On the thirty-fifth day the patient was again given P.A.S., 7.5 g. a day, plus thyroid B.P., 1 gr. (65 mg.) thrice daily. Three days later both drugs were stopped on account of toxic symptoms. After a rest of three days the drugs were again administered, this time being continued for seven days, when again the drugs were stopped on account of toxic symptoms. No enlargement of the thyroid was noted during this period, and it seems that the addition of the thyroid extract prevented the gland from enlarging. The toxic symptoms noted were again loss of appetite, vomiting, headache, and dizziness, with persistence of the exophthalmos; the patient stated that the addition of thyroid extract increased these symptoms. Observations on the temperature and pulse rate were not instructive, although the lowest pulse recorded (76) occurred when the size of the gland was maximal.

Discussion

The literature offers no explanation of the effect of P.A.S. on the thyroid gland. Observations on this patient reveal certain interesting facts; first, that the P.A.S. was the cause of the enlargement; and, secondly, that the enlargement was probably controlled by thyroid extract. If these two observations are correct, one must assume that the enlargement was hyperplastic and hypothyroid in type. This view would agree with the findings of Komrower (1951), who reports a case of myxoedema associated with thyroid enlargement. In fact, so far as is known, all cases reported have been hypothyroid in type. It is further noted that the effect on the thyroid gland in certain experimental animals is to reduce the amount of colloid present. It is therefore suggested that P.A.S. produces its effect on the thyroid gland in the same way as thiouracil—by interfering with the production of the thyroid hormone.

Attention is drawn to an unusual effect of P.A.S. *in vitro* Horn and Bogsch (1950) report that P.A.S. binds a large amount of iodine from a solution. One molecule of P.A.S. binds three atoms of iodine, and it is possible that P.A.S. interferes with the production of thyroxine by binding iodine and preventing the iodization of tyrosine.

If P.A.S. has a thiouracil-like action this might explain in part some of the clinical findings following its administration—in particular, the gain of weight, slowing of the pulse, and lowering of the temperature. As the tuberculosis physician says, "It makes a hot tubercle cold."

Summary

A case of thyroid enlargement with exophthalmos is reported following treatment by P.A.S.

It is suggested that P.A.S. produces its effect by binding iodine and so preventing the iodization of tyrosine. It may thus have a goitrogenic effect similar to that of thiouracil.

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A serious outbreak of rabies in Alberta, Canada, is spreading to neighbouring areas of Saskatchewan and Manitoba, according to recent reports in *The Times*. The rabies was first detected last June among wild animals, particularly wolves and foxes, in northern Alberta, but the danger is that the disease may affect domesticated animals or even man. Rabid wolves lose their fear of man, and they may attack cattle, pigs, or dogs, all of which are susceptible to the disease. If rabies becomes established among the sledge dogs the fur trappers who earn their livelihood in the north will be very seriously threatened. The dogs are indispensable to them. Vigorous steps have been taken to limit the epidemic. The Government of Alberta has embarked on a wide-scale campaign to poison wolves and foxes; all dogs in Alberta, Saskatchewan, and Manitoba north of 55° N. have been quarantined; and sledge dogs are being vaccinated.

Medical Memorandum

Sublingual Mumps

Although precise figures of the incidence of mumps involving only the sublingual glands are not given in many of the textbooks, this condition must be uncommon enough to lead on occasion to confusion, if not error, in diagnosis. Banks (1952, personal communication) could remember seeing only one case, and quoted a series of 77 cases in which, although the percentage of non-parotid types was unusually high, only one sublingual case occurred, an incidence of 1.3%. In his opinion the pure (or almost pure) sublingual type is about as rare as the case involving the lacrimal glands described by Galpine and Walkowski (1952).

Because of its serious complications, the importance of recognizing the infection is obvious. In a series of 14 cases of mumps meningo-encephalitis reported from the Bristol area by Macrae and Campbell (1949) six occurred before other signs of mumps developed. No pure sublingual case was noted in the series of 208 cases described by Laurence and McGavin (1948); 13 were submandibular (submaxillary) types, and orchitis was the only manifestation of the infection in five cases. According to Banks (1949), "Sublingual gland enlargement is not common, but it may be the only sign of the disease, in which case the diagnosis is easily missed."

CASE REPORT

On August 11, 1952, a boy aged 11 complained of a sore throat and pain on swallowing. On examination his temperature was 99.8° F. (37.7° C.), pulse rate 100. (He had been given 5 gr. (0.32 g.) of aspirin the previous evening.) There was a large swelling under the mandible, the overlying skin being pale, shiny, and tense. The soft tissues forming the chin were displaced forward by the swelling, giving the face a peculiarly pugnacious appearance. Bimanual palpation showed that the sublingual glands were very swollen and tender; no swelling of the submandibular (submaxillary) or parotid glands could be detected at any time. The tongue appeared swollen and discoloured; its mobility was restricted, with consequent thickness of speech; and halitosis was pronounced. Under the tongue there was a remarkable degree of oedema of the terminations of Wharton's and the sublingual ducts, and the adjacent mucosa; the palate, fauces, pharynx, and the orifice of Stensen's duct appeared normal. Sialorrhoea was continuous and profuse.

On August 12 (the fourth day of symptoms) it was thought that the local signs had reached a maximum. The next day a blood examination showed total white cells 9,900 per c.mm. (polymorphs 62%, lymphocytes 24%, monocytes 8%, eosinophils 6%). These counts were within normal limits, although a relative lymphocytosis is described as occurring commonly. The serum amylase activity was 55 units per 100 ml., which was to be expected in a "non-parotid" case (Wolman *et al.*, 1947).

On August 14 the temperature had dropped to 98.4° F. (36.9° C.) and the child felt much brighter, although five more days elapsed before the sublingual oedema had subsided and the mouth could be opened fully without discomfort. A fortnight elapsed from the beginning of symptoms before the swelling and tenderness of the sublingual glands disappeared. No symptoms suggestive of cerebral, abdominal, genital, or other complications occurred, with the exception of bradycardia (50) from the fourth to the tenth day (the child's normal pulse rate was known to be 90); no accompanying apical systolic murmur was detected.

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