HAY-FEVER AND HAY-ASTHMA.


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Pollen allergy, whether affecting the upper respiratory tract and giving rise to hay-fever, or affecting the lower respiratory tract and causing asthma, is the term applied to the train of symptoms induced in specifically sensitive individuals through adequate contact with the specific pollens. According to the genera of plants giving rise to the pollen inducing the symptoms, it is customary to subdivide these reactions into tree pollenosis, grass pollenosis and weed pollenosis.

Historical. It is of interest to record the fact that most of the pioneer work in the elucidation of the causes and treatment of hay-fever was carried out in England. Bostock of Liverpool was the first (1819) to describe “summer catarrh” as a disease with a definite symptomatology and a seasonal occurrence. Gordon of London (1829) stressed the aetiological relationship of the aroma of the flowers of the grasses, and was the first to introduce the term “hay-asthma.” Elliotson of London adopted (1831) the term “hay-fever” from the laity, but suggested that it ought not to be called “hay-fever” since it did not depend upon the hay, but upon the flower of the grass, and probably upon the pollen. He was the first to mention a dermatitis of the hands following handling the flowers of grass. Gream of London observed (1850) similar symptoms produced by dust, and remarked upon the influence of rain in diminishing symptoms. Smith of London (1865) recognized that the beginning of the attack coincided with the first flowering of the grasses, but it remained for Blackley of Manchester to prove conclusively (1873) on himself that the pollen of the order Graminaceae was responsible for the disease by testing grass pollen both on his mucous membranes and skin. In 1881 Blackley showed that the attack could be modified by placing in the nostrils and over the eyes some contrivances which would purify the inhaled air of its irritating substances or prevent them from reaching the eyes. In 1890 he designed a perfect pollen filter for the home of a sufferer. In 1910 Yonge of Manchester gave an excellent review of the subject. Noon and Freeman of London obtained (1911) positive results by applying the pollens of grasses to the conjunctiva in hay-fever subjects and using the pollens indicated for therapeutic purposes.

Pollen is the germ cell of the male plant and it is amongst the normally cross-pollinated group of plants that we find the important pollens causing hay-fever. As these pollen granules do not have any power of spontaneous movement, they must be carried from flower to flower by some external agency as water, winds, birds or insects. In hay-fever it is the wind-pollinated group with which we are mainly concerned. Insect pollination does occur in a few species of hay-fever producing plants, but in these cases the patient is brought into intimate contact with the plant either by occupation, by the adornment of the home, or by direct inhalation as in smelling flowers, or picking and playing with daisies and dandelions, as children do. Most of the plants that have been incriminated as frequent causes of pollenosis comply with the following characteristics; the pollen is wind-borne or anemophilous, fairly prolific in its production, sufficiently small or buoyant to be carried considerable distances, and contains an excitant of hay-fever. The parent plant is widely and abundantly distributed with small unscented flowers, lacking brilliant colourings.
In the British Isles true hay-fever symptoms are prevalent from the end of May until early in August, and they correspond principally with the period of pollination of the grasses. Grass is widely and abundantly distributed, and its pollen granules small and buoyant, specially designed for wind distribution, and extremely prolific in their production. Tree pollen is prevalent from March until May but patients rarely commence symptoms so early. Flowers are insect-pollinated and produce only relatively small amounts of large sticky pollen, whilst the cereals produce large, moist, heavy pollen granules which cannot be carried far by wind; hence flowers and cereals are a factor in hay-fever only in persons coming into very close contact with them.

Common meteorological factors which cause marked variations in symptoms during the season include—(a) sunshine, which is a stimulus to pollen production; (b) warmth, a temperature of 75° F. being necessary to open the flowers and liberate the pollen, which usually occurs between 6 and 8 a.m.; (c) rainfall, which lessens pollen production and clears the air; and (d) wind, which determines the amount of pollen coming in contact with the sufferer and the distance it will be carried, for pollen settles out of very still air; another important point is the relationship between the prevalent direction of the wind in the district and the location of its greatest plant abundance. Transport greatly influences symptoms, as the faster the movement the greater the amount of pollen that is encountered in a given time, so symptoms are more severe in a train or automobile than when walking. From calculations made from pollen counts of the air the average person inhales from 8 to about 1,000 pollen grains during twenty-four hours.

Once patients have suffered from hay-fever due to pollen for a few years, usually they become sensitive to many other air-borne substances such as dust, feathers, animal hairs and orris root. At first these substances lead to an accentuation of nasal or to asthmatic symptoms only during the hay-fever season, but later the sneezing and wheezing may last longer and longer into the winter until the patient is a sufferer all the year round. Consequently the bedding should not contain feathers, down or horsehair; the mattress should be composed of rubber (Dunlopillo) and the pillows, bolster and eiderdown filled with the best Java kapok. This special bedding can be obtained from S. Brown & Son, 5, 6, 7, Houndsditch, London, E.C.3. Special face and talcum powders not containing orris root can be obtained from Messrs. C. L. Bencard of Endersleigh Gardens, Hendon, N.W.4.

Males and females appear equally susceptible to pollen allergy, and many more cases develop during childhood than is commonly appreciated, two-thirds of some thousand cases I have investigated dating their symptoms to the first decade. Heredity plays an extremely important rôle. Given such a person inheriting the allergic constitution, it is found that the clinical reaction is most likely to occur to the pollen to which there is the most intense and constant exposure. The first symptoms in many cases follow some unusual massive exposure, such as a long car trip on a windy, dusty day, or a camping expedition or picnic in a pollen-laden atmosphere.

It is obvious that pollens can be the agents responsible only for symptoms that are seasonal in occurrence, yet it is well to remember that seasonal cases with similar symptoms have been reported which have been due to such other factors as orris root and dust. In those persons, in whom these same symptoms are present the whole year round, pollen allergy generally plays only a minor part or even a negligible part. For these reasons it is necessary to discuss two separate types: (a) the seasonal type, and (b) the perennial type or allergic coryza.
The symptoms may be divided for convenience into two major categories, the oculo-naso-pharyngeal group and the asthmatic group.

The Oculo-Naso-Pharyngeal Group. These are of a catarrhal nature. A primary nasal irritation soon gives place to a feeling of fulness due to the swelling of the mucosa, following which paroxysms of violent sneezing and a profuse watery discharge occur, all of which may diminish somewhat for a time, leaving the patient exhausted and in a profuse cold perspiration. Itching of the eyes commences at the inner canthi, progresses along the lid margins, then spreads to the conjunctiva, generally causing profuse congestion and lachrymation and some photophobia. Rubbing intensifies the irritation and a chronic inflammatory appearance is produced. The oral cavity may be affected and itching of the palate and posterior nares is frequently so intense as to lead to an irritative hacking non-productive cough, for as a consequence of the nasal obstruction, mouth-breathing follows. Some suffer from a seasonal deafness due to chronic obstruction of the Eustachian tubes consequent on the chronic swelling of the pharyngeal mucosa.

The attacks are most severe on first rising in the morning, due to the greater concentration of pollen at that time. Though originally the secretions are quite watery and transparent, they later become thick, opaque and muco-purulent as excoriations and inflammatory reactions occur.

The Asthmatic Group. Bronchial spasm occurs in about 40 to 60 per cent. of hay-fever sufferers, generally following several years of catarrh, and becoming more pronounced each season. In the first stages the asthma remains confined to the pollinating season, but with each successive year, it tends to last longer into the fall and winter.

The Cutaneous Group. Some patients suffer from dermatitis or eczema caused by pollen.

The duration of the hay-fever attacks varies greatly. In most cases they recur yearly for an indefinite number of years, in some with an increasing severity, in others with a progressive diminution of symptoms in later years, whilst in rare cases a spontaneous cure is observed. In many sufferers a change of sensitivity is noted, the seasonal symptoms becoming perennial as asthma and affections of the lower respiratory tract replace to a larger extent the higher mucous membrane reactions.

The diagnosis of hay-fever may be approached from two aspects: (a) the specific, by determining the effect of various pollens on the mucous membrane in the production of symptoms, or on the skin with specific pollen extracts or by noting the effect of a change of environment; and (b) the symptomatic or clinical by observing the characters of the coryzal symptoms that are more or less pathognomonic. The itching and burning are of variable severity and associated with changes in various meteorological phenomena, such as sunshine, rain, wind and humidity; the sneezing is of a multiple paroxysmal nature; the symptoms have a definite periodicity, a definite duration, a strongly marked hereditary influence with a surprisingly sudden termination; and permanent gross pathological changes are generally absent.

Skin testing for pollen sensitivity can be carried out at any time of the year. For pre-seasonal treatment the skin testing should be completed and the solution prepared by the middle of February. The individual pollen solutions for testing and treatment may be obtained from Messrs. Duncan, Flockhart & Co., whilst a mixed grass vaccine with feathers, animal hairs and dust can be obtained from Messrs. C. L. Bencard.
Treatment.

Many factors may influence the successful treatment of a given case and the most important would seem to be whether all the specific causes have been recognized, for not only must the pollens be determined, but also the relative etiological importance and prevalence of other irritants, such as orris root, dusts, feathers or animal emanations. The presence of infections or structural alterations in the upper respiratory tract should be ascertained, and an efficient airway and drainage provided. Further factors that may modify the success of treatment depend upon the season at which the patient first seeks medical attention, whether the symptoms have already commenced, and whether it is possible to give treatment pre-seasonally, co-seasonally, or all the year round. In addition, great variations occur in the weather conditions from year to year and, consequently, in the pollen yield.

Specific Avoidance. The complete avoidance of contact with the specific proteins, whether pollen, dust, epidermal or food, is the surest method of obtaining relief. In pure pollen cases this may be brought about by a total change of environment during the season, but such a flight from the cause is not a cure but merely a pleasant temporary escape accessible to the more well-to-do. As a direct antithesis to this, many mechanical apparatus have been designed to afford relief at home, such as air-filters to keep whole rooms pollen-free, or masks through which the patient is supplied with pure filtered air. Such means can only be partially successful, whilst the movements and interests of the individual are necessarily restricted.

Desensitization. Desensitization is the most useful method for those who cannot afford the time and expense of prolonged changes of environment. It may be specific or non-specific, but specific as determined by skin reactions assures the best results and may be brought about in various ways. The time for carrying out this measure varies with different workers as well as with the season at which the patient first applies for treatment. Frequently this is at the first onset of symptoms, and one is forced to undertake co-seasonal treatment, which is probably the least efficacious. In the "rush inoculations" subcutaneous injections of specific pollen extract are given every one and a half to two hours throughout a fourteen hour day, and a great deal of time may be saved, as a very satisfactory course of treatment may be put through in two to four days. The dosage is adapted to the particular needs of the patient, but with co-seasonal treatment the initial dose must always be smaller than those employed in other methods.

The perennial method has been recommended, in which the maximum protective dose of pollen extract—that is, the final dose attained at the end of the first year's pre-seasonal treatment—is given at approximately monthly intervals throughout the year. The advantages of this method are that the treatment may commence at any time of the year; using mixed extracts of trees, grasses and weeds if necessary; the number of injections and visits is lessened; the treatment is less likely to be interrupted by illness or vacation; the results are invariably better; and a clinical cure may be established in a much shorter time.

The pre-seasonal method is favoured by most workers who endeavour to have the course completed just before the date the specific causes commence to pollinate. With this method the tolerance which has been built up is lost and treatment has to be started the next year as though the case were a new one. The best results only can be obtained when the solution for treatment contains all the grasses of the district to which the patient gives positive skin reactions.
The following technique is recommended for inoculation. A bottle is prepared which contains the mixed concentrated solution of the pollens to which the patient is sensitive (strength A). One cc. is measured out and placed in another bottle and diluted with 9 cc. of glycerinated saline solution (strength B). One cc. is taken out of this bottle, placed in another and diluted (strength C) until four to five bottles have been prepared each of which contains a solution ten times weaker than its neighbour. A fiftieth of a cubic centimetre of the weakest is injected intradermally, and if no reaction is present in five minutes a similar dose is injected from each bottle in turn until a positive reaction is obtained with erythema not larger than an inch. The strength that just produces this mild local reaction intradermally is the best initial strength for treatment, of which one minim is given subcutaneously.

The course of injections should commence the last week in February and continue until the middle of June. The later the course is begun the more frequently have the injections to be given in order to get most of them completed by June 1st. If the course commences late the easiest way to calculate the interval in days between each injection is to divide the number of days from the first injection to June 1st by twenty. For courses commencing at the beginning of or during the season the injections may be given at daily intervals.

The solutions. Generally only two are necessary (strengths A and B) except in very sensitive cases. Solution B is the weaker and should be used first. Solution A is ten times stronger.

Site of Injection. The injections are given subcutaneously into the upper arm or thigh.

Dosage. Solution B. Give injections of 1, 2, 4, 7 and 10 minims at intervals of three to four days. To each injection add 2 minims of adrenalin chloride (1/1,000 solution) in order to slow the rate of absorption and prevent any general reaction.

Solution A. Give injections of 1, 1½, 2, 3, 4 and 6 minims at intervals of five days and combine with each 2 minims of adrenalin chloride solution as before. Then continue with doses of 8, 11, 14, 17, 20, 24, 28 and 32 minims at intervals of seven days. The further addition of adrenalin to these injections is not necessary unless the patient has symptoms of hay-fever or asthma.

Reaction.

General. It is essential to keep the patient under observation for at least twenty minutes to watch the development of the wheal in order to forestall the possibility of a general reaction. The first symptoms are usually itching, especially of the palms of the hands, suffusion of the eyes, and an intense feeling of bulging or pressure in each ear. Immediately inject subcutaneously ¼ cc. of adrenalin chloride solution in which case the symptoms usually subside. If they tend to progress to generalized urticaria, asthma or swelling of the tissues of the face and neck, the injections of adrenalin must be repeated as often as necessary. Such reactions are extremely rare, and are most likely to occur after the first two injections of either solution B or A. Should a general reaction follow any injection the next dose should only be a quarter of that previously given combined with double the amount of adrenalin.
Local. After each injection there should be a small area of redness, swelling, itching and tenderness. If there is no local reaction the dosage may be increased more rapidly until a small local reaction occurs. Should a large painful reaction occur the same dose should be repeated next time rather than increasing according to schedule. It is often wiser to give the larger doses in two halves, one injected into each arm or leg. Attempts should be made to reach a final dose of at least 2 cc. of a 5 per cent. solution of the pollens to which the patient is sensitive.

Palliative Measures. Dark glasses will relieve the glare and diminish the amount of pollen coming into contact with the eye, the irritation of which can usually be relieved by Estivin (made by Schieffelin & Co.), one drop in each eye. Nasal Drops (Bencard), Endrine nasal compound (Petrolagar Labs.) or Anesthone cream (Parke, Davis & Co.) relieve the nasal symptoms.

Internally ephedrine hydrochloride in doses of $\frac{1}{4}$ grain night and morning is often sufficient to control the spasms. If there is any cough or wheeziness two teaspoonfuls of Linctus-Anti-Asthmatic (Bencard) should be taken each night. Also hydrochloric acid generally has a beneficial effect, especially if the patient suffers from flatulence, and is best given in tablet form—Pulvis Acidus Tablets (Bencard), one swallowed with a wineglassful of water immediately before each meal.

Though cauterization and ionization of the nose may lead to some temporary alleviation of the symptoms, I have not come across a single case of true hay fever which has derived permanent benefit from these procedures.