



Medicine for Managers

Dr Paul Lambden

BSc MB BS BDS FDSRCSEng MRCS LRCP DRCOG MHSM FRSH

Mercury

Mercury is a widely dispersed element throughout the earth. The largest deposits are in the form of mercuric sulphide (*cinnabar*). It exists in several forms; as compounds, as a vapour and as a liquid (quicksilver). Its chemical symbol is Hg, which, for those who have wondered why it does not begin with 'M', is derived from the Greek word *hydrargyros* which means 'water' and 'silver'.



Cinnabar

Mercury has been known for a very long time. In ancient China it was believed to prolong life and its adverse effects were not recognised. The first Emperor of China was believed killed by alchemists who caused him to drink mercury in the belief that it would produce eternal life. History does not recount what happened to the alchemists.

The ancient Greeks used mercury in ointments, the Romans used it in cosmetics. By 500 BC amalgams (from the Latin word *amalgama*; *alloy of mercury*) were being formulated with other metals.

Alchemists believed that mercury was 'first matter' from which all metals were formed. Many attempts were made to create gold and silver.

Mercury has been mined in Slovenia (formerly Idrija) for over 2,500 years, modern deposits being found as recently as the beginning of the

1900s. There are mines in several other countries such as China, Kyrgyzstan and in California in the USA as well. In recent years, China and Kyrgyzstan have been the biggest producers.

Mercury has had many industrial applications. The term '**Mad as a Hatter**' originated in the nineteenth century because hat manufacturers, who used mercury to process felt, frequently developed mental changes.

Mercury is still present in some batteries, thermometers and lights. Some coal burning power plants emit mercury and it may be concentrated in some seafood such as shellfish and tuna.

Mercury Poisoning

Symptoms of mercury toxicity can develop slowly or over a long period. Generally the symptoms develop more quickly if the exposure dose is higher.

The actual exposure may occur as a result of exposure to elemental or vapourised mercury, to organic mercury or to inorganic mercury. The symptoms are often similar and consist of

- **Neuromuscular symptoms**
 - Insomnia
 - Loss of co-ordination
 - Sensory impairment
 - Tremors
 - Abnormal sensation
 - Decreased cognitive function
 - Muscle twitching
 - Muscle weakness and atrophy
- Headache
- Intestinal symptoms
- The blue line symptom – a blue line along the gum; a feature of heavy metal poisoning

Anyone suspected of having mercury poisoning should seek medical help. Early intervention will lessen or eliminate adverse effects by using a chelating agent, such as **dimercaprol** to absorb the mercury.

It works by preferentially binding with sulphhydryl to which toxic mercury forms bind in tissue cells. Once chelated (the mercury joined to the chelating agent) it can be removed from the blood by dialysis. Other chelating agents are also available in specific circumstances

The problem is that most people don't know when they have been exposed to mercury. Patients with non-specific symptoms may undergo many tests before the diagnosis becomes apparent and treatment may be delayed by weeks or months.

Mercury and Dentistry

Dental amalgam, which is a mixture of mercury together with silver, tin and copper, is a universally used material for restoring teeth. It is often referred to as 'silver amalgam' but in fact silver is only one component. It was used for crude filling of decayed teeth in China one-and-a-half millennia ago but its modern usage in

dentistry has remained substantially unchanged since JV Black introduced standardised tooth cavity preparation for fillings in the mid-nineteenth century. The hazards of mercury have been recognised only relatively recently.

As a dental student in the 1960s I and my colleagues were casual about mercury and it would frequently contact the skin.

Mixing of amalgam was done with a mortar and pestle and vapour inhalation was a real risk. Since the recognition of the hazards of mercury fundamental changes have occurred in recognition of the occupational health safety issues, ensuring that amalgam is now mixed in sealed and safe conditions.

A modern amalgamator, which uses capsules of mercury and metals, is present in every dental



surgery. For the millions of patients with amalgam fillings, there can be plenty of reassurance.

Once amalgamated, the mercury is unavailable (that is, it is chemically unavailable and virtually undetectable). There have been a multitude of government and academic studies and none has found that mercury and amalgam, when properly handled, is a public health risk.

Mercury is actually used in fillings because it provides a vehicle for the metallic materials and

makes the filling more pliable. It is used because it is economic to do so and it is durable, in some circumstances lasting longer than the newer cosmetic filling materials.

Dentists also have other restorative materials such as porcelain, gold and other metals, as well as the composite filling materials.

Mercury and Europe

The European Union has produced directives banning mercury in some electronic and electrical equipment and limits its use in other things to less than 1,000 parts per million.

Its use is controlled in batteries. In 2007 the EU banned mercury in thermometers and barometers.

paullambden@compuserve.com