



衛生署
Department of Health

Poisoning Watch

Volume 2, Number 2
December 2009

Key Messages for You

- Mercury is toxic but mercury poisoning is uncommon in Hong Kong
- Most local incidents known were related to the use of mercury-containing cosmetic creams
- Incidents in Hong Kong are rarely related to other sources of mercury exposure

Inside This Issue

What do you know about mercury poisoning? P. 1-8

- **Introduction** 1
- **Mercury poisoning from cosmetic creams** 2
 - ⇒ Facts & statistics 2
 - ⇒ Signs and symptoms 2
 - ⇒ Laboratory investigation 3
 - ⇒ Management 4
- **Other examples of mercury exposure** 5
 - ⇒ Breakage of devices 5
 - ⇒ Fish consumption 7

News corner 9

What do you know about mercury poisoning?

Introduction

Mercury is a naturally occurring element found in air, water and soil. It can exist in three forms — elemental (metallic) mercury, inorganic mercury compounds and organic mercury compounds. Mercury is toxic and poisoning can occur if a certain amount is absorbed and accumulated in our body.

There are many sources of exposure to mercury. The major ones are:

- Ingestion of mercury contaminated foodstuffs especially predatory fish;
- Exposure to mercury in occupational settings e.g. manufacture of mercury-containing equipment (such as electrical switches, thermometers and blood pressure barometers) and improper amalgam filling procedure during dental treatment;



衛生防護中心
Centre for Health Protection



- Inhalation of mercury vapours due to accidental breakage of devices containing elemental mercury such as mercury thermometers, blood pressure barometers, thermostats and florescent lights / compact florescent lights (CFLs); and
- Application of mercury-containing products, mainly cosmetic creams.

In this article, the non-occupational exposures that the public are more likely to have encountered will be discussed.

Mercury poisoning from cosmetic creams

Facts and statistics

From Jan 2007 to Oct 2009, DH recorded 11 cases of mercury poisoning (4 in 2007, 4 in 2008, and 3 up to Oct 2009). With the exception of one case that was associated with a health product, all cases were related to the use of mercury-containing cosmetic creams and they were female, aged from 26 to 58 years.

Among the 10 cosmetic cream related cases, all presented with swelling of the body parts (such as limbs, trunk and/ or face). Two had neurological symptoms such as numbness and tremor. Seven of them required hospitalization but were later discharged while three only required treatment from a specialist clinic or Accident & Emergency Department (AED). After investigation, four patients obtained the cosmetic creams from their friends in Hong Kong, 3 from local shops, 2 from overseas countries and one from an unknown source. According to the "Hygienic Standards for Cosmetics" of the National Standard of People's Republic of China, the upper limit of mercury concentration in a product is 1ppm. The mercury concentration of the incriminated products ranged from 2 ppm to more than 40 000 ppm, i.e., the mercury contents of these products were around 1 to more than 40 000 times that of the upper limit.

Signs and symptoms of mercury poisoning

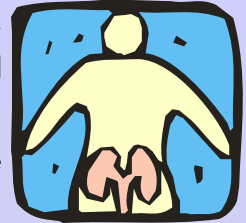
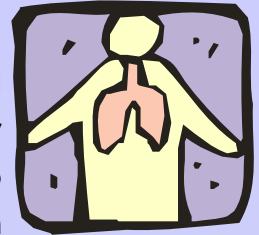
Mercury poisoning can be divided into acute and chronic cases, with different presenting symptoms and signs.





Acute poisoning

Acute poisoning may result from inhalation of concentrated elemental mercury vapour, or from accidental ingestion of organic mercury or its salts such as merbomin which is used as a local antiseptic. Owing to their corrosive nature, it can present with sore throat. Other common symptoms are chest discomfort, shortness of breath, cough, nausea, vomiting, abdominal pain, bloody diarrhea and renal damage. Neurological symptoms include headache, visual disturbances, loss of memory and impairment in cognitive function. Exposure to high amount of mercury can be fatal. These cases seldom occur in Hong Kong.



Chronic poisoning

Chronic poisoning can present with neurological effects including numbness and gradual decrease in the senses of touch, vision, hearing and taste; progressive loss of memory and balance, insomnia, hand tremors, personality changes, hallucinations, decreased ability to focus attention, and impaired cognition. Kidney damage can also occur, presenting with generalized or lower limb swelling. Chronic poisoning may result from prolonged exposure to product containing high-dose mercury. In Hong Kong, chronic poisoning incidents were mainly related to the use of inorganic mercury-containing cosmetic cream.

Laboratory investigation

In general, blood/urine mercury level is useful for detecting exposure to mercury. An individual with mercury poisoning usually has compatible symptoms and signs of toxicity and an elevated level of mercury in blood or urine. There is often a positive history of exposure to mercury.

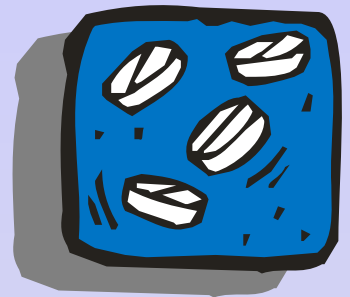
Measuring mercury in hair is not an accurate assessment of mercury load in the body due to the ease of contamination and low sensitivity and specificity of the tests.¹ Furthermore, there is lack of standardized methods and procedures in hair analysis and correlation between levels in hair and blood and other target tissues.² Use of hair mineral analysis for the screening for mercury toxicity is thus not recommended.³





Management

Individuals with significant exposure to mercury and/ or having symptoms of mercury poisoning are advised to seek medical attention for examination and treatment as indicated. It is most important to prevent further exposure once the source of mercury is identified. The source should be isolated and removed if possible. For patients with elevated mercury level in blood/ urine and with compatible symptoms and signs, treatment may be considered after thorough investigation and assessment. Treatment using chelating agents should be used very cautiously as there are side effects including gastrointestinal upset, skin rashes, drowsiness and dizziness, low white cell counts, and renal and liver impairment. Chelation therapy is the use of chemical compounds to remove heavy metals from the body. It maybe indicated for those with documented exposure with increased blood/urine mercury level and target organ toxicity. In general, it is not recommended for cases with chronic symptoms, when the risk of exposure is remote and/ or in the absence of elevated urine mercury level.



Advice on the use of cosmetic products



Public are advised to:

1. Purchase skin care and cosmetic products (in particular, those claimed to have whitening effects) from a reputable store.
2. Follow the Department of Health and Customs and Excise Department's advice not to use suspicious products which may contain excessive mercury.
3. Consult a doctor if they develop symptoms and signs of mercury poisoning. They should stop using the products immediately.



Other examples of mercury exposure

Mercury is ubiquitous. It is present in the environment including soil but the level is usually very low and does not pose a danger to humans. Examples of mercury exposure other than application of cosmetic creams are briefly described below.

1. *Exposure due to breakage of devices containing elemental mercury*

A. Mercury thermometers

A total of seven cases of persons involved with broken mercury thermometer were recorded from the AEDs of six major public hospitals between Jan 2006 and Oct 2009. Affected persons were children aged between 4 to 11 years who had been exposed to mercury following accidental breakage of thermometers. Three patients claimed to have ingested mercury from the broken thermometers and these were confirmed by x-ray findings. All patients remained asymptomatic and were discharged home after observation. In fact, according to the record there were no reported confirmed mercury poisoning cases related to exposure of mercury from broken thermometers in recent years.

When a mercury containing thermometer breaks, liquid mercury from the thermometer may release mercury vapors. Therefore, prompt ventilation of the room, care in handling the broken pieces and cleaning up the mercury spills are important. Nevertheless, the amount of mercury contained in a thermometer is small. Other mercury containing instruments such as blood pressure barometers and thermostats may contain a larger amount of mercury and they should be handled with extra care. Use of mercury-free alternatives such as infra-red thermometer can lower exposure to mercury.⁴

B. Florescent lights/ CFLs

Mercury-containing light bulbs such as florescent lights/ CFLs contain only a very small amount of mercury. However, there is potential health risk with broken florescent lights/ CFLs if they are not handled properly. Ventilation and the proper disposal of broken light bulbs are necessary to minimize the potential health risk. To protect the environment and health, the used light bulbs should be properly recycled. No cases of mercury exposure due to florescent lights/ CFLs breaks had been recorded from the AEDs of six major public hospitals since 2006.



What should I do in the case of breaking mercury-containing devices?

Mercury spills:

Open the windows immediately. Leave the room and allow it to ventilate for at least 15 minutes before cleaning up. Wear rubber or plastic gloves whilst cleaning up. Collect the broken pieces of glass carefully, and put them in a thick plastic bag or container. Collect up the spilled mercury beads by using a thin piece of card and an empty plastic bottle. Immediately place all contaminated materials outdoors in a trash container and wash your hands. Finally, keep the area well ventilated to the outside such as opening windows for at least 24 hours after cleaning up.⁵



Mercury spills must not be vacuumed. Use of a vacuum cleaner can result in vapourizing the mercury and increase the risk of inhalational exposure.

Broken florescent lights/ CFLs:

The management is similar to mercury spills. Open the windows immediately. Leave the room and allow it to ventilate for at least 15 minutes before cleaning up. Wear rubber or plastic gloves whilst cleaning up. Carefully scoop up glass pieces and powder using stiff paper or cardboard and place them in a sealed container or plastic bag. Wipe the area clean with damp paper towels or disposable wet wipes. Place towels in the sealed container or plastic bag .



2. Exposure due to consumption of fish and fish products

The major dietary source of mercury exposure in humans is fish consumption. Methyl mercury (MeHg), which is the most prevalent form of organic mercury, is readily taken up by living organisms and passed along the microscopic plants and animals to larger organisms along the food chain. It binds tightly to the protein in fish tissues. The level of MeHg in fish depends on its species, living environments, feeding patterns and age. The longer-living fish and fish at the top of the food chain such as large predatory fish tend to accumulate higher levels of mercury.



Photo by Pedro Niny Duarte (c) ImadOP

Swordfish

Photo by: Pedro Niny Duarte(c)
ImadOP



Albacore tuna

Source: Agricultural, Fisheries
and Conservation Department

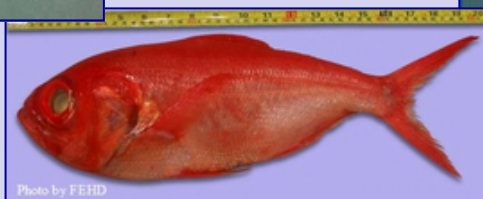


Photo by FEHD

Alfonsino

Source: Food and Environmental
Hygiene Department

Provisional Tolerable Weekly Intake (PTWI) is an estimate of the amount of a contaminant that can be ingested over a lifetime without appreciable risk and it is set locally at 1.6 µg/kg bodyweight (bw) for MeHg. Transient excursion above the PTWI does not result in health consequences provided that the average intake over a long period of time is not exceeded since the emphasis of PTWI is a lifetime exposure (For details, please refer to the Centre for Food Safety website.^{6,7})

Results of a local study showed that most of the fish available in Hong Kong contained relatively low levels of MeHg, while a small proportion contained higher levels (e.g. alfonsino and some types of tuna). According to information from overseas reports, some predatory fish such as shark, swordfish and marlin contained high level of mercury.



The results of the same study revealed that the estimated dietary exposure to MeHg for average consumers of fish was below the PTWI and therefore average consumers would be unlikely to experience major toxic effects from MeHg. For people with high consumption, the estimated dietary exposure to MeHg might exceed the PTWI and therefore their risk of adverse effects due to MeHg could not be excluded.⁶ In fact, according to the record of Centre for Health Protection, there is no reported confirmed mercury poisoning cases resulting from fish consumption locally. However, since exposure to a high level of mercury may cause adverse effects to the nervous system, especially the developing brain, pregnant or nursing women, young children and infants should avoid consuming excessive amounts of predatory fish which may contain high levels of mercury.



How to avoid high mercury exposure in diet?

Public are advised to:

1. Maintain a well-balanced diet to avoid excessive exposure to contaminants from a small range of food items.
2. Consume moderate quantity of fish as fish is an excellent source of high quality protein, omega-3 fatty acids and low in saturated fat. These nutrients can contribute to heart health and children's proper growth and development.
3. Avoid consuming excessive amount of predatory fish (e.g. shark, tuna, marlin, alfonso and swordfish) which may contain higher concentration of mercury, especially for infants, young children and pregnant or nursing women.

Adopted from CFS



News corner



In Oct 2009, a 17-year-old girl developed symptoms of acute psychosis including emotional disturbance, paranoid ideas, hallucinations, having suicidal thoughts, and self-harm behaviour after consuming a slimming product called "Show Party 瘦身派". Sibutramine was detected in the product but not declared in the ingredient list.



Between Jan 2007 and Oct 2009, among all cases reported to Centre for Health Protection that related to adverse effects of sibutramine containing in slimming products, nearly half presented with psychotic symptoms; and more than half of them were aged 15 to 20 years. Regarding the sources of products from all cases, half were purchased via the internet and the remaining ones were obtained from friends or from local or overseas shops.

Sibutramine is a western medicine used as an appetite suppressant. Its side effects include increased blood pressure and heart rate, psychosis and possibly convulsion. People with heart problems should not take it. A product containing sibutramine must be registered before it can be sold in Hong Kong. It can be sold only on a doctor's prescription and be dispensed under the supervision of a pharmacist.

Health tips: Weight control should be achieved through good diet and appropriate exercise. Public should consult healthcare professionals before using any medication for weight control.

**References:**

1. Ip P, Ko P, Lam C, et al. Hong Kong College of Paediatricians Position Paper on Exposure to Lead and Mercury in Children and Chelation Therapy. *Hong Kong Journal of Paediatrics* 2004; 9(2): 101-102.
2. Harkins SK, Susten AS. Hair Analysis: Exploring the State of the Science. *Environmental Health Perspectives* 2003; 111(4) 576-578.
3. Poon WT, Ling SC, Chan AYW, et al. Use of Hair Analysis in the Diagnosis of Heavy Metal Poisoning: Report of Three Cases. *Hong Kong Medical Journal* 2004; 10(3):197-200.
4. World Health Organization (WHO). Exposure to Mercury: A Major Public Health Concern. Geneva: WHO; 2007. Available from URL: <http://www.who.int/phe/news/Mercury-flyer.pdf>
5. U.S. Environmental Protection Agency (EPA) website: Mercury Spills, Disposal and Site Cleanup. Updated on Dec 2009. Available from URL: <http://www.epa.gov/mercury/spills>
6. Food & Environmental Hygiene Department (FEHD). Risk Assessment Studies Report No. 31: Mercury in Fish and Food Safety. Hong Kong: Centre for Food Safety, FEHD; April 2008. Available from URL: http://www.cfs.gov.hk/english/programme/programme_rafs/files/ras31_mercury_in_fish_e.pdf
7. Food & Environmental Hygiene Department (FEHD). Risk in Brief. Issue No.13: Risk of Mercury in Fish. Updated on Jan 2005. Available from URL: http://www.fehd.gov.hk/english/safefood/report/mercury_fish/report.html

Acknowledgement:

We would like to thank the Agriculture, Fisheries and Conservation Department, the Customs and Excise Department, Food and Environmental Hygiene Department (Risk Assessment & Communication Division of the Centre for Food Safety), Labour Department (Occupational Health Service) and Professor Thomas Chan, the Director of Poison Treatment Centre for valuable inputs in this article.

Editorial Team:

Dr TH LEUNG, Dr Tina MOK, Mr Anthony CHAN, Dr Chris CHAU, Dr Scarlet CHAN, Dr Andrew CHEN, Mr David CHEN, Mr Vincent CHU and Mr Ken LEE