

Can one get amnesia from canned tuna? What are we forgetting?

The assertion in the Case Report by Roger Ho and colleagues (Jan 24, p 352)¹ that methyl mercury (MeHg) exposure from a daily diet of tuna is responsible for amnesia is problematic toxicologically and clinically.

The lowest level reported for adult manifestations of MeHg exposure is 200 µg Hg per L whole blood.² That level is used by most national regulatory committees. The blood Hg level of the patient in the Case Report was 28 µg/L. This is equivalent to a hair level of about 5.5 µg/g (ppm). In populations that consume fish regularly, this level is commonly seen: one study in the Seychelles found the mean maternal hair level to be 6.9 µg/g.³ There were no reports of memory loss.

Additionally, neurological deficits from MeHg poisoning are permanent, yet Ho and colleagues' patient improved. The concomitant reduction of blood Hg by 9 µg/L in 2 months is consistent with the reported 44-day half-time in the blood.

In Iraq, the first symptoms of MeHg poisoning were paraesthesias and ataxia.⁴ Memory loss has not been a part of clinical reports in the past. Tremor, gingivitis, and erythema are typical of inorganic Hg poisoning.⁵

The absence of any of the typical findings of MeHg poisoning, the presence of an atypical finding, amnesia, and the patient's improvement make the conclusion that the patient suffered from MeHg poisoning from consuming tuna untenable.

We declare that we have no conflicts of interest.

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1 Ho RCM, Lam SYW, Tan ESL, Ng PMY, Mak A. Amnesia, political ambition, and canned tuna. *Lancet* 2009; **373**: 352.

- International Program on Chemical Safety. Environmental health criteria 101: methyl mercury. Geneva: World Health Organization, 1990. <http://www.inchem.org/documents/ehc/ehc/ehc101.htm> (accessed April 28, 2009).
- Myers GJ, Davidson PW, Cox C, Shamlaye C, et al. Prenatal methylmercury exposure from ocean fish consumption in the Seychelles child development study. *Lancet* 2003; **361**: 1686–92.
- Bakir F, Damluji SF, Amin-Zaki L, Murtadha M, et al. Methylmercury poisoning in Iraq. *Science* 1973; **131**: 230–41.
- International Program on Chemical Safety. Environmental health criteria 118: inorganic mercury. Geneva: World Health Organization, 1991. <http://www.inchem.org/documents/ehc/ehc/ehc118.htm> (accessed April 28, 2009).

Authors' reply

The key purpose of our report was to remind clinicians of remaining open-minded when considering mercury poisoning as a differential diagnosis and preventing tragic outcomes—ie, missing the diagnosis and omitting appropriate treatment.

Mercury is an abundant element and it occurs in several forms: liquid metal, inorganic salts, and organomercury compounds. Clinicians need to be aware of the multifaceted nature of mercury poisoning, and that its effects are determined by the chemical form, route of exposure, and dose, as well as patient factors.¹ Fish and amalgam fillings are important sources of mercury exposure in occupationally unexposed individuals. Cutaneous absorption by skin products has also been reported.² In our case, we need to consider the daily canned tuna consumption and frequent use of unlicensed traditional Chinese medicine. Serum mercury assay often confirms the level but not the type of mercury. One cannot assume that dietary consumption only leads to an elevation in methylmercury, since unlicensed traditional Chinese medicine often contains inorganic mercury.³

G J Myers and colleagues comment that the lowest mercury exposure level for adult manifestation is 200 µg/L, but this figure is not substantiated by the literature. Nuttall and colleagues¹ summarised 24 reports of mercury poisoning, and found that the blood

mercury concentration ranged from 0.8 µg/L to 10 000 µg/L. The mercury concentration of our patient was 28 µg/L after 6 weeks' delay in blood testing. It is well known that urine and blood levels of mercury correlate poorly with clinical and neurological findings.²

Myers and colleagues' assumption that memory loss is not a manifestation of methylmercury toxicity reflects a lack of understanding of the pathophysiology of mercury toxicity. In an animal study, Fischer and colleagues⁴ found that methylmercury led to impaired memory abilities, and the mechanism for cognitive defects was shown to involve the cholinergic system. Clinicians need to be clinically versatile and prepared to anticipate uncommon yet clinically relevant presentations of mercury poisoning, such as attention deficit and hyperkinetic disorder in children.⁵

Patients with mercury poisoning can present with atypical findings and clinicians should not be surprised about its abundance and new applications. Holding a rigid view of the presentation of mercury poisoning and ignoring its multifaceted nature will create therapeutic nihilism.

We declare that we have no conflicts of interest.

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- Nuttall KL. Interpreting mercury in blood and urine of individual patients. *Ann Clin Lab Sci* 2006; **34**: 235–50.
- Sin KW, Tsang HF. Large-scale mercury exposure due to a cream cosmetic: community-wide case series. *Hong Kong Med J* 2003; **9**: 329–34.
- Kang-Yum E, Oransky SH. Chinese patent medicine as a potential source of mercury poisoning. *Vet Hum Toxicol* 1992; **34**: 235–38.
- Fischer C, Fredriksson A, Eriksson P. Coexposure of neonatal mice to a flame retardant PBDE 99 (2,2',4,4',5-pentabromodiphenyl ether) and methyl mercury enhances developmental neurotoxic defects. *Toxicol Sci* 2008; **101**: 275–85.
- Cheuk DK, Wong V. Attention-deficit hyperactivity disorder and blood mercury level: a case-control study in Chinese children. *Neuropediatrics* 2006; **37**: 234–40.