The catarrhal child

Glenis K Scadding

Abstract

Catarrhal children, those with anterior or posterior rhinorrhoea, are highly prevalent. There are multiple causes for this problem, ranging from structural nasal defects, foreign bodies, recurrent viral upper respiratory tract infections, through allergy to innate or acquired immune deficiency. Each child needs careful assessment, including history and examination, a few need further tests and some require specialist referral.

This article explains the possibilities and suggests a logical approach to diagnosis and management of such children and their parents/carers.

Keywords adenoid hypertrophy; allergy; catarrh; cystic fibrosis; immune deficiency; nasal congestion; nasal discharge; nasal obstruction; paediatric rhinitis; paediatric rhinosinusitis; primary ciliary dyskinesia; rhinorrhoea

Introduction

Children with chronic nasal discharge are known as catarrhal: "catarrh", derived from Greek meaning to 'flow down'. They are prevalent and, for many, this is a transient life stage, for others there is lurking pathology requiring accurate diagnosis and treatment. This article attempts to explain how to approach the problem in a logical manner.

What is mucus?

Mucus, the product of secretions from nasal glands, goblet cells and transudation from the nasal vasculature, contributes to all nasal functions. It covers the respiratory mucosa, providing effective protection from the environment. It helps to humidify the air during respiration and aids in the transport of olfactory molecules to their receptors high in the nose. It is a complex substance which coats the surface of the nose and is propelled backwards by ciliary action to the nasopharynx, where it is swallowed, in litres, daily. Mucus has two definable layers: an outer more viscous layer into which the cilia project their hooked tips, with underneath a watery layer in which the cilia move in a constant "Mexican wave" pattern, providing impetus to cause mucus movement. Abnormalities in mucus or cilia result in the breakdown of protection which may be temporary or, in more severe cases, permanent.

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Diagnosis

The main causes of catarrh are listed in Table 1. Diagnosis depends upon an accurate history, full ENT and general examination, with sometimes a need for tests.

History

The age of the child at presentation gives clues to possible underlying problems.

Those troubled unremittingly from birth are likely to have either a structural abnormality such as choanal atresia or encephalocoele, or an innate immune defect such as primary ciliary dyskinesia and require referral. This should be to the ENT surgeon in the first instance, urgently if there are feeding problems, since neonates are obligatory nose breathers. The role of gastro-oesophageal reflux in giving rise to nasal symptoms in early childhood is still a matter of dispute.

Those affected from a few months of life are likely to be suffering intermittent viral upper respiratory tract infections, particularly if the discharge is intermittent. The average child has 6–8 colds per annum, each lasting symptomatically some 5–7 days, but there is a Gaussian distribution with more colds occurring in children with elder siblings, day care attendance, minor transient immune-incompetence and more prolonged symptoms in those with underlying allergic rhinitis. CT studies in adults have revealed that a viral cold involves not only the nose but the sinuses too. It is an acute rhinosinusitis, with sinus changes persisting for 6 weeks. Adenoid hypertrophy can also present from a few months of age, usually with obvious nasal obstruction, often plus rhinorrhoea and sleep problems. This can be combined with allergic or immune problems which then warrant investigation.

For those with a slightly later onset of symptoms allergic rhinitis (AR) itself is a very common cause of rhinorrhoea in children, affecting between one in four or five children. Rhinorrhoea is classically clear and anterior in intermittent rhinitis, but switches to thicker, discoloured secretions when persistent, or when rhinosinusitis occurs, often following an additional viral cold. This form is often unrecognized as having underlying allergy which benefits from treatment. Recognition of AR in different age groups requires knowledge of different presentations, see Table 2.

Immune deficiency is another possibility, usually becoming manifest when maternally derived immunoglobulin wanes from the circulation at around 6 months. In many children this is a transient situation with delayed development of the full range of IgG subclasses. Typically IgG2 is the last subclass to appear. This subclass is particularly effective against the sugar-coated pathogens: *Streptococcus pneumoniae* and *Haemophilus influenzae* that are found commonly in upper respiratory tract infections. Recovery from transient immunodeficiency is usual by 3 years of age, but in some children the delay persists and involves late IgA development – sometimes until 12 years of age. IgA is the immunoglobulin responsible for protection at mucosal surfaces, so catarrh is a symptom. Cellular immune defects rarely present in the rhinitis clinic, but this is not unknown.

Unilateral nasal secretions suggest structural pathology at any age: choanal atresia in younger children, but this can be missed and present later; foreign body in the age group where manual

Possible causes of catarrh in children. The initial section applies to all ages, but particularly to younger children aged 5 or less. The second part is only likely in older children/adolescents. The list is not mutually exclusive: for example infectious rhinosinusitis is likely in association with immune deficiency, but is also common in otherwise normal children

Infectious rhinitis/rhinosinusitis:
- Viral
- Bacterial
- Fungal

Structural:
- Adenoidal hypertrophy
- Foreign body
- Turbinate hypertrophy
- Nasal tumours (benign — e.g. polyps, encephalocoele or, rarely, malignant)
- Choanal atresia or stenosis
- Septal deviation

Allergic rhinitis:
- Intermittent/persistent

Non-allergic rhinitis with eosinophilia syndrome (NARES):
- Eosinophilia on nasal smears with negative testing for specific allergens. May represent local allergy

Immune deficiency:
- Innate — cystic fibrosis, primary ciliary dyskinesia
- Acquired — humoral, cellular

Older children:

Idiopathic (neurogenic) rhinitis:

Profuse, clear rhinorrhoea and nasal congestion — triggered by environment, not by allergens:
- Cold air induced
- Smells
- Barometric pressure

Reflex-induced:
- Gustatory rhinitis: watery rhinorrhoea occurring immediately after food ingestion
- Chemical or irritant induced

Drug-induced:
- Oral contraceptives
- Aspirin and other NSAIDs
- Topical decongestant overuse (rhinitis medicamentosa)
- Cocaine abuse

Hormonally induced:
- Hypothyroidism
- Pregnancy
- Menstrual cycle
- Exercise
- Atrophic

Miscellaneous:
- Cerebrospinal rhinorrhoea (usually presents with unilateral, clear rhinorrhoea)

Table 1

Presentations of allergic rhinitis in childhood. The nose may not be the focus in some children

Classic symptoms and signs:
- Rhinorrhoea — clear or discoloured discharge, sniffing
- Itch/sneeze — nose rubbing, the "allergic salute", "allergic crease", "paroxysmal sneeze", may be associated with complaints of an itchy mouth or throat in older children
- Congestion — mouth breathing, snoring, sleep apnoea, allergic shiners

Potential atypical presentations:
- Eustachian tube dysfunction — ear pain on pressure changes (e.g. flying), reduced hearing, chronic otitis media with effusion
- Cough — often mis-diagnosed as asthma
- Poorly controlled asthma — rhinitis often co-exists with asthma
- Sleep problems — tired, poor school performance, irritability
- Prolonged and frequent respiratory tract infections
- Rhinosinusitis — catarrh, headache, facial pain, halitosis, cough, hyposmia
- Pollen — food syndrome, particularly with pollen driven allergic rhinitis

Table 2

dexterity allows insertion of small objects into crevices, septal deviation is another possibility. A rare occurrence at any age, especially in childhood, but one that must not be missed is unilateral nasal discharge of cerebrospinal fluid. Testing the discharge for beta transferrin is diagnostic and, if positive, needs to be followed by ENT referral.

The spectrum of possible causes changes in the older child and becomes similar to that in the adult. Non-allergic rhinitis is uncommon in younger children, but can occur in those over five. There are multiple causes, some are medication or hormonally-related. Aspirin sensitivity is found in a small percentage of rhinitic children, the oral contraceptive is a possible cause, as is hypothyroidism. A history of drug and medication use, including smoking, and symptoms relative to thyroid dysfunction should be taken. Possible relevant medications include aspirin and the oral contraceptive, also regular overuse of topical intranasal decongestants is seen in teenagers. Cocaine abuse can result in a picture of granulomatous rhinitis with blood — stained discharge and septal perforation, even with a positive ANCA test. Urine drug testing is obligatory since the history is often one of denial.

Catarrhal children sometimes present with symptoms primarily affecting the ear.

Otitis media with effusion (OME) or "glue ear" is an inflammation of the middle ear with a collection of fluid behind an intact tympanic membrane. Most children are affected at some point in their lives with a bimodal peak incidence at two and five years. Most effusions are self-limiting, but in some children persist over three months and are then labelled as chronic. Chronic OME is the commonest reason for surgery in childhood, the most frequent intervention being insertion of ventilation tubes (grommets) into the tympanic membrane, sometimes accompanied by adenoidectomy (see article by Robb and Williamson in this volume of P&CH). Recent studies have identified the (sometimes small) benefit from such procedures. For many