Dibble
Wants to meet
with Chads

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30 Jan 76

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Dear Shep:

Because of your concern of the potential toxicity to some of your employees from exposure to polychlorinated biphenyls, I have reviewed extensively the literature on the toxicity of these compounds as well as reviewing the results of our monitoring program for individuals with exposures to polychlorinated biphenyls.

Polychlorinated biphenyls are fat soluable and tend to accumulate in adipose tissue. In pigeons the half life in various tissues ranges from 125 to 140 days[1]. The relative toxicity of the various polychlorinated biphenyls appears to be directly related to the amount of chlorine atoms in each compound. This might be explained in part by the liver microsomal enzyme system's ability to more readily metabolize the less chlorinated isomers. In fact these less chlorinated isomers can induce livar microsomal enzyme systems with resultant hydroxilation of the parent compound.[2] Metabolic byproducts of chlorinated biphenyls are mainly excreted in the urine where they may be measured by mass spectrophotometry[3]. The parent compound may be measured in the blood or plasma by gas spectrophotometry.[4]

Polychlorinated biphenyls are toxic to several organ systems. The first toxic manifestation demonstrated was chloracne and this can occur with either topical or systemic exposure[5]. PCBs are exceptional hepatotoxins and have caused death in industrial workers due to cirrhosis of the liver[6]. PCBs can cause mental changes with unexplained episodes of anger, memory loss and EEG changes[6]. In both humans and animals PCBs can induce hepatic porphyria with resultant excessive porphyrin excretion in the urine. In addition, PCBs can cause an elevation of triglycerides with an accompanying abnormal beta lipoprotein[7]. In experimental animals PCBs have been also noted to cause kidney damage as well as a depression of the immune system[5]. PCBs are often contaminated by degradation products called dioxins. These compounds are much more toxic than PCBs causing evidence of organ damage with exposures in the nanogram/m^3 range. In addition to toxic effects that are similar if not identical to those of PCBs, they can cause thyroid abnormalities and in one case have been associated with a chemical thyroiditis[8].

Our own results have confirmed the wide organ toxicity of polychlorinated biphenyls. We examine 10 individuals with ongoing exposures to various types an quantities of PCBs. 5 of the individuals had abnormalities in the following areas:

AREA:	LIVER	HEMOPOIETIC	SKIN	THYROID	LIPIDS	PHORPHYRINS	MEMORY
# with abnormalities:	3	3	3	2	1	0	2

The 3 individuals with liver abnormalities had resolution of their abnormalities after discontinuing exposure for 6 months.

We have also had the oportunity of examining an addition 17 people exposure to dioxins but not to PCBs. 9 had abnormalities in the following areas:

AREA:	LIVER	HEMPOIETIC	SKIN	THYROID	LIPIDS	PHORPHYRINS	MEMORY
# with abnormalities:	4	1	2	2	0	2	1

From the above information I would recommend the following medical program in order to evaluate whether or not you have a potential problem in your workers from exposure to polychorinated biphenyls:

Examination and history
Physiologic parameters
Cholesterol and triglycerides
WBC count
Hemoglobin
Platelet count
SGOT, LDH, Alk. Phos., bilirubin, SGPT, GGTP, LAP
Thryoid panel
Urine porphyrins

Exposure can be monitored both by measuring air and plasma levels of the chlorinated biphenyl in question or by measuring the hydroxy biphenyl metabolic byproduct in the urine.

I hope this information will be of use to you.

Sincerely,

Sandy Stopford

Woodhall Stopford, M.D.

cc: L. J. Goldwater
R. Kull

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