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HUMAN CONTAMINATION AND DETOXIFICATION: MEDICAL RESPONSE TO AN EXPANDING GLOBAL PROBLEM

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INTRODUCTION

Current industrial practices involve the mining, manufacture and utilization of an abundance of chemicals. A portion of these compounds are either deliberately or inadvertently released into the environment. The extent of this worldwide contamination is estimated to be millions of pounds per year (Schiller et al., 1984). Through a variety of processes, these compounds may be transported from the point of release to a site where they become an exposure hazard.

Amongst these chemicals and their byproducts are many known or suspected human toxicants. Occupational, environmental, and incidental exposure to these compounds has resulted in many individuals suffering adverse health effects (Epstein et al., 1982; Fischbein et al., 1985; Juntunen, 1986; Gamble, 1988; Goh and Ng, 1988; McCunney, 1988; Smith and Brown, 1988). These exposure consequences have been exacerbated by the fact that many manmade chemicals are designed to have long half-lives. Thus they persist in the environment, increasing the opportunity for exposure. These same compounds are also often difficult for humans to metabolize or excrete, leading to elevated body burdens and a sustained chemical influence.

Health consequences from chemical exposure may entail complete disability or reduced ability to work. In fact, as the number and variety of chemicals used by modern societies expands, one can expect the number of individuals removed from the work force due to chemical exposure to parallel this expansion.

What can be done about this consequence of modern development? We have been involved for several years in researching a method aimed at reducing body burdens of lipophilic

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chemicals, especially as this relates to the recovery of health in exposed individuals. In this paper, we present a series of cases representing a variety of exposure scenarios. All of these individuals were unable to work or had reduced work capacity prior to treatment. Each of them was treated with the method of detoxification developed by Hubbard, previously shown to reduce body burdens of several toxic compounds (Schnare et al., 1982; Roehm, 1983; Schnare et al., 1984; Schnare and Robinson, 1985; Tretjak et al., 1989), and in each of these cases the individual was able to return to work following treatment. Though the results presented herein are anecdotal, they confirm previous findings in the peer-reviewed literature and demonstrate that this approach can be effective in reducing body burdens of toxic compounds and returning individuals to the workplace.

MATERIALS AND METHODS

All of these patients were referred to us following documented chemical exposure. Initial medical evaluations included standard chemical panels at a fasting state and screening for tissue levels of relevant chemicals. Each patient was then treated with the method of detoxification developed by Hubbard, with medical evaluations repeated following treatment.

This procedure is a medically supervised regimen consisting of several components. Daily aerobic exercise is followed by frequent periods of low-heat (60-80 °C) sauna. Niacin and polyunsaturated oil are administered to sustain and further promote the mobilization and elimination process. Vitamins and minerals are supplemented and the daily liquid losses are replaced. Body weight is kept constant throughout the program. The program is pursued individually until a stable clinical improvement is achieved. A detailed description is provided elsewhere (Hubbard, 1980).

Adipose tissue was aspirated subcutaneously in the gluteal region according to the method described by Daum et al. (1978). Blood samples were obtained in the fasting state. All analyses for chemical contaminants were performed by Pacific Toxicology Laboratories in Los Angeles.

CASE REPORTS

Case 1: This 27-year-old Mexican-American male had been employed as a firefighter, inspecting fires in the smoldering stage with little or no protection, for 6 years. During this time he had gradually developed sinus problems involving excessive discharge, disabling headaches, and skin lesions. Complaints included excessive fatigue, decreased mental acuity, intolerance of stress, constipation and excessive neck pain.

Forty days prior to presentation, he assisted with a fire involving a tractor trailer loaded with isopropylamine. In addition to exposure to fumes while containing, extinguishing, and cleaning up the fire, contact exposure occurred when isopropylamine was spilled on his chest while unloading the burning trailer. A solvent used in conjunction with the clean-up added to the exposure. Following this fire, his headaches and rash became exacerbated and he began missing work.

Toxicology screening showed that he had elevated levels of the solvent 1,1,1-trichloroethane, with 12 mcg/L detected (reference range < 1 mcg/L). Other compounds were within their ranges for the general population.

He underwent three weeks of treatment. Following treatment, his skin condition had improved, his headaches resolved and his symptomatic complaints were markedly alleviated.

Levels of 1,1,1-trichloroethane had been reduced below detection limits.

The patient returned to consistent work and continues to perform as a firefighter. He now helps lead the hazardous material training section for his department and uses his protective gear appropriately.

Case 2: This 29-year-old Caucasian male was employed as an industrial painter for 12 years and was referred by his employer for detoxification due to increasing illness on the job. Complaints included itching skin rashes (pruritis and dermatitis), joint pains, and the onset of neurotoxic complaints including tingling in hips, arms and legs and deteriorating memory and mental acuity. He had worked with sprays, epoxies, oil-based paints, acetones, lead-based paints, and methylethylketone. Blood levels of chemicals at pre- and post-treatment were:

<u>Compound</u>	<u>Pretreatment</u>	<u>Post-treatment</u>	<u>Percent Reduction</u>
Toluene	11.00 ng/mL	<0.5 ng/mL	> 95%
Ethylbenzene	3.3 ng/mL	<0.5 ng/mL	> 85%
Xylene	27.0 ng/mL	<1.0 ng/mL	> 95%
Dichloromethane	1.4 ng/mL	<1.0 ng/mL	> 30%
Chloroform	1.9 ng/mL	<1.0 ng/mL	> 45%
1,1,1-Trichloroethane	1.8 ng/mL	1.2 ng/mL	35%
Tetrachloroethylene	4.2 ng/mL	<0.5 ng/mL	> 88%

This patient worked half-time during his 46 days of treatment, with treatment costs covered by his workmen's insurance. Following treatment, his pruritis, dermatitis, and joint pains had completely resolved and his neurological complaints had improved.

This patient has returned to full-time employment at his original occupation, now taking care to use his respirator, wear protective eye and skin clothing, and work in well-ventilated areas.

Case 3: This patient was a 39-year-old female referred by her internist after complaining of chronic fatigue, headaches, decreased mental acuity, frequent flu episodes, and neck pain. Symptoms had persisted over a year and eluded diagnosis. Suspecting a possible domestic poisoning, the internist had recently run general toxicology screens. These revealed that the patient had extremely high levels of trichloroethanol (TCE: 1024 mcg/L; reference range < 79 mcg/L) and trichloroacetic acid (TCA: 249 mcg/L; reference range < 48 mcg/L) in urine and high levels of chloroform (14 mcg/L; reference range 3 mcg/L) in blood. Testing of the patient's home water found elevated levels of these same compounds.

This patient had been unable to work or go to school for six months prior to arrival. She was treated for forty days. Following treatment, she reported her muscle weakness, mental acuity difficulties, short term memory and attention span problems, lethargy and arthritis symptoms had resolved. In addition, her fatigue, flu-like symptoms and allergies were greatly reduced. Her TCE and TCA levels in urine and chloroform level in blood had been reduced to below detection limits (< 25 mcg/L for TCE and TCA; < 3 mcg/L for chloroform). She was able to return to work as well as pursue continued education at the University.

Case 4: This 39-year-old man was the owner of a metal fabricating company. A heightened incidence of cancers and worker health complaints at his company prompted an environmental assessment of the facility. This revealed that the facility had previously been used as a transformer repair shop. Retro-filling of transformers with dielectric compounds had been a major

operation at the facility, with polychlorinated biphenyls (PCBs) as the main compound used. Improper disposal had heavily contaminated both the building and the surrounding factory yard. Thus, this patient and his employees had been inadvertently exposed to excessive levels of PCBs and related compounds throughout the 12 years of operation at this site.

At the time of initial examination, this patient was not working. His complaints included headaches, stress intolerance, nervousness, emotional instability, and an inability to focus. Formerly very active, this loss of mental acuity was his main concern. Laboratory findings revealed transient elevated liver enzymes and slightly elevated levels of PCBs, Trans-nonachlor, and 1,1-dichloro-2,2-bis[*p*-chlorophenyl]ethylene (*p,p'*-DDE) in adipose.

This patient was treated for 24 days. At the conclusion of treatment he reported considerable improvement in his attention span, nervousness, irritability and headaches, with complete resolution of his fatigue, impaired memory and depression. His liver enzyme levels were again in normal range, and his PCB levels had been reduced by 19 percent. He is currently working at a new business.

Case 5: Two years prior to treatment this patient had accidentally drenched himself with concentrated chlordane when the sprayer he was pulling, containing some 100 pounds of the substance, burst open. He had also worked frequently with lower amounts of pesticides in his interior landscaping business. Outstanding complaints included tremors, coolness and tingling of extremities, shortness of breath, lack of energy, headaches, nausea, and severe gastrointestinal difficulties including diarrhea and abdominal pains.

These complaints persisted and he was eventually referred for detoxification. Adipose tissue levels of pesticides were measured before and after his 23 days of treatment:

<u>Compound</u>	<u>Pretreatment (mg/Kg)</u>	<u>Post-treatment (mg/Kg)</u>	<u>Percent Reduction</u>
Alpha-chlordane	0.013	<0.01	> 25%
Gamma-chlordane	0.015	<0.01	> 33%
Oxychlordane	0.18	0.07	61%
Trans-nonachlor	0.35	0.17	51%
<i>p,p</i> -DDT	2.14	0.66	69%
(1,1,1-trichloro-2,2-bis[<i>p</i> -chlorophenyl]ethane)			
<i>p,p</i> -DDE	4.66	3.13	33%
<i>p,p</i> -DDD	0.44	0.07	84%
(1,1-dichloro-2,2-bis[<i>p</i> -chlorophenyl]ethane)			

In addition to the chemical reductions, he reported remissions of his headaches, fatigue, neuromuscular tremors, gastrointestinal complaints and his mental acuity had greatly improved.

This patient resumed management of his companies and reports continued improvement.

DISCUSSION

In this report we have presented cases involving some of the common routes of exposure to toxic chemicals. Occupational, environmental, and accidental exposures such as these will continue as long as we use these compounds without taking full responsibility for adequate, long-term protection. As the chemical milieu becomes more complicated and the potential for toxic exposure expands, we can expect an increasing number of individuals to be unable to

work due to the consequences of exposure to toxic chemicals. Therefore, it behooves us to develop means of correcting these adverse health effects.

Prior studies have demonstrated the effectiveness of this detoxification procedure in reducing body burdens of PCBs (Schnare and Robinson, 1985; Tretjak et al., 1989), polybrominated biphenyls (Schnare et al., 1984), and other compounds (Root and Lionelli, 1987; Schnare et al., 1982) with concomitant improvements in physical findings and overall well-being. In this report, we have focused on cases which demonstrate the applicability of this approach to the recovery of affected workers; addressing their health affects with a program aimed at reducing body burdens of toxic compounds appears effective in returning these individuals to productive employment.

REFERENCES

- Daum SM, Knittle J, Rosenman K, Rom WN, Hostein EC (1978): A simple technique for fat biopsy of PBB-exposed individuals. *Env Health Persp* 23:183-185.
- Epstein SS, Brown LO, Pope C (1982): "Hazardous Waste in America." San Francisco, CA: Sierra Club Books.
- Fischbein A, Rizzo JN, Solomon SJ, Wolff MS (1985): Oculodermatological findings in workers with occupational exposure to polychlorinated biphenyls (PCBs). *Brit J Ind Med* 42:426-430.
- Gamble W (1988): Perturbations of biochemical systems. In Waid J (ed): "PCBs and the environment. Vol II." London: CRC Press, pp 50-61.
- Goh CL, Ng SK (1988): A cutaneous manifestation of trichloroethylene toxicity. *Contact Dermatitis* 18:59-61.
- Hubbard LR (1980): Bulletin of 6 February 1978. In: "The Technical Bulletins. Vol. 12." Los Angeles: Bridge Publ., pp 163-181.
- Juntenen J (1986): Occupational toxicology of trichloroethylene with special reference to neurotoxicity. *Dev Toxicol Environ Sci* 12:189-200.
- McCunney RJ (1988): Diverse manifestations of trichloroethylene. *Br J Ind Med* 45:122-126.
- Roehm DC (1983): Effects of a program of sauna baths and megavitamins on adipose DDE and PCBs and on clearing of symptoms of Agent Orange (dioxin) toxicity. *Clin Res* 31:243 (abs).
- Root DE, Lionelli GT (1987): Excretion of a lipophilic toxicant through the sebaceous glands: A case report. *J Toxicol Cut Ocul Toxicol* 6:13-17.
- Schiller CM, Shoaf CR, Chapman DE (1984): Alteration of intestinal function by chemical exposure: Animal Models. In Schiller CM (ed): "Intestinal Toxicology." New York, NY: Raven Press, pp 133-160.
- Schnare D, Robinson P (1985): Reduction of HCB and PCB human body burdens. In "Proceedings from the International Symposium on Hexachlorobenzene (HCB)." Lyon, France: IARC, pp 598-602.
- Schnare DW, Denk G, Shields MG, Brunton S (1982): Evaluation of a detoxification regimen for fat stored xenobiotics. *Med Hypotheses* 9:265-282.
- Schnare DW, Ben M, Shields MG (1984): Body burden reductions of PCBs, PBBs and chlorinated pesticides in human subjects. *Ambio* 13:378-380.
- Smith AB, Brown DP (1988): Polychlorinated biphenyls in the workplace. In Waid J (ed): "PCBs and the environment. Vol III." London: CRC Press Inc., pp 63-82.
- Tretjak Z, Beckmann SL, Tretjak A, Gunnerson C (1989): Occupational, environmental, and public health in Semic: A case study of polychlorinated biphenyl (PCB) Pollution. In: Gunnerson C (ed): "Post Audits of Environmental Programs and Projects." New York, NY: American Society of Civil Engineers, pp 57-72.