AIR PRESSURE CHANGES IN THE FRONTAL SINUSES AS THEY AFFECT THE OPHTHALMIC SURGEON

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South Africa's varied climate favours the study of the effects of atmospheric irritation on human mucous membrane.

In the Transvaal winter the dry air, and in the summer grass pollen and house dust, appear to be the main sources of irritation. House dust has a fairly constant composition in any one area, but it is activated in summer when, as the temperature and the moisture content of the air rise, fungi and yeasts appear. For this reason house dust is more active at the coast.

The problem is aggravated in Johannesburg where there are large quantities of silica dust of a particle size too small to become wetted. Industries and mine ventilation shafts also supply quantities of sulphurous acid to the air.

Very little work has been done on the composition of the dust in this city. A bus company investigated the matter to try to find out why their buses did not last. This resulted in the development of an effective filter for their diesel engines. They did not analyse the dust chemically, but found Johannesburg dust more abrasive than

that of either Pretoria or Durban. If one considers that London buses require no air filter at all, while the best commercial air filters are not satisfactory in Johannesburg, one can realize that differences do exist. The efficiency of dust filtration depends on the particle size and on the presence or absence of a layer of moisture around such a particle. The drier the dust particle the poorer its 'wetting' properties, and consequently filtration efficiency is less. The same may apply to the arresting of dust in the nose. Dust does not constitute the whole of the problem because various kinds of gases also play their part.

FRONTAL SINUS INVOLVEMENT

Once the nasal mucous membrane becomes dry, inhaled air is no longer efficiently cleaned, warmed and moistened. The mucous membrane would also become irritated and possibly swollen and so block the ostia leading to the sinuses. This results in air pressure changes in the sinuses. Pressure changes in the frontal sinus, particularly, seem to give rise to uncomfortable symptoms. It is possible that the frontal nerve is irritated in its course along the floor of the sinus.

Symptoms

In the early stages a dull frontal headache with a deep-seated ache around the eye is complained of. This headache is a morning headache made worse by bending down. It either wakes the patient, is present on waking or develops a few hours after waking. Analgesic tablets are not effective, but the headache tends to improve as the day wears on.

Should the frontal nerve be involved, the pain is sharp and can be severe. It is seldom that both sinuses are involved equally and so the pain usually occurs in the distribution of one or other of the frontal nerves as they pass over the frontal region. There is frequent neck pain, which may radiate forward, and pain also occurs in a limited area on top of the head. Occasionally there is referred pain in the shoulder on the same side.

Diagnosis

These patients show a marked point tenderness to pressure deep in the inner orbital angle formed by the eyebrow and the root of the nose. This is diagnostic. Application of such pressure should be gentle, since the pain is often acute.

Radiography is of no use in the diagnosis of this condition at this stage. Sinus opacity and fluid level in the later stages can be diagnosed radiologically, but by this time the patient has already suffered for years.

An occasional patient may present a typical history, but show little tenderness over the lamina papyracea. In such a case it is useful to do a therapeutic test by starting treatment.

Treatment

Treatment is aimed at shrinking the sinus and nasal mucous membrane and re-establishing good nasal function.

Chemical decongestants are best avoided because of their temporary effect and because they may cause other reactions. A daily nasal lavage with a half teaspoonful each of salt and sodium bicarbonate in water has proved effective in most cases.

The Caucasian nose, developed in the cool, moist climate of Europe, is not completely suited to dry, hot climates. During dry seasons the mucous membrane dries and becomes crusted. At this stage the inferior turbinate bone attempts to narrow the nares. It is therefore often hypertrophied and may close Hasner's valve, causing lacrimal insufficiency and epiphora. If a patient shows clinical signs of frontal-sinus pressure maladjustment, no matter what Cottle's nasal index may be, he would require mechanical narrowing of the nares to avoid excessive dehydration of the nose.

The use of two soft cotton-wool balls placed anteriorly in the upper vestibule of the nose supplies such aid. Patients become used to it quickly and the cotton-wool balls are not seen. The cotton-wool pledgets are inserted dry, should be soft so as not to interfere with the movement of the alae nasi, and should be large enough to bring about an objective awareness of slight nasal expiratory effort. It should not be necessary to use these under humid conditions, but their use during the dry season could vary, depending on the severity of the case and the improvement of nasal function.

Attention to environment is also indicated, and as dust-free a bedroom as possible is aimed at. In this regard the use of a sponge-rubber pillow, smooth curtaining, covers for woolly blankets, and no mats could be suggested.

Finally, a word about the use of snuff. It is used extensively by sufferers from sinus headaches and seems to give real relief. It probably has the same disadvantages as are associated with most decongestants, as well as being habit-forming. This may be the reason why some patients become so attached to their treatment!

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