We have presented, in a previous communication (1), a statistical study on the geographical distribution of mongolism in some states in the central United States, showing a parallelism between the prevalence of this affliction and the concentration of fluorine in the drinking water.

The paradoxical rarity of dental caries, observed in mongoloids (2,3), constituted the point of departure of this study. The hypothesis of a simultaneous attack on these two structures derived from the primitive ectoderm, the brain and the enamel, by the same pathological process, has also been recently proposed by several authors (4,5). The high frequency of opacification of the crystalline lens (cataract) (3) and of licheniform hyperkeratosis (6), among mongoloids made us return this affliction (mongolism) into the group of neuroectodermoses of Touraine (7), and gave weight to the hypothesis indicated above.

It is important to mention, likewise, that the passage of fluorine across the placenta has been demonstrated by several recent works. (8,9,10).

Our communication on the pathogenic role of fluorine in mongolism has stirred up a certain number of recommendations and work, which we have taken into consideration in making some new statistics.

Following the advice of Dr. A.L. Russell, Chief of the Department of Epidemiology and Biometry of the National Institute of Dental Research in the United States, we have limited our investigation to a single state, Illinois. The Department of Public Health of this state had communicated to us the chemical analyses of the potable water of all the towns with 10,000 to 100,000 inhabitants.

We, on our part, proceeded to discover all cases of mongolism for which the diagnosis had been put on the birth or death certificates, or in the registers of the specialized medical and pedagogical institutions of the state. All cases of mongolism born from Jan. 1, 1950, to Dec. 31, 1956, for which the habitual residence of the mother before the delivery was in towns of 10,000 to 100,000 inhabitants, have been included in the study.

The frequency of mongolism has been calculated in relation to the number of cases per 100,000 births. The results of this investigation are presented in the following table.

<table>
<thead>
<tr>
<th>Total Number</th>
<th>Fluorine mg/liter</th>
<th>Cases of Mongolism</th>
<th>Statistical significance: X²=16.29 P&lt;001</th>
</tr>
</thead>
<tbody>
<tr>
<td>196,186</td>
<td>0.0-0.2</td>
<td>67</td>
<td>34.15</td>
</tr>
<tr>
<td>70,111</td>
<td>0.3-0.7</td>
<td>33</td>
<td>47.07</td>
</tr>
<tr>
<td>67,053</td>
<td>1.0-2.6</td>
<td>48</td>
<td>71.59</td>
</tr>
</tbody>
</table>

It is the same with other pathological aspects associated with fluorine. Dental anomalies, known by the name of mottled enamel, are encountered in England in regions where the water contains no more than 0.3 mg of fluorine per liter (17), while the same anomaly is seen in the United States only where the amount of fluorine in the water exceeds 1 mg per liter.

It is important, therefore, to take into account in a study of mongolism, the role of the age of the mother in the etiology of this affliction. The statistics of Penrose (18) in England, show that 40.7 per 100 of the mothers had reached or passed 40 years at the birth of the mongoloid. Our statistics on the frequency of mongolism in Illinois, show that 16.9 per 100 of the mothers had reached or passed 40 years. This difference depends without doubt, on geographical conditions variable from one country to the other, and can contribute equally to the frequency of mongolism in England. The role of the advanced age of the mothers in the pathogenesis of mongolism could be explained by a slow and progressive accumulation of fluorine in the mother's body. This process was shown by several recently reported studies (13). Deposited in the skeleton, fluorine is brought back into the circulation during pregnancy. This explains its presence in the foetus.

SUMMARY: A new statistical study on the distribution of mongolism in cities in Illinois, United States, from January 1, 1950 to December 31, 1956, permits us to verify an increasing frequency of this affliction associated with the concentration
of fluorine in the drinking water.

This study follows a preceding inquiry on the prevalence of cases of mongolism born before 1950 in the same state.

Such inquiries should not be conducted in other countries without an evaluation of the contribution of fluorine from diet which varies from country to country.

The role of the advanced age of the mother, in the etiology of mongolism, would seem to reflect a slow and progressive accumulation of fluorine in the mother’s body.

(Work of the Psychiatric Institute of the University of Wisconsin, Madison (Wisconsin).)

Bibliography


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