngologic Routine

Tosse Crônica na Rotina Otorrinolaringológica

Francisco Xavier Palheta Neto*, Camilo Ferreira Ramos**, Amanda Monteiro Tavares e Silva**, Karla Araújo Nascimento dos Santos**, Ana Carolina Guimarães de Azevedo**, Angélica Cristina Pezzin Palheta.***

* Otorhinolaryngologist Doctor. Master in Otorhinolaryngology from Federal University of Rio de Janeiro. Doctor in Neuroscience from Federal University of Para.
** Undergraduate Students at the Fourth Year of Medicine Degree. State University of Para.
*** Otorhinolaryngologist Doctor. Master in Otorhinolaryngology from Federal University of Rio de Janeiro.

Institution: Otorhinolaryngology Center of Para.
Belém / PA - Brazil.
Mailing address: Otorhinolaryngology Center of Para - Avenida Conselheiro Furtado, 2391, salas 1508 e 1608 - Edificio Belém Metropolitan - Bairro: Cremação - Belém / PA - Brazil – ZIP Code 66040-100 - Telephones: (+55 91) 3249-9977 / 3249-7161 / 9116-0508 - Email: franciscopalheta@hotmail.com
Article received on October 19, 2009. Article approved on January 4, 2010.

SUMMARY

Introduction: The chronic cough is sometimes manifested as an imprecise symptom, but of great importance for both the diagnosis and the prognosis. In an otorhinolaryngologic approach, several illnesses that can occur with it can be numbered, including 2 of the 3 main causes of chronic cough.

Objective: To identify the main otorhinolaryngologic diseases showing the chronic cough as one of their manifestations.

Method: A literature's revision was performed in several scientific articles, specialized books and consultation in Birene and Scielo databases.

Literature's revision: cough production in the upper airways is usually associated with an inflammatory reaction by stimulating sensitive receptors of these areas or by mechanic stimulus. The main cause of the chronic cough in the otorhinolaryngology day-to-day is the post-nasal drip, gathering together by itself 02 of the most common diseases: rhinitis and sinusitis. Laryngitis as a result of gastroesophageal reflux (GER) stands out in the index of chronic cough etiology, but it is not as severe as GER . Neoplasias are also somewhat frequent causes of cough, and the difficulty in diagnosing the cough cause is common in this disease group. Motility disorder, laryngeal irritation persistence, parasitic disease and injuries by inhalation of toxic products were also found as a cause of cough for longer than 03 months.

Conclusion: Chronic cough is a frequent and important finding in otorhinolaryngology and cannot be underestimated, and a careful anamnesis is the best way to determine the etiology and perform a correct treatment for the patient's disease.

Keywords: cough, rhinitis, sinusitis, gastroesophageal reflux, otorhinolaryngopathies.

RESUMO

Introdução: A tosse crônica por vezes manifesta-se como um sintoma inespecífico, mas de grande relevância tanto para o diagnóstico como o prognóstico. Em uma abordagem otorrinolaringológica, enumeram-se várias enfermidades que podem cursar com ela, inclusive duas das três principais causas de tosse crônica.

Objetivo: Identificar as principais doenças otorrinolaringológicas que apresentam tosse crônica como uma de suas manifestações.

Método: Realizou-se revisão de literatura em vários periódicos científicos, livros especializados e consulta aos bancos de dados da Bireme e Scielo.

Revisão de Literatura: A produção da tosse nas vias aéreas superiores geralmente está associada a uma reação inflamatória, por estímulo de receptores sensitivos dessas áreas, ou estímulo mecânico. A principal causa de tosse crônica no cotidiano da otorrinolaringologia é o gotejamento pós-nasal, entidade que reúne em si duas das mais comuns doenças: rinites e sinusites. As laringites como consequência de refluxo gastroesofágico (RGE) ocupam posição destacada no índice de etiologias da tosse crônica, porém não se apresentam em severidade proporcional ao RGE. Neoplasias também são causas relativamente frequentes de tosse, e a dificuldade em diagnosticar a causa da tosse á comum neste grupo de doenças. Distúrbios de motricidade, persistência de irritação laríngea, parasitoses e lesões por inalação de produtos tóxicos também foram encontradas como motivo de tosses por mais de três meses.

Comentários Finais: Tosse crônica é um achado frequente e importante em otorrinolaringologia, e que não deve ser subestimado, sendo uma anamnese cuidadosa a melhor forma de determinar a etiologia e realizar o tratamento correto para a doença do paciente.

Palavras-chave: tosse, rinite, sinusite, refluxo gastroesofágico, otorrinolaringopatias.

Introduction

In otorhinolaryngology, chronic cough (CC) is usually an imprecise symptom, but understanding it can be helpful with differentiated diagnosis, evaluation of lesion occurrence and also prognosis. For it is found in diseases having the most diverse etiologies, the otorhinolaryngological causes are the most remarkable ones, and they are represented by two of the three most common causes (post-nasal drip and laryngitis for gastroesophageal reflux) (1,2).

CC is characterized by the continuity of cough in a minimum 3-week period (2,3). This is the most widely accepted concept, although some authors claim a time equal to or above eight weeks (4). Cough is one of the most frequent symptoms in medical inspection and its diagnostic variety shall therefore be acknowledged to all professionals (5). The three greatest groups of causes, which are up to 95% of CC cases, are: otorhinolaryngopathies, pneumopathies and psychogenesis (1). For the remarkable incidence the first ones have, they shall be approached.

The post-nasal drip, or posterior rhinorrhea, is the most frequent etiology of CC, including rhinitis and sinusitis (1). The gastroesophageal reflux (RGE) is also described as a relevant cause of this sort of cough, and this association is found is as much as 33% of children, but there is another important data: GER severity is not associated with laryngeal symptoms and patients with less severe reflux characteristics can cough more (6).

Among other things, there are laryngitis and neoplasias. In laryngeal tumors, cists, papillomas, nodes and Reinke edema are the most remarkable ones and can occur with cough simultaneously. They can be symptomatically presented as scarce, and chronic cough of an unidentified etiology is regarded as a factor requiring some attention to perform deeper diagnostic examinations (7). There are also neoplasias of salivary glands (mucoepidermoid carcinoma), among which they are considered to be the cause of continual cough.

Cruz and Fonseca (2009) (9) describe inhalation complications of toxic products as a continual irritator of airways and, therefore, the etiology of CT. Further CC cases have also been described as a result of past lesions (2,10).

Another form of cause of chronic cough is parasitism. It can have a pneumologic background, like in pulmonary-cycle worms, or it can be a chronic parasitism of the upper airway tract, which is a rare condition (11).

For there is a large number of diseases indicating chronic cough in its symptomatic scope, learning some of their peculiarities is extremely important to reach a correct diagnosis. This literature's revision intends to approach the main features of the most common causes of otorhinolaryngopathic CT.

Method

The research was performed by searching through Cochrane, LILACS, MEDLINE, OMIM and SCIELO databases and including in the research terms like chronic cough, otorhinolaryngopathic cough, rhinitis, sinusitis, among others related to the purpose of this study, as well as renowned literature on the subject.

Interested readers can deepen their studies by searching the Internet for recent articles. The free database On-line Mendelian Inheritance in Man – OMIM is a suggestion, since it contains permanently updated information and articles (12).

Cough in otorhinolaryngology

cough is a common symptom with a varied significance, and typically a reflex response to receptor-irritating stimuli of larynx, trachea or the big bronchi. Additional causes are inflammations on respiratory mucosa and pressure or tension in airways caused by a tumor or an augmentation of the peribronchial lymphatic ganglia. Its presence means a typical problem of respiratory pathways, but the symptom can as well have a cardiovascular background (13).

In a scenario with a wide range of possible etiologies, the otorhinolaryngological causes can be hardly remembered at the moment when finding a diagnosis. Literature describes foreign achievements that are also used in Brazil. They firstly approach the interruption in the utilization of inhibitors of the angiotensinogen-converting enzyme, and secondly they carry out a thoracic x-ray examination. In case it is unchanged, in this moment, the patient is kept away from environmental irritators, and if cough still continues, otorhinolaryngological causes are now considered (1,14).

In the otorhinolaryngological environment, cough is a common symptom and can evolve from benign in 7 to 14 days. It is the consequence of bacterial, viral, sinusal and allergic processes as well as of gastroesophageal reflux. cough treatment depends on the primary disease treatment, with otorhinolaryngologists being frequently called to evaluate patients with a history of a long-term cough.

Cough can be classified as acute, subacute and chronic: when this symptom remains for as long as 3

weeks, it is classified as acute; between 3 and 8 weeks, it is subacute; longer than 8 weeks, it is classified as chronic cough (2).

Cough happens when there is an upward expulsion of air from lungs, and it is originated when the glottis is opened, what produces a bursting noise. Its work is an efficient mechanism of defense to both prevent strange material from entering the lower respiratory tract and remove non-gaseous particles of the respiratory tree.

It is physiologically an involuntary membrane, an exclusively vagal phenomenon provoked by receptors found in the inferior part of the oropharynx, inferior respiratory tract (like in tracheal carina) and areas of bronchial bifurcation, as well as the tympanic membrane and the external hearing conduit. The neural receptors that are involved seem to be RAIR (Rapidly Adapting Irritant Receptors) and fibers C12. The stimulation of these receptors can have an inflammatory background (edema, secretions and ulcerations), a chemical background (irritating gases), mechanical (dust, strange body, reduction of pleural pressure) and a thermal one (excessive cold or heat). The afferent pathways leave from the cough-generating zones, going to the bulb through the vagum. The efferent pathways are extended from the bulb to the glottis and the expiratory muscles too, and they are composed of the inferior or recurring laryngeal nerve (responsible for closing the glottis), the phrenic nerve and the intercostals nerves innervating the expiratory muscles (13).

According to Bretan, cough production is also originated in both upper and lower digestive pathways, which communicate with the airways in such a way that the secretions can flow off in several directions with those coming from the paranasal sinuses being a frequent cause of cough. In acute sinusitis, an inflammation can become chronic and cough seems to be the only major symptom. Nasal and dental alterations also allow for sensual infection, and when performing a careful anamnesis, the signs and symptoms are noticed (15).

Post-nasal drip (PND)

Chronic cough is a regular clinical situation. In more than 80% of patients, they have a variety of causes, out of which Posterior Rhinorrhea Syndrome (also called Post-Nasal Drip) is the most frequent cause of chronic cough in adults of all ages and the second one in children (16,17).

The term 'post-nasal drip' has been largely used in such situations as follows: Sensation of having 'something dripping in the throat', or post-nasal discharge (sign of pharyngeal aspiration); frequent need to clean the throat (sign of clearing the throat); when the physical examinations of nasopharynx or oropharynx, after the sign of pharyngeal aspiration, reveal the presence of mucus or muco-purulent secretions adhered to their posterior walls; when it is noticed a 'paved' appearance (cobblestone) of the pharyngeal mucosa on the physical examination (although gastroesophageal reflux can cause a similar finding) (2).

The post-nasal drip is one of the most common conditions of chronic cough in nonsmoking patients having a thoracic radiograph with no significant alterations. It is mostly associated with rhinitis or rhinosinusitis and adenoiditis, these patients commonly have a cough starting in the evening, usually during sleep or in the morning, and it is associated with nasal obstruction or coryza and the sensation of something dripping in the throat and/or the need to clean it frequently. It must be remembered that the absence of these symptoms does not exclude the diagnosis, since PND is likely to be silent, and in this situation it is only manifested by cough (18).

The most common causes of GPN-secondary cough are seasonal or perennial allergic rhinitis, vasomotor rhinitis, post-viral rhinitis, sinusitis, rhinitis medicamentosa, as well as secondary rhinitis and environment-irritating agents. Within the scope of the diseases concurrent with post-nasal drip, sinusitis is approximately 30% of the causes of non-productive cough and 60% of productive causes (1). In a study with 33 patients with fungal sinusitis, post-nasal drip was found in 25 cases and cough in 17 cases (19).

In allergic rhinitis, there is a hypersensitivity to allergy inhalers and, sometimes, to alimentary inhalers. It mainly occurs in young adults, being concurrently found aqueous rhinorrhea, sneezing, itching, nasal obstruction and hyposmia, in addition to cough. The feature is worsened in the morning, due to the variation of temperature between sleep, room and external environment. In decubitus, worsening also occurs as a result of mucus congestion. The secretion has an eosinophilic feature (very prominent), showing basophiles and mastocytes too. The eosinophiles determine the differentiated diagnosis of non-eosinophilic allergic rhinitis (3).

Allergic manifestations in the nasal cavity occur more slowly than in lungs, of which one of the causes is the nasal response for hyperreactivity making a contact with high concentrations of allergens (3).

Sinusitis is the most common complication of allergic rhinitis. Facial sinuses are located in bone cavities around the nose and therefore the continual alteration of the nasal mucosa also results originating the mucosa that covers the facial sinus, and it is also called 'rhinosinusitis'. The main symptoms of sinusitis are: headache (more frequent in

adults), continual nasal obstruction, coryza secretion from nose, fever or physical indisposition. In some cases, however, it can be manifested just like a continual cough with nocturnal worsening, especially in children (19).

Patients with rhinitis usually show coryza, rhinorrhea, nasal and ocular sneezing, and they become worse due to climatic changes and exposures to irritating or allergen factors. Those with rhinosinusitis habitually show cough with expectoration of a number of characteristics (18).

Chronic cough can be caused by continual rhinitis, even without sinusitis. It occurs because the nasal secretion trends to slide through the posterior area of the nose towards the pharynx, causing a real drip and leads to a long-term cough, which usually becomes worse in the evening (20).

The responsible physiopathological mechanism implies the mechanical stimulation of the afferent pathway of cough reflex in the upper airways (by draining the secretion of both nose and perinasal sinus for oropharynx) (16).

The diagnosis of cough induced by PND should not, however, be made only by the history and physical examination, but reaching a favorable response to the treatment of the likely cause of the drip and the subsequent solution for the cough is required (17,21).

At PND's etiology evaluation by the non-specialized doctor, a simple radiography of the paranasal sinuses must as well be requested in the four classical positions. In the cases where the simple radiologic study is common, it is required to perform the otorhinolaryngological examination with an endoscopy of the upper airways. In cases where doubt still remains, a computed tomography of paranasal sinuses must be requested, preferably at a high resolution (17). There is a lower diagnostic accuracy of the x-ray in comparison with the Computed Tomography of Paranasal Sinuses, and optic-fiber rhinoscopy is regarded as a suitable option to Computed Tomography of Paranasal Sinuses (21).

The treatment of allergic rhinitis is comprised of measures of environmental hygiene in order to avoid contacts with allergens associated with the administration of oral antihistaminic that can initially be related to nasal decongestants and topic steroids. Chronic sinusitis without a hydro-aerial level in image examinations requires a nasal saline solution to be used and followed by the instillation of topic corticosteroids, and the utilization of antibiotics left to cases in which it is found a hydro-aerial level or a sealing of the paranasal sinus that can be used for 3 to 4 weeks in chronic rhinosinusitis. The response to PND treatment is usually swift, and there is an improvement of the cough in less than a week after the administration of the proper treatment (18).

Gastroesophageal reflux disease

The gastroesophageal reflux disease (GERD) is a pathology caused by the anatomic and/or functional failure of the contention mechanisms of the gastric content in the stomach (12).

GERD has been increasingly interesting for otorhinolaryngologists, as a result of the signs and symptoms manifested by the mentioned disease (22).

For long, it has been believed that GERD would only affect the upper digestive pathway, but today, however, it is known that this disease can show atypical clinical manifestations (e.g. chronic cough), leading the patient to search for other specialists than the gastroenterologist only, such as an otorhinolaryngologist (23).

In GERD, the main problem is in the inferior sphincter of the esophagus, where there is an association between esophageal motility and chronic cough.

Upper and lower digestive airways show tubes that communicate with one another as high as the oropharynx, and there can be an ascent of the secretions and substances from the lower parts to the upper ones, therefore, provoking signs and symptoms in segments with regard to otorhinolaryngological expertise (laryngopharyngeal structures) that can be associated with gastroesophageal reflux and lead to a number of complaints, among which chronic cough stands out (12).

Chronic cough is one of the most common extra-digestive manifestations of GERD and produces significant changes in the gradient of the thoracic-abdominal pressure and in the diaphragm curvature, enabling the gastric content to be refluxed to esophagus (25). This cough is usually dried preceded by nutrition and can occur at any time of the day, mainly at night, when the patient is in horizontal dorsal decubitus (20).

The gastroesophageal reflux disease (GERD) can cause cough in two occasions, which are explained in two theories (25):

1. Reflux theory – the direct contact between the aspired gastric content with the upper and lower airways would cause lesions to their mucosa, provoking an inflammation with a variable degree and cough.
2. Reflex theory – the contact of the gastric acid with the esophageal mucosa would cause an esophageal-

bronchial reflex intermediated by the vagum, leading to cough.

In the last three decades, GERD has been considered one important etiology of this symptom. The patients with chronic cough exclusively associated with GERD have a typical profile: No exposure to irritating agents; no tabagism history; no current utilization of angiotensin-converting enzyme inhibitors; normal thoracic radiograph or with imprecise alterations; and asthma, sinusitis and eosinophilic bronchitis were disregarded. The best option, however, to confirm that the cough arises from GERD is its improvement after esophagitis treatment (2,5,25).

Chronic cough is a frequent cause that has led individuals to search for a doctor. Patients with chronic cough with dry or low-productive characteristics can see the otorhinolaryngologist as a professional of first choice (26).

The examination deemed to be highly valuable and mandatory in the diagnosis of otorhinolaryngological manifestations of the gastroesophageal reflux disease is the nasofiberlaryngoscopic examination, since it is less invasive, it does not use radiation, it does not have risks of contrast aspiration and it allows for an excellent view of all the upper respiratory mucosa from the nasal fossas to rhinopharynx and larynx (22).

According to most of the published studies, 24H-pHmetry associated with daily notes of the symptoms taken by the patient is a satisfactory diagnostic method so as to establish the relation between chronic cough and GERD. It is a particularly useful method for it can be related to the episodes of cough registered by the patient in his/her daily notes of symptoms. However, the false-negative rate shows to be elevated and conventional measures of abnormal acid exposure cannot be recorded (27). Additionally, 24h-pHmetry is only indicated when there is no response to the empiric test of acid suppression (5).

Laryngitis

Laryngitis is inflammatory affections of larynx and deemed to be the causes of cough, even though it is not the main symptom. Acute laryngitis evolves in as long as 7 days and is not included in the concept of Chronic cough. As to the chronic cough, there is a symptomatology easily indicating the participation of larynx: hoarseness, stridor, aphonia, odynophagia, odynophonia, pain and even dyspnea.

Weber (28) emphasizes the similarity of this symptomatology with those of laryngeal cancer, being it considered important when this diagnosis is excluded.

The chronic laryngitis is divided into two major groups:

1. Imprecise chronic laryngitis – they do not have an explicit cause responsible for the pathology, but factors cooperating to develop laryngitis instead. Several factors are involved such as vocal abuse, infections, variations of temperature, inhalation of chemical products, tabagism, alcoholism, oral breathing and GER. Lesion starts with vasodilatation and edema, inflammatory reaction evolving into basal hyperplasia, with acanthuses and parakeratosis (28,29). In them, common laryngitis occurring after viral infections, manifested days after the solution of the disease, is involved. This group is as follows:
   - 1.1) Simple chronic laryngitis: Its significant symptom is hoarseness, as well as a large quantity of expectoration. So that airways can be freed, patient coughs constantly.
   - 1.2) Chronic atrophic laryngitis: Atrophy of mucosal glands occurs with a subsequent resection of the laryngeal wall. Cough functions as a way to lubrificate the area.
   - 1.3) Vocal chords nodes and ulcers: Mainly related to the excessive utilization of voice. Nodes are always bilateral and ulcers tend to be nodes by contact.

The treatment of imprecise laryngitis is not always efficient due to the multiple etiologies and the difficulty in following with the medical indication (vocal relaxation – mainly in voice professionals). It is indicated a constant humidification of the larynx, vocal relaxation, and, in most severe cases, the utilization of anti-inflammatory drugs (28,29).

2. Specific chronic laryngitis – they have an identifiable etiology, whether it is a certain agent or an associated disease. They are intentionally divided into infectious and non-infectious. Treatment is performed by fighting the specific cause.
   - 2.1) Infectious – cough occurs by directly stimulating the laryngeal vagal receptors.
   - 2.1.1) Tuberculous laryngitis – laryngeal granulomas caused by pulmonary tuberculosis (*Mycobacterium tuberculosis)*. In this disease, the contaminated spittle infects larynx, which, in turn, develops granulomas with subsequent laryngeal symptoms, one of which is cough (30). In addition to the general symptoms of laryngitis, there is the loss of weight and night fever (caused by tuberculosis) (29). Although it is uncommon, the laryngeal impact can be primary and start by an amygdale infection, which can be unilateral and make a differentiated diagnosis with initial malign tumors (31).

2.1.2) Syphilitic laryngitis – more common in the secondary way, although it can be seen as an inoculation chancre. They are painless, erythematous or gray lesions concurrently with cervical lymphadenopathy. Serologies for syphilis confirm the diagnosis (*Treponema pallidum*).

2.1.3) Hansen's laryngitis – more common in Virchow's presentations of leprosy (*Mycobacterium leprae*). Simultaneously with nasal access, it starts with leproma (elevated and erythematous lesions). Identification and treatment are performed by the renowned methods for leprosy.

2.1.4) Other bacterial causes, such as rhinoscleroma, fungal (rhinosporidiosis, paracoccidoidomycosis, histoplasmosis), by protozoans (28,29).

2.2) Non-infectious.

In this group, the main forms of laryngeal attack are secondary to other diseases, some of which are noticeable: Systemic lupus erythematous, amyloidosis, Wagner's granulomatosis, GERD, sarcoidosis, pemphigus, etc. Other causes are due to direct radiation and trauma.

Benign and malign tumors

Benign pathologies of larynx can have epithelial, conjunctive or cartilaginous background. Cartilaginous tumors of larynx are rare and cricoid cartilage is the most attacked one of them.

Granulomas usually occur in the posterior area of the organ, more commonly in the vocal process and in the body of the arytenoid cartilage. It is frequented to be anticipated by prolonged orotracheal intubation, gastroesophageal reflux, chronic cough or laryngeal trauma. Intubation granulomas can also be subglottic.

The process begins with any trauma in the posterior area of the larynx, developing perichondritis due to an abrasive lesion or necrosis of the vocal process exposing the cartilage, and as a response there is an ulceration in the place or a production of granulomas. After this stage, there is the formation of an inflammatory polyp caused by the proliferation of the central tissue and epithelization of periphery. They are usually unilateral, with an irritation area by contact in the opposite vocal process (22).

According to Scala (32), the tumor of granular cells is a slowly-evolving uncommon neoplasia, and most of the cases being benign and it can attack any organ. Then it preferably attacks the area of head and neck, laryngeal involvement occurs in 6% to 10% of the cases. Their major symptoms are hoarseness, dysphagia, pain, cough and hemoptysis.

Extra-medullar plasmocytoma are tumors of plasmatic cells derived from B-lymphocytes. In larynx, they appear as lobulated polyps or thickened plates, and they are usually submucosal and their surface is smooth, and they can cause ulceration when they are locally advanced. It is prevalent between 40 and 70 years of age and it prevails in male. Most of the patients with laryngeal plasmocytoma present a progressive hoarshness for several months and even some years, the acute presentations are rare and they appear as a result of hemorrhage or infection on the tumor. Other symptoms are dyspnea and dry cough (33).

Larynx cancer is responsible for 2.8 of the new cancer data in men all over the world, becoming the eleventh most frequent malign neoplasia and the most significant risk factor for this cancer is tabagism.

Larynx cancer is rare in young adults, according to a study performed with young adults, it has been noticed that the cases described in the prepubertal stage are usually the ones with the worst prognosis. It is extremely important for the otorhinolaryngologist to bear in mind that the likelihood of a malign tumor in larynx, even with respect to young patients during a continual dysphonia with a moderated cough.

Cists are benign lesions of an important diagnosis, and this way the possibility of malign neoplasia is disregarded. In a study performed at ABC hospital in the city of Santo Andre – SP, a 56-year-old married, workman, retired patient was followed up. He went to the otorhinolaryngological service, and his major complaint was about a 3-month dry cough with a sudden start and it used to worsen during the evening. After an inspection, his diagnosis was a pedunculated cyst in the basis of the tongue by the epiglottis and with pharynx hyperemia. Chronic cough is considerably caused by a certain functional restraint. In this case, it appeared as a result of the pedunculated characteristic of the cyst, which allows for their movement towards epiglottis, thus being a defense mechanism (36).

Among the malign tumors of head and neck, the ones located in the nasopharynx are the ones with the worst diagnosis, since they are close to the basis of the cranium. They represent 2% of the tumors in head and neck. The main one is the carcinoma of nasopharynx in its epithelial cover (37).

Among the benign tumors of nasopharynx, we have Angiofibroma, which is rare and highly vascularized (37).

Nasal polyps are prolapses of the upper respiratory mucosa with stromal edema. Recent studies show the nasal cavity as background sites of polyp (38).

There is a close relation between nasal polyps and cystic fibrosis. Cystic fibrosis is a general disease of the exogenous glands, autosomal and recessive. Patients with this affection often show nasal obstruction, nasosinusal polyposis and chronic sinusitis (39).

Clinical alterations in upper airways occur in 100% of the patients, including recurring sinusitis, rhinitis and nasal polyposis. It is believed that around 14% of the patients with cystic fibrosis shall need a surgical treatment for polyposis. The beginning of the symptoms is widely varied, the classical disease starts with a dry cough, tachypnea, slight intercostal strip, or it is manifested with a acute bronchitis infection.

Cystic fibrosis is also called mucus viscosity. The age group in which nasosinusal symptoms mostly occur is around 5-14. A hypothesis to explain for the formation of polyps is that the release of growth factors by the chronic infection leads to a proliferation of the submucosal tissue, edema and mucosa prolapsed. There is still a hyperplasia of calceiform cells, metaplasia of squamous cells and loss of ciliated cells, increasing the thickness of the mucus, what contributes to the vicious cycle (37).

As to the salivary glands, they correspond to 3% of the tumors in head and neck, and mostly with epithelial backgrounds. They are the most complex human neoplasia, the benign tumors are the most frequent (54 to 79%) than malign (21 to 46%) (41).

Myoepithelioma is a benign neoplasia of the salivary glands considered. Its cellular morphology varies with cellular in fusiform standard, plasmocytoid, epithelioid or cellar; the fusiform and clear cells are those presenting a higher reactive activity in comparison with others (42).

Myoepithelioma diagnosis is less frequent, and it is found in approximately 1% of the tumors of salivary glands. A 58-year-old female patient searched for medical assistance due to the difficulty in swallowing, and she showed the sensation of both 'choked voice' and cough (43).

Other causes

The utilization of ACE inhibitors in the treatment of hypertension and cardiac insufficiency has the adverse and continual effect of a non-productive cough. Studies demonstrated that the main mechanism of cough induced by the use of ACE inhibitors is the local accrual of kinins, with a subsequent stimulation of inflammatory cells and the pro-inflammatory peptides; P substance, Y neuropeptide, histamine, prostaglandin and thromboxanes (5). The release of acetylcholine in the vagal nervous terminations and the located inflammation determine an imitating disease in the airways, by stimulating the nervous receptors and the vagal reflex of the cough (13). In diseases compatible with nasal allergies, the classical treatment of allergy with the use of anti-histaminic would not induce to a reduction of the disease, presenting, if much, a moderated improvement of the cough (44).

The disturbances of deglutition are very frequent and they can manifest symptoms such as sensation of a strange body for stasis of residual alimentary material in the vallecula and piriform sinuses, even profound cough and aspirating pneumonia, due to a total laryngopharyngeal incompetency (45).

The ingestion of chemical products can produce round esophagic lesions, evolving systematically to cicatricial stenosis. Edema and inflammation of mouth, tongue, pharynx and larynx reduce the airway calibration, enabling pulmonary complications to appear. It can be presented aphonia, cough, stridor, dyspnea and cyanosis (46).

The environmental pollution in elevated levels is deemed to be the cause of respiratory problems such as asthma and bronchitis, which can have cough as their symptomatology. However, big particles (around 10 micrometers) can be retained in the upper airways, i.e., in the nose and nasopharynx, and the organism utilizes cough as an aid in the excretion of these particles. The most frequent complication seems to be tumors in the nasal cavity, but if there is any continual exposure to allergens, it can also make cough chronic (47).

Croce e col. (1998) (47) showed that the group of pollutants with a closer relation with nasopharyngeal irritation is that of the *breathing non-determined particles*, a heterogeneous group mainly comprised of compounds from smoke of wood burning, fuels and cigars. Other pollutants can also participate in CT genesis, such as compounds of nitrogen, carbon and formaldehyde (47,48). These pollutants, in high concentrations, can become allergic and provoke irritation in the laryngeal mucosa as well. Just like other otorhinolaryngological etiologies of CT, this type does seem to be a diagnostic challenge, since it frequently occurs simultaneously with the symptomatology of lower airways and other nasal attacks.

The endotracheal intubation can attack the integrity of the epithelium of the upper airways, mainly caused by the pressure placed by the ballonet of the cannula over the tracheal mucosa. Insufflations can determine ischemia of the mucous vase followed by ulceration, epithelial and cartilaginous necrosis. These alterations can provoke permanent laryngotracheal complications, such as subglottic

stenosis, laryngomalacia and granulomas, manifesting symptoms like dysphonia and cough (49).

Vocal fold is a conjunct made of mucosa and muscle. It is constituted of covering epithelium and proper blade. In the free board of the vocal fold, the epithelium is plain, stratified, squamous, and the blade shows three levels: superficial, medium and profound. The most frequent pathologies are represented by nodes, polyps, Reinke's edema, hyperplastic lesions, papillomas and malign neoplasias, which are mostly easily diagnosed.

The vocal cords are very sensitive and smoking is highly aggressive to the vocal tract and it is one of the main symptoms of the larynx cancer. Smoke can lead to the irritation of the vocal tract, edema on the vocal folds, phlegms, cough, increase of secretion and infection (50).

Conclusion

Due to the wide scope of differentiated diagnosis of chronic cough, we consider important not to underestimate this symptom. Knowledge about post-nasal drip and gastroesophageal reflux, and about neoplasia, in addition to understanding their relations with otorhinolaryngology are extremely important to solve the characteristic cough, manifested in these pathologies. With a chronic cough, an otorhinolaryngologist must always be consulted, so that the excellence of the treatment and the improvement of the prognosis can be achieved, minimizing the social stigma and providing the patient with a quality of life.

Bibliographical References

1. Jacomelli M, Souza R, Pedreira Júnior WL. Abordagem diagnóstica da tosse crônica em pacientes não-tabagistas. J Pneumol. 2003, 29(6):413-20.

2. II Diretrizes brasileiras no manejo da tosse crônica. J Bras Pneumol. 2006, 32(6):403-46.

3. Hungria H. Otorrinolaringologia. 7 ed. Rio de Janeiro. Guanabara Koogan, 1995

4. Irwin RS, Madison JM. The Diagnosis and Treatment of Cough. N Engl J Med. 2000, 343(23):1715-21.

5. Gursk RR, Rosa ARP, Valle E, Borba MA, Valiati AV. Extraesophageal manifestations gastroesophageal reflux disease. J Bras Pneumol. 2006, 32(2):150-60.

6. Chone CT, Gomes CC. Doença do Refluxo Gastroesofágico em Otorrinolaringologia. Rev Bras Otorrinolaringol. 1995, 61(4):298-312.

7. Person OC, Cerchiari DP, Zanini RVR, Santos OR, Rapoport PB. Cisto de base de língua como causa de tosse crônica. Arq Med ABC. 2005, 31(1):35-7.

8. Ogawa AI, Takemoto LE, Navarro PL, Heshiki RE. Neoplasias de Glândulas Salivares. Arq Int Otorrinolaringol. 2008, 12(3):409-18.

9. Cruz WP, Fonseca MCB. Sequelas Laríngeas Devido Inalação Acidental de Amônia Anidra. Arq Int Otorrinolaringol. 2009, 13(1):111-6.

10. Mittal RK, Balaban DH. The esophagogastric junction. N Engl J Med. 1997, 336(13):924-32.

11. Atherino CCT, Silva PPC, Santos CF, Meirelles, RC. Tosse crônica de origem incomum: Relato de um caso de singamose humana. Folha Méd. 1997, 115:117-9.

12. Barbosa AB, Barberena LS, Barbosa KLP, Ribeiro DS. Manifestações laríngeas do Refluxo Laringo-faríngeo e suas relações com hábitos alimentares manauenses. Arq Int Otorrinolaringol. 2008, 12(1):55-61.

13. Bickley LS, Szilagyi PG. Bates Propedêutica Médica. 8ª ed. Rio de Janeiro (RJ): Guanabara Koogan, 2005.

14. Pratter MR, Bartter T, Akers S. An algorithmic approach to chronic cough. Ann Intern Med. 1993, 119:977-83.

15. Bretan O. Tosse, uma visão do otorrinolaringologista. Rev Assoc Med Bras. 1992, 39(3):151-4.

16. Rosmaninho I, Oliveira JF. Tosse Crônica. Rev Port Imunoalergol. 2003, 11:85-94.

17. I Consenso Brasileiro sobre Tosse. J Pneumol. 1998, 24(1).

18. Fiss E, Filho AAM, Pinto RMC. Tosse. Rev Bras Med. 2003, 60(7):497-504.

19. Araújo E, Anselmi F, Leiria TLL, Richter VT, Pires LM. Sinusite fúngica: uma análise clínica em nosso meio. Revista HCPA. 1999, 19(2):177-85.

20. Bagatolli D. Revisão Bibliográfica sobre Rinite [Monografia - Conclusão do curso de Graduação em Farmácia Clínica Industrial]. Erechim(RS):Universidade Regional Integrada do Alto Uruguai e das Missões; 2008.

21. Villanova CAC, Araújo E, Miorim MCG, Irion K, Palombini

BC. Gotejamento pós-nasal como causa de tosse crônica. Rev Bras Clín Ter. 2002, 28(3):91-6.

22. Eckley CA, Zuna G, Duprat AC, Costa HO. Repercussões otorrinolaringológicas da Doença do Refluxo Gastroesofágico na infância. Rev Bras Otorrinolaringol. 2001, 67(1):67-72.

23. Eckley CA, Marinho VP, Scala WR, Costa HO. PH-Metria esofágica de 24 horas de duplo canal no diagnóstico da laringite por refluxo. Rev Bras Otorrinolaringol. 2000, 66(2):110-4.

24. Gouveia MCMA. Tosse crônica : análise da simultaneidade entre os principais fatores causais [Tese - Doutorado]. Porto Alegre (RS): Universidade Federal do Rio Grande do Sul - Curso de Pós-Graduação em Medicina, 2005.

25. Macedo-Filho ED. Manifestações otorrinolaringológicas (ORL) da doença do refluxo (DRGE). In: Macedo-Filho E, Pisani JC, Carneiro J, Gomes G. Disfagia abordagem multi-disciplinar. 3ª ed. Rio de Janeiro: Frontis, 2000. p.217-25.

26. Bretan O, Tagliarini JV. Mecanismos das manifestações otorrinolaringológicas da Doença do Refluxo Gastroesofágico. Arq Int Otorrinolaringol. 2001, 5(3):156-162.

27. Steffan N, Moschetti MB, Zaffari RT. Cistos de pregas vocais - Análise de 96 Casos. Rev Bras Otorrinolaringol. 1995, 61(3):179-186.

28. Weber R. Laringites. Disponível em http://www.otorrinousp.org.br/imageBank/seminarios/seminario_17.pdf. Acessado em 04 de outubro de 2009.

29. Crespo CC, Souza DG. Laringopatias. 2008. Disponível em: http://www.sorocaba.pucsp.br/atn/apostilas/otorrino/apost_laringopatias.htm . Acessado em 04 de outubro de 2009.

30. Costa SS, Cruz OLM, Oliveira JM. Otorrinolaringologia: princípios e prática. Porto Alegre: Artes Médicas, 1994.

31. Whitaker HG. Capilares do sangue e otorrinolaringologia. Rev Bras Otorrinolaringol. 1955, 23(4):140-9.

32. Scala WAR, Fernandes AMF, Duprat AC, Costa HOO. Tumor de células granulares da laringe na infância: relato de caso. Rev Bras Otorrinolaringol. 2008, 74(5):780-785.

33. Torres LFB, Totsugui JT, Fugmann EA, Soares C, Werner B. Plasmocitoma de laringe com apresentação clinica de pólipo. Rev Bras Otorrinolaringol. 1995, 61(4):324-8.

34. Sartor SG, Eluf-Neto J, Travier N, Filho VW, Arcuri ASA, Kowalski LP, Boffetta P. Riscos ocupacionais para o câncer de laringe: um estudo caso-controle. Cad Saúde Pública. 2007, 23(6):1473-81.

35. Pinto JA, Cruz WP, Silva WA, Ayres MA, Pinheiro JM. Câncer da Laringe em Jovens. Rev Bras Otorrinolaringol. 1984, 50(4):33-5.

36. Person OC, Cerchiari DP, Zanini RVR, Santos RO, Rapoport PB. Cisto de base de língua como causa de tosse crônica. Arq Med ABC. 2005, 31(1):35-7.

37. Carvalho CP, Teixeira DC, Ribeiro ACG, Barreiros AC, Fonseca MT. Manifestações otorrinolaringológicas da fibrose cística: Revisão de literatura. Arq Int Otorrinolaringol. 2008, 12(4):552-8.

38. Abritta D, Coraçari AR, Maniglia JV. Microcirurgia na polipose nasal: analise evolutiva clínica e cirúrgica. Rev Bras Otorrinolaringol. 2004, 70(2):156-162.

39. Piltcher OB, Zucatto AE, Rosa DD, Preissler LC, Hentschel EL, Paixão LQ. Sinusopatia na Fibrose Cística. Rev Bras Otorrinolaringol. 1997, 76(1):469-75.

40. Weber SAT, Ferrari GF. Incidência e evolução da polipose nasal em crianças e adolescentes com fibrose cística. Rev Bras Otorrinolaringol. 2008, 74(1):16-20.

41. Lima SS, Soares AF, Amorim RFB, Freitas RA. Perfil epidemiológico das neoplasias de glândulas salivares: análise de 245 CASOS. Rev Bras Otorrinolaringol. 2005, 71(3):335-40.

42. Silveira EJD, Pereira ALA, Fontora MC, Souza LB, Freitas RA. Mioepitelioma de glândula salivar menor: uma análise imunohistoquímica de quatro casos. Rev Bras Otorrinolaringol. 2006, 72(4):528-32.

43. T-Ping C, Pizarro GU, Pignatari S, Weckx LLM. Mioepitelioma de glândula salivar menor em base de lingual: relato de caso. Rev Bras Otorrinolaringol. 2004, 70(5):701-4.

44. Nakao M, Denis CK, Mariúba BGO, Pelizza VI. Tosse de difícil controle em otorrinolaringologia, induzida por anti-hipertensivo - inibidor da enzima conversora da angiotensina. Rev Bras Otorrinolaringol. 2000, 66(3):217-22.

45. Eckley CA, Fernandes AM. Método de avaliação Otorrinolaringológica da deglutição. Acta ORL. 2005, 23(4):182-6.

46. Cruz WP, Fonseca MCB. Sequelas Laríngeas Devido Inalação Acidental de Amônia Anidra. Arq Int Otorrinolaringol. 2009, 13(1):111-6.

47. Croce M, Vasconcelos DM, Manso ERC, Duarte AJS. Poluição ambiental e alergia respiratória. Medicina (Ribeirão Preto). 1998, 31(1):144-153.

48. Schwartz J, Slater D, Larson TV, Pierson WE, Koenig JQ. Particulate air pollution and hospital emergence room visits for asthma in Seattle. Am Rev Respir Dis. 1993, 147:826-831.

49. Martins RHG, Braz JRC, Bretan O, Figueiredo PR, Defaveri J. Lesões Precoces da Intubação Endotraqueal. Rev Bras Otorrinolaringol. 1995, 61(5):343-8.

50. Vasconcelos SV, Mello RJV, Silva HJ, Soares EB. Efeitos do Fumo nas Dimensões das Pregas Vocais de Idosos. Arq Int Otorrinolaringol. 2009, 13(1):24-9.