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26

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COMMENTARY

Cola-colored Babies. Chlorobiphenyl Poisoning in Japan

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In June 1968 a 3-year-old girl with an acnelike skin eruption was seen at the Kyushu University Hospital in Fukuoka City. It was learned that both her parents and an older sister were similarly affected (Katsuki, '69). Within 7 months, 325 such cases were identified in Fukuoka Prefecture (Kuratsune et al., '69). Household aggregation was pronounced, with an average of three cases per family.

The skin eruption was typical of that cause by chlorinated organic compounds, and was quickly traced to a particular brand of cooking oil made from rice hulls. Certain lots of the oil, it was learned, had become contaminated with tetrachlorobiphenyl (Kanechlor 400). This substance, contained in pipes immersed in the oil, was used in one of the purification processes of the oil, as a heat-transfer agent. Pin-sized holes had developed in the pipes, permitting leakage to occur (Hirohata, in press). In consequence, the cooking oil contained 1000–1500 ppm of organic chloride (Tsukamoto et al., '69). It was estimated that a family of four ingested about 1.8 liters of the oil per month (Goto and Higuchi, '69). Chemical analysis revealed that the chlorobiphenyls were retained in the adipose tissue of the patients for "quite a long time" (Tsukamoto et al., '69).

The severity of "Yusho," as rice-oil disease is known in Japan, varied with age, being greatest from adolescence through 40 years (Goto and Higuchi, '69). The disorder cleared when exposure to the offending agent was discontinued.

Yusho was known to have affected nine pregnant women and their fetuses (Taki et al., '69). At delivery the nine infants had dark brown staining of the skin, especially of the groin. Two were stillborn, one of them a premature infant who weighed only 660 g and whose death was attributed to intrauterine knotting of the umbilical cord (Kikuchi et al., '69). The seven live-born infants weighed between 1800 and 2930 g; five were considered to be small-for-date babies (Taki et al., '69). A battery of laboratory tests showed no abnormalities. The discoloration of the skin faded within a few months.

During pregnancy each of the mothers had ingested contaminated rice oil for at least 11 weeks, all but one beginning in the first trimester. The exception was a women who had used the oil from the 23rd-36th weeks of her pregnancy. Although the chlorinated hydrocarbon had passed through the placenta during organogenesis, the only abnormality found during infancy was staining of the skin. In conversation, Japanese physicians have referred to these children as cola-colored babies.

The autopsy of one of the stillborn children has been reported (Kikuchi et al., '68). Histological examination revealed hyperkeratosis and atrophy of the skin, and cystic dilatation of the hair follicles, particularly of the head. Chromatographic analysis of the skin disclosed the presence of chlorobiphenyls.

All too often important biomedical observations are published in journals that are not widely available. So it was with Yusho. The June 1969 issue of *Fukuoka Acta Medica* was devoted to the many studies on this subject by the Faculty of Medicine at Kyushu University. This special issue contained 19 articles written in Japanese, but each has a summary in English. The only other publication to my knowledge is a brief description of the epidemic which has been prepared by Hirohata for the Proceedings of the XVI International Congress on Occupational Health. Unfortunately, not only are these publications difficult to obtain, but neither is listed by the *Index Medicus*.

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