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The use of fluoride in combating dental decay

Irving, J. T.

1960

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Irving, J.T.1960.The use of fluoride in combating dental decay.South African Medical Journal; 34:3-4

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In dié reeks is gevind dat 75% van die gevalle hipertensief is. 'n Aanhoudende bloeddruk (sistolies bo 160 en diastolies bo 90 mm. Hg.) het as maatstaf vir die diagnose van hipertensie gedien.[20] In die literatuur is daar teenstrydigheid of die voorkoms van hipertensie hoër onder diabetici as onder nie-diabetici is.[21,22] Wat wel bekend is, is die hoë voorkoms van hipertensie in interkapillêre glomerulosklerose. Die hipertensie word egter deur navorsingswerkers nie as oorsaak vir die kenmerkende retinale veranderinge wat in diabetes mellitus aangetref word, beskou nie, maar as 'n gesamentlike simptoom van die bloedvatdegenerasie in diabetes mellitus.[23,24] Die hoë voorkoms van hipertensie in die gevalle met neuropatie word as nog 'n uiting van die wesenlike gelyksoortige aard van die aantasting, naamlik aantasting van die kleinere bloedvate, beskou.

Diabetiese neuropatie word dus beskou as 'n deel van diabetiese angiopatie wat 'n wydverspreide bloedvatdegenerasie eie aan diabetes mellitus is. Diabetiese neuropatie as eerste bevinding mag in alle waarskynlikheid, net soos retinopatie, op daaropvolgende wydverspreide bloedvatdegenerasie dui.

OPSOMMING

1. Uit 'n uiteensetting van 56 gevalle met organiese diabetiese neuropatie blyk dit nie asof die stofwisselingsfout, soos weergegee deur die gehalte van bloedglukose, die insulienbehoeftes, en 'n neiging tot ketose, aanleiding tot die ontstaan van diabetiese neuropatie gegee het nie.

2. Die hoë voorkoms van perifere bloedvataantasting, veral die aantasting wat met behulp van pletismografie aangetoon kan word, dui op 'n moontlike oorsaaklike verband: Dat die oorsaak vir neuropatie waarskynlik primêr 'n aantasting van die vasa nervorum is.

3. Die voorkoms van retinopatie (50%), albuminurie (30%), en albuminurie tesame met retinopatie (27%), is 'n verdere aanduiding van die aard van die letsels in die vasa nervorum.

4. Die hoë voorkoms van hipertensie (75%) word as nog 'n uiting van die wesenlike gelyksoortige aard van die aantasting beskou.

5. Diabetiese neuropatie word beskou as deel van 'n angiopatie wat eie is aan diabetes mellitus.

SUMMARY

1. In an exposition of 56 cases of organic diabetic neuropathy it could not be shown that the metabolic derangement, reflected by the fasting blood-sugar level, insulin need, and tendency to acidosis gave rise to diabetic neuropathy.

2. The high incidence of changes in the peripheral blood vessels (64%), especially those demonstrable by plethysmography, suggests a causal relationship; the cause of neuropathy is thought to be primarily a lesion of the vasa nervorum.

3. The occurrence of retinopathy (50%), albuminuria (30%), and albuminuria in the presence of retinopathy (27%), is an indication of the nature of lesion in the vasa nervorum.

4. The high incidence of hypertension (74%) is further evidence of the type of vascular degeneration which is found in diabetes mellitus.

5. Diabetic neuropathy is thought to be part of an angiopathy specifically found in diabetes mellitus.

Die gegewens oor 25 van die gevalle is afkomstig uit die proefskrif ,'n Studie oor die bloedvatveranderinge in diabetes mellitus en die verband met diabetiese neuropatie', deur die skrywer ingehandig te Pretoria Universiteit, 1958. Die gegewens oor die oorblywende 31 gevalle is afkomstig uit die Diabetiese Kliniek Karl Bremer-Hospitaal.

My dank aan dr. R. L. M. Kotze, Superintendent Karl Bremer-Hospitaal, Bellville vir verlof tot publikasie, aan prof. A. J. Brink vir deurlees en gewaardeerde kommentaar, mnr. R. Ellis, kliniese fotograaf, Karl Bremer-Hospitaal en mej. Y. Stuart vir die tikwerk verbonde aan die manuskrip.

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THE USE OF FLUORIDE IN COMBATING DENTAL DECAY*

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Our modern diet is very deleterious to the teeth owing to the consumption of refined carbohydrate, largely in the solid or semi-solid state. Attempts to change our present sophisticated diet are quite impracticable, though it has been reported that diets low in sugar, voluntarily taken, have caused a considerable decrease in the incidence of caries. In fluoride, however, we have a weapon in our hands with which the incidence of dental decay can be greatly reduced.

The effect of fluorine and its use in domestic water supplies to reduce the incidence of dental caries are so well known that one need say very little about the earlier work on this subject. Mottled enamel was described in 1901 and was recognized as an endemic condition, but it was not till 1931 that Churchill[1] showed that the fluoride content of waters in areas of mottled enamel was abnormally high. At the same time, it was noticed that children from areas of mottled enamel had less dental decay than those elsewhere, and field work by Dean and his colleagues[2] clearly established that a high content of fluorine in the water was associated with a reduction in decay; and that a level of 1 ppm (parts per million) of fluoride as fluorine in the water had a marked effect in reducing dental decay with but minimal effect upon the enamel. Following on this, the fluoride content

* From Presidential Address delivered at the Annual General Meeting of the Nutrition Society of Southern Africa, 26 November 1958.

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of domestic water has been deliberately raised to 1 ppm in a very large number of communities in the USA and the policy has also been adopted in some towns in the UK. Since the matter is being seriously considered in the Union, it behoves us to go into the pros and cons with some thought.

Recently the New Zealand government[3] appointed a commission to consider the question and their report is the most important summary to date of the whole position. In this report, the commission concluded. 'Fluoride is not a drug but a nutrient and fluoridation is a process of food fortification. As a process it is quite analogous to the compulsory addition of fat-soluble vitamins to margarine or of vitamin B_1 (thiamine) to bread, or to the non-compulsory addition of potassium iodide to salt'. With this view I completely concur.

Seeing that the beneficial effects of fluoridation of domestic water on teeth are admitted by almost everybody, it is important to consider the possible dangers of this procedure. We must remember that all members of the community will get fluoride, but it is really only helpful to children whose teeth are developing and in the structure of which fluoride is incorporated during formation. Adults probably do not need it, and people with no teeth certainly do not. Do these persons suffer in any way from a fluoride intake at a level of 1 ppm?

I think it is true to say that few public-health measures have called forth such invective and polemic as that of fluoridation, which appears in this respect to be in the same category as the pasteurization of milk. So strongly has the public feeling been whipped up by skilful propaganda, that anti-fluoridation societies have been formed, and a vigorous opposition, mostly of an emotional and hysterical type, has appeared. In 1954 the Weir anti-fluoridation bill was introduced into Congress in America. At a committee of investigation,[4] those in favour of the bill brought their own drinking water in jugs, since the water at Washington is fluoridated. They stated that fluoridation was a crime calculated to destroy America's human strength, that Washington bath water soaked into one so that one became violent, and the deaths of Senator Taft and Judge Vinson were attributed to drinking fluoridated water. Some of the statements made to the New Zealand commission by medical practitioners were quite astounding, and utterly without scientific backing—such as that fluorine caused insanity and increased the incidence of cancer.

Let us therefore look at some very critical analyses that have been made of mortality and morbidity rates of people who have drunk fluoridated water for some length of time. Leone *et al.*[5] studied the inhabitants of a Texas town, Bartlett, with a fluoride content in domestic waters of 8 ppm as fluorine. People were investigated in 1943 and the same people again in 1953. The subjects chosen, aged 16 to 68 in 1943, had lived at least 15 years in Bartlett, and the average length of fluoride exposure was 37 years. Apart from a great deal of mottled enamel, the health of the Bartlett people was the same as that of those of a neighbouring town whose water supply contained a negligible amount of fluoride.

More recently Geever *et al.*[6] made a comparison of 728 autopsies on people who had lived in Colorado Springs for more than 20 years, with others who had lived there for much shorter periods of time. The autopsies were performed between 1947 and 1953 when the fluorine content of the water was 2·5 ppm. No differences of any kind were found which could have been related to the length of residence in this environment. Steinberg *et al.*[7] investigated patients with arthritic disorders, some of whom had drunk fluoridated water and some not. Since it is known that fluoride when taken in high concentrations will cause bony changes, it was felt that patients already arthritic might have their conditions worsened by fluoride. No such change was found. The fluoride content of the bones and the X-ray findings were identical in the two groups. There was no relation between fluoride ingestion and various forms of arthritis.

This report[7] contains an interesting calculation. At the age of 70, a person drinking 1 quart of water per day containing 1 ppm of fluoride would have accumulated in his bones only 4,000 ppm, the normal fluoride content at this age being 1,500 ppm. Such a negligible increase would cause no untoward effects. We must also remember that many communities have drunk naturally fluoridated waters for a long time. Those in Arizona and Colorado may be instanced, where the health of the people is as good as elsewhere. How long they have drunk this water we do not know, since water analyses have only relatively recently been undertaken. In England the people of Deeping St. James in Kesteven have had water with 2·5 ppm of fluorine for at least 20 years, with no ill effects, the children having a markedly superior dental condition.[8]

To those interested in following recent views in more detail, I would recommend an article by Griffith,[9] a British medical officer of health, in a recent number of the *British Dental Journal*. In this paper the author gives a reasoned viewpoint from the public-health angle. He concludes by quoting the following statements issued at a conference of British nutritionists: 'There is no definite evidence that the continued consumption of fluorides in water at a level of about 1 part per million is in any way harmful to health'; and 'If any untoward effect is revealed by future research this is most unlikely to be serious'.

In conclusion it may be said that both the World Health Organization[10] and the American Medical Association[11] have given this procedure their support and approval. I therefore feel confident that it is both safe and desirable and, in our plans for a new outlook on nutrition, fluoridation must certainly play a part.

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FORTHCOMING INTERNATIONAL MEDICAL CONFERENCES

Regional Paediatric Conference, Middle East and Mediterranean Countries. The Egyptian Paediatric Association have announced that this Conference will take place in Cairo on 6-11 March 1960 and South African paediatricians have been welcomed to the Conference. Further particulars may be obtained from the Secretary of the South African Paediatric Association (MASA), Dr. R. McDonald, c/o Department of Child Health, University of Cape Town, Medical School, Observatory, Cape.