Seasonal allergic rhinitis and/or conjunctivitis, more commonly known as hayfever, are allergic hypersensitivity reactions in the nasal mucosa and the conjunctiva of the eye associated with the presence of pollens in the atmosphere in the summer months.

**Causes**

- Hayfever is caused by exposure to pollen or other allergens that only occur at certain times of year. The most common causes are:
  - tree pollens in spring
  - grass pollen in summer
  - mugwort and chrysanthemum pollen and fungal spores in autumn.
- Symptoms are the result of a type I allergic reaction in which initial exposure of a sensitive individual to an antigen results in the production of antigen-specific immunoglobulin E (IgE). IgE attaches to mast cells and basophils, which become sensitive to further antigenic material. On further exposure the antigen binds to IgE, causing degranulation of the mast cells and release of chemical mediators, including histamine, leukotrienes and prostaglandins, which produce an inflammatory response. Prolonged exposure to the allergen may result in a sustained response, causing nasal congestion.

**Epidemiology**

- Hayfever is estimated to affect 10–15% of the UK population, and the incidence appears to be rising.
- Up to 10% of children and 20–30% of adolescents are thought to suffer. Incidence peaks in the early teens and then diminishes. About two-thirds of adult sufferers are under 30 years old.
- Heredity may play a role, and children whose parents suffer from hayfever have a high chance of suffering themselves.

**Signs and symptoms**

**Nasal symptoms**

The development of nasal symptoms over time is described in terms of early and late phases.

**Early-phase nasal symptoms**

- Rhinorhoea (nasal discharge): discharge is clear and watery, and frequent blowing and wiping can make the nose sore, sometimes leading to infections.
■ Sneezing: begins within 60 seconds of inhalation of allergen and can result in long bouts of repeated sneezing, which is disruptive and distressing.
■ Nasal pruritus (itching): may be continuous or intermittent, and is extremely unpleasant and irritating.
■ Some sufferers also experience an itching sensation in the roof of the mouth.

Late-phase nasal symptoms
■ Nasal congestion, usually developing after some days of exposure to allergen, when the blood vessels in the nose become dilated. Congestion may be uni- or bilateral, and may shift from one nostril to the other every few hours. Mouth-breathing may result, which can lead to a dry mouth and bad breath, disrupted sleep and anosmia (loss of sense of smell).
■ Nasal congestion may cause frontal or sinus headaches and give rise to secondary infections such as sinusitis.
■ The eustachian tubes may become blocked with mucus and infected, and otitis media may result.
■ In some cases a dark or bluish swelling, like a black eye, develops around the eyes, caused by impaired nasal venous outflow.

Eye symptoms: allergic conjunctivitis
■ clear, watery ophthalmic discharge
■ redness caused by dilation of the conjunctival blood vessels
■ ophthalmic itching, sometimes so severe that the sufferer resorts to scratching the eyelids to relieve it
■ photophobia
■ skin folds or pleats develop parallel to the lower lid margin, extending from under the eye to the top of the cheekbone.

Differential diagnosis
Allergic rhinitis and the common cold have several features in common. They may be confused with each other but can be distinguished by the differences shown in Table 23.1.

Symptoms and circumstances for referral
■ wheezing or shortness of breath, which could indicate asthma
■ earache or facial pain, as these may indicate sinusitis or otitis media requiring antibiotics
■ purulent, rather than clear, discharge from the eyes, indicating the possibility of infection
■ blood in nasal discharge
■ no improvement after 1 week of treatment with over-the-counter medication.
Table 23-1. Differential diagnosis of hayfever (seasonal allergic rhinitis) and the common cold

<table>
<thead>
<tr>
<th>Allergic rhinitis</th>
<th>Common cold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasal discharge usually remains clear, and if it does become infected takes much longer to do so</td>
<td>The initially clear nasal discharge usually thickens and becomes purulent within a few days</td>
</tr>
<tr>
<td>Sneezing usually frequent and paroxysmal</td>
<td>Sneezing usually less frequent</td>
</tr>
<tr>
<td>Nasal itching common</td>
<td>Normally no nasal itching</td>
</tr>
<tr>
<td>Eye symptoms common</td>
<td>Normally no eye symptoms</td>
</tr>
<tr>
<td>Symptoms continue for as long as the sufferer is affected by the allergen, often several weeks</td>
<td>Symptoms last for about 4–7 days</td>
</tr>
<tr>
<td>Sudden onset of symptoms</td>
<td>Gradual onset of symptoms</td>
</tr>
<tr>
<td>Symptoms occur at the same time each year, when the causative allergen is in the air</td>
<td>Can occur any time, but more usually in the winter</td>
</tr>
<tr>
<td>Affects only isolated individuals</td>
<td>Highly contagious; other family members or acquaintances may be suffering at the same time and the infection will be quite common in the community</td>
</tr>
</tbody>
</table>

Treatment

Systemic treatment

- Histamine is the main chemical mediator responsible for the inflammatory response of hayfever and other allergic reactions. All oral formulations for treatment of hayfever are antihistamines and act through competitive antagonism of histamine at the H₁-receptor.
- Antihistamines are generally effective in controlling symptoms of hayfever, including sneezing, nasal itching, rhinorrhoea and, to a lesser extent, allergic conjunctivitis, but they have little or no effect on nasal congestion.
- The maximum effect of antihistamines is not achieved until several hours after peak serum levels have been reached and they cannot reverse the consequences of H₁-receptor activation, so are only effective if they are able to block histamine release before it occurs. For maximum effectiveness, therefore, antihistamines should be taken when symptoms are expected, rather than after they have started.
- Oral antihistamines fall into two groups: sedating and non-sedating.

Sedating antihistamines

- Sedating antihistamines (also known as first-generation antihistamines):  
  - are lipophilic and readily cross the blood–brain barrier  
  - as well as binding to H₁-receptors, bind to and block muscarinic receptors and, in some cases, alpha-adrenergic and serotonergic receptors in the brain, and, as a result  
  - can cause several generally undesirable side-effects, including sedation, dry mouth, blurred vision, urinary retention, constipation and gastrointestinal disturbances.
Sedating antihistamines available without prescription are:
- chlorphenamine
- clemastine
- diphenhydramine
- promethazine.

There is no evidence of difference in effectiveness between older antihistamines, although individual response to specific drugs varies widely. Choice is often based on personal preference and factors such as the degree of sedation caused and duration of action, which do differ between compounds.

Non-sedating antihistamines
In comparison with sedating antihistamines, non-sedating antihistamines (also known as second-generation):
- are less lipophilic and do not reach the brain to a significant extent
- are much less likely to cause centrally mediated adverse side-effects. (However, a few individuals exhibit drowsiness and other central nervous system side-effects in response to non-sedating antihistamines and even to placebo, and impairment of function, if it occurs, is not always accompanied by subjective feelings of drowsiness. Patients should therefore be warned that these antihistamines may affect driving and other skilled tasks and that excess alcohol should be avoided.)

Compounds available are:
- acrivastine
- cetirizine
- loratadine.

All are of equal efficacy.

Acrivastine has a rapid onset of action and a short half-life, necessitating more frequent dosing than cetirizine or loratadine, but it may be useful to give rapid relief.

Peak plasma levels of cetirizine and loratadine are reached in about an hour; they have long elimination half-lives and are long-acting, requiring only once-daily dosage.

The incidence of sedation is extremely low for all three drugs, but loratadine is less likely to be sedating than acrivastine or cetirizine.

Combination products
Some oral products combine antihistamines with sympathomimetic decongestants and are marketed for nasal congestion associated with hayfever and the common cold.

Antihistamines on their own are effective for treating the early-phase symptoms of hayfever. First-generation antihistamines reduce rhinorrhoea through their anticholinergic action but do little to relieve the nasal congestion associated with the late-phase response; co-administration of a sympathomimetic decongestant may be helpful.

Topical treatment
Intranasal and ophthalmic preparations are available without prescription for the treatment of hayfever symptoms.
Nasal preparations
Nasal preparations contain anti-inflammatory, sympathomimetic decongestant or antihistamine ingredients.

Anti-inflammatories
The anti-inflammatory agents available are:
- beclometasone
- fluticasone
- sodium cromoglicate
- triamcinolone acetonide.

Beclometasone, fluticasone and triamcinolone are corticosteroids. They down-regulate the inflammatory response of type I allergic reactions by reducing the number of basophils and mast cells, and by blocking release of mediator substances. They inhibit both early and late responses to allergen exposure, and are therefore effective in relieving nasal congestion.

Sodium cromoglicate is known as a mast cell stabiliser. Its mode of action is not entirely understood but it is thought to act by stabilising mast cell membranes and preventing their degranulation. It counteracts both the early and late response to allergen exposure.

Beclometasone, fluticasone, triamcinolone and sodium cromoglicate are effective in relieving all nasal symptoms of hayfever. They take some days to achieve optimum effect, and treatment should ideally be started at least 2 weeks before symptoms are expected. Patients should be advised that, if symptoms are already present when treatment is started, it could be several days before an effect is noted and several weeks before full relief is obtained.

Beclometasone, fluticasone and triamcinolone acetonide
- Beclometasone, fluticasone and triamcinolone acetonide are presented as aqueous non-aerosol sprays. Absorption from the nasal mucosa is low, and systemic effects are highly unlikely at recommended doses (although pregnant and lactating women are advised to avoid using them unless a doctor regards treatment as essential).
- Any local reactions, such as stinging, burning and aftertaste, are mild and transient.
- Treatment may need to be maintained throughout the hayfever season, and repeated each year. The preparations can be used for up to 3 months without consulting a doctor.
- Beclometasone, fluticasone and triamcinolone acetonide are licensed for use in adults of 18 years and over.
- They should be avoided if there is infection in the nose or eye. There are otherwise no significant contraindications or interactions.

Sodium cromoglicate
- Sodium cromoglicate is available as a 4% aqueous spray.
- It is a prophylactic agent so treatment should begin before the pollen season starts and continued throughout.
It is less effective at controlling nasal symptoms than corticosteroids and has the disadvantage of requiring administration at least four times daily. However, it is safe and is suitable for children from 5 years of age.

There are no specific cautions or contraindications, and it does not interact with other drugs.

**Sympathomimetic decongestants**

Drops and sprays containing sympathomimetic decongestants are used to relieve nasal congestion associated with hayfever, and may be useful to begin treatment when the nose is badly blocked.

Compounds available are:

- oxymetazoline
- phenylephrine
- xylometazoline.

All exert a rapid and potent vasoconstricting effect when applied directly to the nasal mucosa. They should only be used for short periods as rebound congestion can occur.

**Eye preparations**

- The only agent available is:
  - sodium cromoglicate

Most eye symptoms relating to hayfever will be controlled by oral antihistamines, but if symptoms are persistent or particularly troublesome, eye drops are usually effective.

Sodium cromoglicate is a mast cell stabiliser. It is used four times daily and is suitable for children.

All eye drops for allergic conjunctivitis contain the preservative benzalkonium chloride, which is absorbed into soft contact lenses and released onto the cornea during wear, causing inflammation and irritation. Soft lenses should not be worn while using these products; gas-permeable lenses may be inserted 30 minutes after using the eye drops.

**Additional advice**

- Stay indoors and keep all windows closed (this reduces pollen exposure by a factor of up to 10 000).

- Avoid going out, particularly in the early evening and mid-morning. Wear close-fitting sunglasses when outside, and a mask if symptoms are really severe.

- In the car, keep windows closed, especially on motorways. Keep the air-conditioning system on, if there is one.
Self-assessment

It is mid-summer and you are consulted by a young woman wanting advice about her hayfever. She tells you that she is about 18 weeks pregnant and is experiencing really bad hayfever symptoms. She has been prescribed desloratadine tablets by the obstetrician at the antenatal clinic but they do not relieve all the symptoms. She has a lot of discomfort: her eyes feel very itchy and her nose is permanently blocked. She wants to know if you can recommend anything that might help.

Multiple choice questions
1–3. (Closed-book, classification)

Questions 1–3 concern the following drugs available without prescription for the treatment of hayfever symptoms:

a. acrivastine
b. beclometasone
c. cetirizine
d. chlorphenamine
e. fluticasone

Which of the above:
1. is likely to cause drowsiness?
2. needs to be taken only once daily?
3. is a short-acting second-generation antihistamine?

4. (Closed-book, simple completion)

A long-distance lorry driver who has to work every day for the next 5 days asks for something to relieve his hayfever symptoms. Which one of the following antihistamines would be the best to recommend?

a. promethazine
b. diphenhydramine
c. clemastine
d. chlorphenamine
e. cetirizine

Tips

Much of the knowledge and all of the professional decision-making skills you need to answer questions in the registration examination should be acquired through your pre-registration training programme.