

UNSPECIFIC IRRITATION OF THE NOSE

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By specific irritation of the nose we mean those reactions caused by a specific allergen in an organism sensitized to this allergen. By unspecific irritation of the nose we mean those reactions which occur by the inhalation of irritating particles, vapours or odors as for instance pepper and ammonia. Specific irritation only occurs in atopic allergy of the hayfever type whereas unspecific irritation occurs in every individual.

Whereas the pollution of our atmosphere is considerable and in some big cities even on the verge of intolerability, similarly to the conditions in many factories, the important question arises, as to what part this pollution plays a role in nasal pathology.

The symptoms of nasal irritation are vasomotor reactions as swelling of the turbinates and secretion but also activation of the protecting sneezing reflex by which particles and secretion are removed. Thus an equilibrium between nose-blocking and the nose-cleaning actions may result in an irritated and swollen but still passable nose. In the long run infection will complicate the chronic irritation as is a common experience in certain factories, mines and other works.

In order to study the unspecific nose irritation under experimental conditions, we have investigated the effect of the exposure to known amounts of irritants in normal and certain pathological individuals. These experiments were carried out with ammonia, tobacco, pepper and veratrine. The best results were obtained with pepper for studying the vasomotor- and with veratrine for studying the sneezing threshold.

It appeared that in normal test persons, mostly students, on the insufflation of 1 mgr. of pepper with 19 mgr. of rice-powder (5%) no reaction occurred. On the introduction of 10 mgr. of pepper with 10 mgr. of rice-powder (50%) in a number of these test-persons a distinct reaction consisting of swelling and secretion could be observed, but within 8 minutes in all of them the nose was normal again. This reaction was considered to be the normal threshold reaction on pepper.

Now the important question arises if the attacks in unspecific nasal allergy and thus in the true rhinitis vasomotoria may be provoked by external irritants or if these attacks are the periodical unloading of the nerve system, comparable to the epileptic fit.

Indeed on testing 100 of these patients it appeared that their threshold was considerably lower. Already on 1 mgr. of pepper strong reactions were seen, and on 10 mgr. in 22 of them nose blocking and strong secretion was present during more than 30 minutes.

Inhalation of ammonia had the same effect in this group. Remarkable is the sharp difference, the sharp bend in the curve, between the group of patients with nearly normal reactions and this group with considerably lengthened reactions, pointing to the existence of a special nervous condition in the latter.

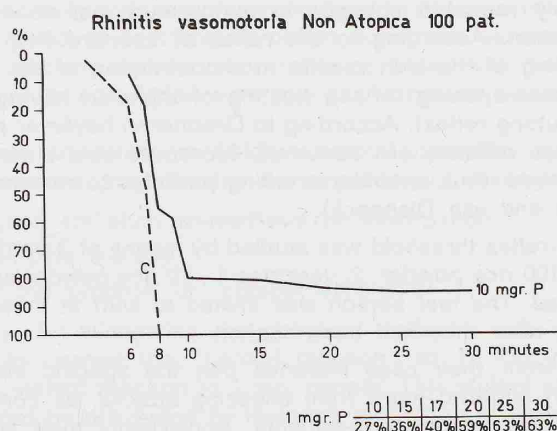


Fig. 1. The reaction on 10 mgr pepper in patients suffering from rhinitis vasomotoria non-specifica. Among them 22 showed a strong and lengthened reaction. Note the abrupt bent at 10 minutes. The reaction on 1 mgr pepper is presented in the small diagram.
C. control persons.

Fig. 1. La réaction à 10 mg de poivre chez des malades, souffrant, de rhinite vasomotrice non-spécifique. Parmi ceux-ci 22 cas montraient une réaction importante et de longue durée. Notez la chute rapide après 10 minutes. La réaction à 1 mg de poivre est présentée dans le petit diagramme. C. Sujets de contrôle.

To our surprise, in a group of patients suffering from nasal allergy caused by house-dust, similar reactions were obtained in 13%. Thus the special nasal condition responsible for heightened susceptibility for irritants does not exclusively belongs to nonspecific rhinitis vasomotoria but is linked to both kinds of nasal allergy. Thus in specific allergy, external unspecific irritants may be an additional cause of the attacks apart from the allergen-antibody reaction.

Both the normal reaction and the lengthened reaction could repeatedly be reproduced, but would then vary quantitatively. Differences in the reaction of one side of the nose and the other were repeatedly observed. Moreover in the course of time patients presenting a strong reaction were seen to change over to a normal reaction. It is a matter of common experience that the susceptibility to such irritants differs considerably from one individual to the other and even in a given person from one day or one hour to the next.

Similarly well known is the changing individual susceptibility for the photo-sternutatory reflex viz. in the sneezing attacks when looking at the sun.

Strong variations in temperature are well known nasal irritants. From their histories it appears that infact a third of the allergic patients reported a distinct increase in their complaints under the influence of cold or heat. The patients with greater sensitivity and lengthened reaction do not have more complaints proportionally than the other patients.

Most probably repeated changes in temperature act as additional non-specific stimulation. According to the reflex of Leonard Hill, in the normal individual, cooling of the skin results in a contraction of the blood vessels of the nose (nose-opening reflex), heating of the skin having the opposite effect (nose shutting reflex). According to Drettner in hayfever patients during the season these reflexes are abnormal. Moreover cold air stops the ciliar activity in the nose, thus enabling irritating particles to remain longer in the nose. (van Ree and van Dishoeck).

The sneezing-reflex threshold was studied by means of 3 bottles containing: 1. veratrine 1 : 100 rice powder, 2. veratrine 1 : 10 rice powder and 3. veratrine powder undiluted. The test person was invited to sniff at these bottles, one after the other, after they had been shaken.

It appeared from their case histories that the specific allergic patients (atopic patients) suffered more from sneezing attacks, as compared to the non-specific rhinitis vasomotoria-patients. Accordingly their sneezing reflex threshold proved to be lower. Those patients in both groups who were known to react strongly on pepper stimulation, proved to have also a low sneezing reflex threshold. As all these specific allergic patients were tested in the time they were exposed to the allergen (mostly house-dust), the question arises whether this fact is responsible for a higher sensitivity.

In order to study this problem 15 hay-fever patients were tested during the season and in the winter. Indeed these patients proved to be much more sensitive in summer as compared to winter. According to Tiffeneau the bronchomotoric hyperexcitability of patients suffering from asthma is the consequence of prolonged and repeated bronchial constriction and conse-

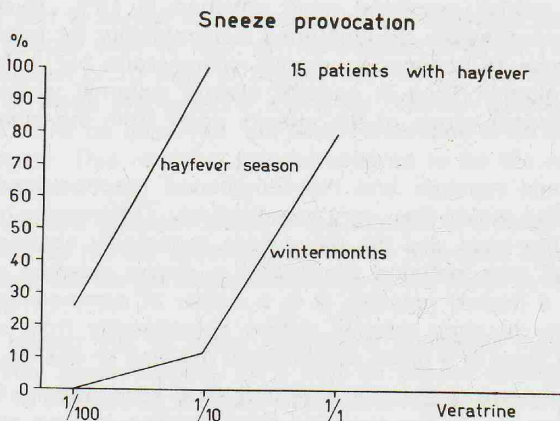


Fig. 2. Sneezing provocation tests with veratrine in hayfever patient in and out of season. Provocation de la réflexe d'éternuement chez des malades souffrant de rhume des foins par des dilutions de veratrine pendant la saison et pendant l'hiver.

Fig. 2. Test provoquant le réflexe sternutatoire au moyen de veratrine chez les malades souffrant de rhume des foins, durant et en dehors de la saison critique.

quently hypersensitivity will be more pronounced in the case of a continuously acting allergen as house-dust and as pollen during the season.

For the nose blocking and secretion reflex as tested with the pepper provocation test, such a correlation with allergen exposure could not be established.

There are three conditions in which a normal individual, by a change in his nervous conditions, may develop the symptoms of vasomotor rhinitis viz.

- 1° After ganglion stellatum anaesthesia or extirpation.
- 2° During reserpine therapy.
- 3° As part of the syndrom of "combat exhaustion".

Experimentally, by eliminating the ganglion stellatum with novocaine 1% we were able to change the "normal reaction" to 10 mg. pepper into a lengthened and violent reaction to 1 mg. pepper. This violent and lengthened reaction could not be prevented by lowering the action of the parasympathic nerve with sulfas atropine. It is likely, therefore, that in the rhinitis vasomotoria patients, who displayed a violent and prolonged reaction to aspecific stimuli, the cooperation between sympathicus and parasympathicus in the nasal area is disturbed in a similar manner. This disturbed cooperation leads to such an unstable condition of the nasal mucosa that specific stimuli, which produced only very slight reactions in control persons, will cause a violent and prolonged swelling of the mucosa and secretion. As it were, a latent vasomotor rhinitis is brought about by this disturbed cooperation, which may manifest itself a.o. by the stronger reaction on aspecific stimulation.

On the strenght of the above-mentioned observations after pepper provocation and in view of the publications on the apperance of a permanent severe vasomotor rhinitis after surgical elimination of the tractus sympathicus in the neck, we are of the opinion that in a number of cases vasomotor rhinitis is caused by a disregulation of the autonomous nervous system in the nasal area. We still have some difficulty in explaining the etiology of this dis-regulation and the nature of the stimuli causing the attacks. Bacterial allergy, endocrine and psychosomatic factors are likely to play an important part.

STIMULATION NON-SPÉCIFIQUE DU NEZ

La stimulation spécifique est celle d'un allergène réagissant avec une muqueuse nasale sensibilisée; la stimulation non-spécifique est celle d'une matière comme la poivre, l'ammoniaque, le tabac, la veratrine etc. Pour des dilutions de poivre en poudre de riz le seuil de réaction de sujets normaux fut établi. En partant de l'idée préconçue que dans la rhinite vasomotrice non-spécifique les attaques pourraient être provoquées par des agents inhalés, nous avons recherché chez un nombre de malades allergiques, spécifiques aussi bien que non-spécifiques, ce seuil de réaction pour le poivre et l'ammoniaque. Il se montrait que dans environ 20 pour cent la réaction était anormalement forte et prolongée.

En éliminant le ganglion stellaire par une injection de novocaine à 1%, il fut possible de changer la «réaction normale» en une «réaction prolongée et violente». Le sulfate d'atropine n'a exercé aucune influence sur la réaction

prolongée chez ces sujets et chez nos malades. Sur la base de ces observations et vu les publications sur l'incidence d'une rhinite vasomotrice permanente après l'élimination de la chaîne ganglionnaire sympathique du cou, il semble probable qu'un mauvais fonctionnement du système nerveux autonome de la région nasale soit responsable pour une hypersensibilité latente. A base de cette hypersensibilité, il y a des facteurs extrinsèques mais aussi des facteurs intrinsèques, tout les deux encore mal connus, qui peuvent être responsables pour les attaques. L'allergie bactérienne, des facteurs endocriniens et psycho-somatiques jouent probablement un rôle important. Une pareille dysfonctionnement se manifeste pendant un traitement à la réserpine et aussi chez des militaires épuisés par le combat.

Les malades souffrant d'allergie spécifique (atopiques) ont notamment plus de crises d'éternuement. Chez eux un test à la dilution de veratrine en poudre de riz, montrait que leur seuil de reflexe sternutatoire se trouve sensiblement plus bas que chez les malades non-spécifiques (non-atopiques) ou ceux du groupe de contrôle. Chez les malades souffrant de rhume des foies, ce seuil est bas durant le printemps, tandis que durant les mois d'hiver, il se trouve au même niveau que celui des sujets de contrôle.

Cette observation prouve que les réactions répétées du nez et des bronches résultent dans un abaissement du seuil reflex (Tiffeneau).

Les changements répétés de température ont probablement l'effet d'une stimulation non-spécifique additionnelle. Au point de vue anamnèse, un tiers des malades spécifiques (atopiques) aussi bien que non-spécifiques (non-atopiques) ont nettement plus à se plaindre sous l'effet du froid ou de la chaleur. Selon le reflexe de Léonard Hill chez un individu normal, le refroidissement de la peau du nez résulte dans une contraction des vaisseaux des muqueuses nasales et l'échauffement dans une dilatation. Selon Aschan et Drettner ces reflexes de la peau du nez sont anormaux chez les malades souffrant de rhume des foies. Le froid arrête l'activité ciliaire de la muqueuse nasale. Dans ce cas les irritants inhalés auront une action plus prolongée (Van Ree et Van Dishoeck).

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