ASSOCIATION BETWEEN HIGH CUMULATIVE FLUORIDE EXPOSURE AND PINEAL CALCIFICATION

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SUMMARY: Decreasing serum levels of melatonin can increase the risk of developing chronic disease. Pineal calcification (PC) causes reduced melatonin production and fluoride (F) has also been implicated as it is readily incorporated into hydroxyl apatite. F is put in drinking water and dental products in many countries, but in Thailand there are no programs currently for the fluoridation of domestic water supplies. Thus the exposure of most Thais to F is expected to be very low. Some Thai people, however, have a risk of exposure to high levels of F due to the high natural levels that may occur in well water. The pineal gland is outside the blood brain barrier and therefore exposed to systemic F. F deposition in bones and teeth is positively correlated with F intake and can be used to assess lifelong exposure. We assumed that high cumulative F exposure may lead to deposits in bone or teeth and also increase PC, because fluorapatite is more stable and thermodynamically favored than hydroxyl apatite. In the present study, we collected bone, teeth, muscle, and pineal glands from 48 cadavers and analyzed the calcium and F by atomic absorption spectroscopy and a F electrode respectively. Most subjects had low F, but 9 subjects had greater than 0.4 ppm F, and 4 subjects had very high levels of F (>16 ppm) and calcium (r^2=0.92 for F:Ca) implying that a high level of F may be associated with higher pineal calcification. The level of pineal calcification observed was between 7 and 67%. The correlations are being calculated for bone and tooth F, pineal calcification, pineal F, and local water F content.

Key words: Pineal gland, Calcification, High Cumulative, Fluoride, Melatonin

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