

Postnasal drip syndrome. Two hundred years of controversy between UK and USA*

A. Sanu and R. Eccles

Common Cold Centre and Healthcare Clinical Trials, Cardiff School of Biosciences, Cardiff University, Cardiff, United Kingdom

SUMMARY

This review discusses the trans-Atlantic controversy concerning Post Nasal Drip Syndrome (PNDS). PNDS was described as a common condition in the UK in the nineteenth century and was so extraordinarily prevalent in the USA that it was called 'American catarrh'. American chest physicians adopted PNDS as the most common cause of chronic cough. A relationship between PNDS and chronic cough was not accepted by UK chest physicians, who preferred to use the term 'rhinosinusitis' instead of PNDS. In the USA the diagnosis of PNDS was linked to a response to therapy with a sedating antihistamine and decongestant, but UK physicians doubted if this was a specific therapy and did not accept the therapy as diagnostic for PNDS. In 2006 the American College of Chest Physicians replaced the term PNDS with upper airway cough syndrome and some UK otolaryngologists proposed that PNDS should be replaced with rhinosinusitis. PNDS is now being replaced with more general descriptions of upper airway disease and a causal link with chronic cough is now disputed. PNDS may be caused by a mucus hypersecretory phenotype that develops following chronic exposure of the respiratory tract to particulate matter, allergens, irritants and pathogens. Current research on treating excessive airway mucus in the lower airways may be applicable to PNDS.

Key words: postnasal drip, cough, rhinitis, sinusitis, rhinosinusitis, mucus

INTRODUCTION

Postnasal drip syndrome (PNDS) has been discussed in the medical literature for over 200 years. The first detailed description of the syndrome was made by Dobell in 1866⁽¹⁾, although Frank in 1794⁽²⁾ referred to 'a form of chronic catarrh the seat of which is the pharynx', and this article in Latin, is referred to as the first mention of PNDS⁽³⁾. A literature search in PubMed using the term 'postnasal drip' lists 222 publications using this term (1950-2007), including 14 publications in 2007, indicating that the term PNDS is still in general use. However, despite the popularity of the term PNDS in clinical literature in the USA, the diagnosis of PNDS as a clinical condition is controversial in the UK and has sometimes been ridiculed in the UK medical literature⁽⁴⁾, indicating a clinical disagreement about this condition across the Atlantic. The use of the term PNDS is now being questioned in both the USA and UK.

In the USA the recent Evidence-Based Clinical Practice Guidelines for Diagnosis and Management of Cough by the American College of Chest Physicians (ACCP)^(5,6) indicates that the USA may be reconsidering PNDS as a diagnosis for cough, as the guideline committee unanimously recommends

'that the term upper airway cough syndrome (UACS) be used in preference to postnasal drip syndrome (PNDS) when discussing cough that is associated with upper airway conditions because it is unclear whether the mechanism of cough is postnasal drip, direct irritation, or inflammation of the cough receptors in the upper airway'.

In the UK the term PNDS has recently been criticised, and both chest physicians⁽⁴⁾ and otolaryngologists⁽⁷⁾ recommend that PNDS be replaced by the term 'rhinosinusitis'.

This paper will look at the history, diagnosis and treatment of PNDS and consider that the condition is no better understood today than it was over two hundred years ago.

DEFINITIONS

Despite the fact that the term PNDS is widely used, especially in relation to chronic cough⁽⁷⁾, the term is not listed in modern medical dictionaries⁽⁸⁻¹⁰⁾. Surprisingly, modern textbooks of medicine^(11,12) and otolaryngology^(13,14) do not define or discuss the condition. Morice⁽⁴⁾ also comments on the fact that medical textbooks do not mention PNDS. The term is in common use in the modern literature, but some authors report

that there is no accepted definition of the condition^(4,7). For definitions of PNDS one needs to return to the literature of the nineteenth century. This literature is not referred to in any of today's publications on PNDS (ISI Web of Science, citation search 2007), because of the limited reach of computerised literature search engines such as PubMed and Medline. It is instructive to compare the nineteenth century definitions of PNDS with the twenty first century definition of UACS.

Dobell 1866 Post-nasal catarrh⁽¹⁾

Dobell (1866), an otolaryngologist practising in London UK, was the first to define the condition of PNDS and his definition is still the best and most complete in the literature. He says that the condition is particularly worthy of attention because of its frequency.

"Post-nasal catarrh may be acute or chronic, but it is much the more frequent in the chronic form, and is rather to be classed among the 'vestiges' of diseases than among primary affections." Dobell (1866) describes in classic clinical detail the symptoms of chronic post-nasal catarrh:

"1. A sense of fullness deeply seated in the back of the nose, with constant stinging and tickling sensation about the uvula, soft palate, and posterior part of the hard palate. The sensation is much aggravated after sleep, so that the patient wakes every morning with a sore throat; but on examination of the throat, no inflammation, ulceration, or swelling is detected.

2. Short tickling cough, coming on at intervals, especially night and morning, or if long without food or drink; but on examination of the chest no morbid sounds are present,

3. Frequent hawking and spitting of small pellets of mucus, which are not unfrequently of an orange-brown colour and very tenaceous.

4. On examining the pharynx shreds of stringy mucus may often be seen hanging down from behind the velum; or the back of the pharynx is coated with brownish adhesive mucus, and sometimes, but not always, the mucus follicles are enlarged and red."

Dobell reports three further clinical observations about sore throat and nose blowing and concludes:

The history of the case will generally show that the post-nasal affection has been left behind as a vestige of one or more severe attacks of Influenza or Coryza, or of many slighter Catarrhs coming in quick succession.

Mackenzie 1884 Chronic catarrh of the naso-pharynx⁽³⁾

Mackenzie (1884) (a UK otolaryngologist practising in London) in his classic textbook on diseases of the throat and nose provides the following synonyms: Post-nasal catarrh, retro-nasal catarrh, follicular disease of the nasopharyngeal space, and American catarrh. He gives the following definition:

Chronic inflammation of the lining membrane of the naso-pharynx, giving rise to a more or less viscid secretion, the adhesion of which to the part causes a most disagreeable sensation, and induces the patient to make frequent efforts to get rid of it by "hawking" and "clearing the throat.

Macdonald 1892 Post-Nasal catarrh⁽¹⁵⁾

Macdonald (1892) (a UK otolaryngologist practising in London) in his treatise on the diseases of the nose describes PNDS.

The patient is troubled with a more or less continual inclination to hawk mucus from the throat often preceded by a noisy inspiratory act through the nose, which forces the mucus into the pharynx proper. After the symptoms have persisted for a variable period the voice becomes affected, either from the constant presence of some obstruction in the post-nasal space preventing the perfect approximation of the palate to the posterior wall, or because the velum becomes actually enfeebled in its movements. Hence the sufferer has a tendency to speak through his nose...

Richards (1955) Postnasal Drip⁽¹⁶⁾

The chief complaint is a sensation, localized roughly to the posterior superior surface of the soft palate, of something which is not normally present and which therefore generates the desire to be rid of it. Vaguely, it is a sense of fullness, not quite so much as to constitute the otherwise frequent description of a lump, but something, which should be readily dislodged by swallowing. It being immediately evident that such swallowing is quite useless in eliminating the sensation, there is next evoked the peculiar and more vigorous pharyngeal reaction, which has come to bear the odd term of 'hawking'...

Forer and Ananda (1999) Postnasal drip⁽¹⁷⁾

PNDS is reported as a common problem by two Australian otolaryngologists, so the condition is not only an American problem.

Postnasal drip is a common presentation to the medical practitioner. Postnasal drip results from mucus being secreted continually by cells lining the nasal and sinus passages. Its accumulation in the postnasal space is what the patient refers to as 'catarrh'. It is associated with halitosis, chronic cough or sinus complaints in the adult population. In children this may result in a purulent rhinorrhea and cough.

Pratter (2006) Upper airway cough syndrome⁽⁶⁾

The American chest physician Pratter (2006) introduces the term 'upper airway cough syndrome' (UACS) to replace PNDS but it is apparent from the definition of UACS that there is little or no difference in the conditions as they present clinically.

The clinical presentation of patients with UACS in addition to cough, commonly involves complaints (or at least an affirmative response to questioning) of a sensation of something draining into the throat, nasal congestion, or a nasal discharge. Patients sometimes complain of hoarseness. A medical history containing an upper respiratory illness (e.g. a cold) is often present. A history of wheeze is also common. Most patients with UACS cough will have symptoms or evidence of one or more of the following: drainage in posterior pharynx; throat clearing; nasal discharge; cobblestone appearance of the oropharyngeal mucosa; or mucus in the oropharynx. These clinical findings are relatively sensitive but are

not specific. They are also found in many patients with cough due to other causes.

The term 'hawking' and the verb 'to hawk' in relation to PNDS are referred to in the early English literature above, but this term has gone out of use in modern English, yet is still defined in American and English dictionaries. The American Heritage Dictionary of the English language (2006) ⁽¹⁸⁾ refers to 'hawking' as 'to clear or attempt to clear the throat by or as if by coughing up phlegm'. The Oxford English Dictionary ⁽¹⁸⁾, defines 'hawking' as to make an effort to clear the throat of phlegm; to clear the throat noisily.

HISTORY

PNDS is first described in any detail by Dobell (1866) ⁽¹⁾ and he says that his first reason to write about this condition was because it was a common complaint. Dobell's name is still linked to the condition today as he invented Dobell's solution, an aqueous alkaline solution of sodium borate and phenol that is still sold today in the USA as a spray or douche to cleanse the nose and treat inflammation of the nose and pharynx.

Even in the nineteenth century there appears to be some difference between the incidence of PNDS in Europe and North America as Mackenzie (1884) ⁽³⁾ states 'the affection is exceedingly common in America' and that concerning a visit he made to the United States he reports:

'I was greatly astonished at the extremely wide diffusion of the affection. I met with it all over the Eastern States, it was very common in Chicago and St Louis, I found it prevalent in Nebraska, I encountered it on the Pacific coast, finding it of frequent occurrence in San Francisco.'

Mackenzie (1884) ⁽³⁾ also uses the synonym 'American Catarrh' to describe PNDS. Thus right from its first descriptions in the medical literature, the very common incidence of the condition in the United States is reported, and Mackenzie as a practising otolaryngologist in the UK would have been in a very good position to compare the conditions between Europe and the United States. Considering his expertise in this area, it seems reasonable to accept this difference in the incidence of PNDS between the two continents was a real difference rather than some bias on the part of the American clinicians in diagnosing the condition. Mackenzie (1884) ⁽³⁾ considered that the difference in prevalence of PNDS between America and Europe was due to the dry dusty environment in America.

The high incidence of PNDS in North America is also commented on by Macdonald (1892) ⁽¹⁵⁾ who states the opinion of an eminent American nose-specialist Dr Beverley Robinson of New York who 'holds that post-nasal catarrh is the national disease of his country'. Macdonald (1892) ⁽¹⁵⁾ also states: *'Post-nasal catarrh is so extraordinarily prevalent in the United States that it has been styled American catarrh.'*

At the start of the 20th century, PNDS is included in standard UK textbooks of rhinology and otolaryngology and discussed as a common condition of post-nasal catarrh or chronic catarrh of the nasopharynx ^(19,20).

The condition of PNDS is recognised throughout the 20th century as a very common disorder but one that has received very little attention. Haase and Noguera (1962) ⁽²¹⁾, two American physicians state in their opening sentence of their article on PNDS 'It is not unusual for a doctor to see two or three patients every day complaining of post nasal drip; yet it is uncommon for the most frequent source of this difficulty to receive attention'. The status of PNDS throughout the 20th century is nicely summarised in the quote from Haase and Noguera ⁽²¹⁾:

'Much of our study and research is concentrated on major problems. But the "minor" ones - like post nasal drip - need some thought and attention too.'

In the hundred years after the first clear description of PNDS by Dobell (1866) ⁽¹⁾ there was little or no progress in understanding or treating the very common condition. However, interest in PNDS was again awakened towards the end of the twentieth century when the American chest physicians adopted PNDS as the main cause of chronic cough in the community.

The interest in PNDS as a cause of cough was initiated by Irwin (1977) ⁽²²⁾ a chest physician practising in New York USA. This is not surprising considering the fact that PNDS had been previously described as American catarrh because of its high incidence in North America. Irwin and co-workers developed the idea that PNDS was associated with common cold and cough and that a common cause of chronic cough was PNDS ^(23,24). The chest physicians in the USA reported that chronic cough due to PNDS could be readily treated with a combination of a first generation sedating antihistamine and oral decongestant, and described their success rate for treatment as between 97-98% of cases ⁽²⁴⁾. This enthusiasm for PNDS as a common cause of chronic cough and dual therapy with antihistamine and decongestant has continued in the USA right up to the present day, but the mechanism and therapy of cough associated with PNDS has not been accepted by chest physicians outside the USA, and this has led to some heated debates across the Atlantic.

The recent Evidence-Based Clinical Practice Guidelines for Diagnosis and Management of Cough by the American College of Chest Physicians (ACCP) (2006) ^(5,6) now describe PNDS as UACS but it is not clear if there is any difference between these conditions, as UACS is described as being 'due to a variety of rhinosinusitis conditions, which was previously referred to as post nasal drip syndrome PNDS'. The ACCP report (2006) ^(5,25) still recommends first generation antihistamine and decongestant therapy for treatment of UACS but

this mechanism of cough and its treatment is not accepted by many UK clinicians. Morice (2004)⁽⁴⁾ doubts the specific efficacy of antihistamines and decongestants in treating cough and concludes 'Post-nasal drip syndrome is a symptom masquerading as a syndrome. It varies widely across different societies and there is no objective test. The term rhinitis or rhinosinusitis should be used in preference'.

The American position on PNDS as a mechanism of chronic cough has been recently challenged by a UK study that reported that 'most patients with purulent nasal secretions do not complain of cough'⁽⁷⁾. The study looked at 108 consecutive patients referred to a rhinology clinic with symptoms of chronic infective rhinosinusitis and investigated any relationship between post-nasal secretions and cough. The investigators found that only 9/108 patients had purulent nasal secretions and cough with no other discernible pathology such as asthma, bronchiectasis or sarcoid, and they concluded that only a small proportion of patients with purulent rhinosinusitis without coexisting chest disease (8%), complain of cough and that: *'The mechanical 'drip' of mucus from the nasopharynx into the larynx or hypopharynx does not appear to be an adequate mechanism for the production of cough as a result of nasal disease'*⁽⁷⁾.

DIAGNOSIS

The diagnosis of PNDS is usually based on clinical history, and the description of PNDS by Dobell in 1866 (as detailed above) is still valid, with a sensation of the presence of viscous mucus in the post-nasal space and irritating and unproductive attempts to clear the mucus being typical features of the condition. The possible link to chronic cough has been mentioned above, and this is why PNDS has been of interest to chest physicians in the USA. PNDS has also been in the unusual situation of being diagnosed as a condition that responds to combination therapy with a first generation antihistamine and oral decongestant (26). The algorithm of diagnosing PNDS by specific therapy with antihistamine and decongestant has been criticised by Morice⁽⁴⁾ who argues that first generation antihistamines are not specific therapies since they are sedating, and act as CNS depressants, and this sedative action is sufficient to explain the inhibition of cough of many different origins. The first generation antihistamines also have other pharmacology such as an anticholinergic action and may also have effects on 5HT receptors⁽⁴⁾.

PNDS may also be considered as a symptom that may have multiple causes. This is the approach of Forer and Ananda (1999)⁽¹⁷⁾ who list various causes of PNDS in the child and adult, as shown in Table 1. In this case, the diagnosis of PNDS would be linked with the diagnosis of one or more of the conditions listed in Table 1. However, there may be no link of PNDS with other conditions in some patients as concluded by Forer and Ananda (1999)⁽¹⁷⁾:

Table 1. Causes of postnasal drip
As described by Forer and Ananda (1999)⁽¹⁷⁾

Children
<ul style="list-style-type: none"> • Allergic rhinitis • Enlarged adenoids • Sinusitis/gastroesophageal reflux • Polyps (cystic fibrosis) • Anatomical anomalies • Mucociliary dysfunction • Immunodeficiencies
Adults
<ul style="list-style-type: none"> • Allergic rhinitis • Sinusitis • Polyps • Anatomical anomalies • Smoking and exposure to toxins • Senile rhinitis • Atrophic rhinitis

'Postnasal drip can result from a number of different conditions that upset the normal production of mucus from the nasal and sinus cavities. However, this is a normal physiological event, and if no pathological process is arrived at then the patient may have to be counselled with regard to accepting the problem'.

AETIOLOGY AND PATHOPHYSIOLOGY

PNDS is often described as a chronic problem that is related to repeated episodes of colds and flu⁽¹⁾. The upper airway infections leave the patient with a persistent condition of catarrh and PNDS⁽¹⁾, due to some change in mucociliary clearance causing accumulation of mucus in the postnasal space⁽¹⁷⁾. However, PNDS has been described as due to a wide range of conditions varying from environmental conditions such as a dry dusty environment to systemic conditions such as hypothyroidism⁽²⁷⁾.

The acute condition of PNDS associated with purulent rhinosinusitis can be readily understood, as any allergic or infectious disease of the nose will trigger inflammation and this will be accompanied by an increase in mucus production and increased plasma exudate due to increased capillary permeability⁽²⁸⁾. Chronic mucus hypersecretion is an important feature of chronic respiratory lower airway diseases such as asthma, chronic bronchitis and chronic obstructive pulmonary disease (COPD)⁽²⁹⁾. The mucus is derived from surface epithelial goblet cells and mucous cells in submucosal glands. In this respect the upper and lower airways have a similar response to airway irritation and infection as both airways respond with an increased production of mucus that protects the airway epithelium and helps to trap and clear infectious agents. The major mucus components of respiratory mucus appear to be the product of two mucin genes MUC5AC and MUC5B that are responsible for a mucus hypersecretory phenotype that develops following chronic exposure of the respiratory tract to particulate matter, allergens, irritants and pathogens⁽²⁹⁾.

PNDS may represent a condition of chronic activation of the hypersecretory phenotype with chronic activation of the mucus producing goblet cells in the nasal epithelium and submucosal glands. The phenotype may be switched on by infection or nasal irritation and PNDS develops when the hypersecretory phenotype persists in the absence of the original stimulus.

TREATMENT

Early treatments for PNDS involved nasal washing with mild alkaline solutions containing borate such as Dobell's solution^(19,20).

If it is accepted that PNDS is a symptom that may be caused by a range of different conditions as listed in Table 1, then the treatment of the underlying condition may help to resolve the PNDS. This is the approach of Forer and Ananda (1999)⁽¹⁷⁾ who discuss medical and surgical treatments such as antibiotic therapy and functional endoscopic sinus surgery as means of treating sinusitis that may present with PNDS.

PNDS may present as a cause of chronic cough, and the ACCP recommend treatment with a first generation antihistamine and oral decongestant (6).

If PNDS is due to the persistence of a hypersecretory phenotype, then any therapy that will switch off this phenotype may be a useful treatment for PNDS. Recent research in this field is focussing on antagonists to chemokine receptors. Chemokine receptors CXCR1 and CXCR2 activate the inflammatory response in the airway with recruitment of neutrophils, mucus production and goblet cell hyperplasia and antagonism of these receptors in animal models has been shown to reduce mucus production and goblet cell hyperplasia⁽³⁰⁾. This therapy has been proposed for treatment of lung disorders associated with mucus hypersecretion⁽³⁰⁾ but it may also prove to be of benefit in diseases of the upper airway associated with mucus hypersecretion, such as PNDS.

CONCLUSIONS

PNDS has been discussed in the medical literature for over 200 years and the nineteenth century literature from the UK gives clear clinical descriptions of a common chronic condition that may result after an acute upper respiratory tract infection.

The early descriptions of PNDS discuss the condition as American catarrh because of the common occurrence of PNDS in the USA.

In the latter part of the twentieth century the interest in PNDS has been mainly as a cause of chronic cough in the USA but any causal relationship to chronic cough has been disputed in the UK.

At present, USA clinicians have adopted the term UACS to replace PNDS, and UK clinicians prefer the term 'rhinosinusitis'.

The change in terminology for PNDS does not help to treat what is still a common complaint in both the USA and UK.

PNDS may be caused by a mucus hypersecretory phenotype

that develops following chronic exposure of the respiratory tract to particulate matter, allergens, irritants and pathogens.

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Professor Ron Eccles

Common Cold Centre and Healthcare Clinical Trials
Cardiff School of Biosciences
Cardiff University
Cardiff CF10 3 US
United Kingdom

Tel: +44-(0)292-087 4102

Fax: +44-(0)292-087 4093

E-mail : eccles@cardiff.ac.uk

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