Mercury's Affects on the Heart

Marked Elevation of Myocardial Trace Elements in Idiopathic Dilated Cardiomyopathy Compared With Secondary Dysfunction
Frustaci, A., Magnavita, N., Chimenti, C., Caldarulo, M., Sabbioni, E., Pietra, R., Cellini, C., Possati, G.F. and Maseri, A. Journal of the American College of Cardiology Vol. 33, No. 6, 1999, pp. 1578-1583

> Conclusions: A large, significant increase of myocardial TE is present in IDCM but not in secondary cardiac dysfunction. The increased concentration of TE in pts with IDCM may adversely affect mitochondrial activity and myocardial metabolism and worsen cellular function.

Mercury effects on the contractile activity of isolated heart muscle.
Oliveira EM, Vassallo DV, Sarkis JJ, Mill JG Toxicol Appl Pharmacol 1994 Sep;128(1):86-91

> These findings suggest that Hg2+ promotes dose-dependent toxic effects on heart muscle via actions on the sarcolemma, the sarcoplasmic reticulum, and contractile proteins.

Mercury compounds: lipophilicity and toxic effects on isolated myocardial tissue.
Halbach S Arch Toxicol 1990;64(4):315-9

> The results support the view that the toxicity of mercurials increases with their lipid solubility. In conjunction with the previously reported negative inotropic effect of Hg compounds, a model is proposed allocating thiol groups responsible for the negative inotropic action to lipid compartments within the cell membrane, while SH groups conveying the increase in contraction force are thought to be situated at the internal surface of the sarcolemma.

The relationship between mercury from dental amalgam and the cardiovascular system. Siblerud RL Sci Total Environ 1990 Dec 1;99(1-2):23-35

> The findings presented here suggest that mercury poisoning from dental amalgam may play a role in the etiology of cardiovascular disorders. Comparisons between subjects with and without amalgam showed amalgam-bearing subjects had significantly higher blood pressure, lower heart rate, lower hemoglobin, and lower hematocrit. Hemoglobin, hematocrit, and red blood cells were significantly lower when correlated to increased levels of urine mercury. The amalgam subjects had a greater incidence of chest pains, tachycardia, anemia, fatigue, tiring easily, and being tired in the morning. The data suggest that inorganic mercury poisoning from dental amalgam does affect the cardiovascular system.

Hemodynamic and electrophysiological effects of mercury in intact anesthetized rabbits and in isolated perfused hearts. Rhee HM, Choi BH Exp Mol Pathol 1989 Jun;50(3):281-90

> The profound hemodynamic effects of Hg that we have observed emphasize the potential importance of Hg cardiotoxicity and indicate the need to differentiate between the primary and the secondary effects of Hg intoxication on CNS tissues for evaluation of the toxic effects of Hg compounds.

Cardiovascular homeostasis in rats chronically exposed to mercuric chloride.
Carmignani M, Boscolo P Arch Toxicol Suppl 1984;7:383-8

> On the other hand, Hg exposure induced baroreflex hyposensitivity and produced a drastic alteration of the levels of copper and zinc in brain and kidney.

Mechanisms in cardiovascular regulation following chronic exposure of male rats to inorganic mercury. Carmignani M, Finelli VN, Boscolo P Toxicol Appl Pharmacol 1983 Jul;69(3):442-50

In this study we verified the possibility that chronic exposure to inorganic mercury may induce hemodynamic changes in the rat by affecting some neurogenic and/or humoral mechanisms regulating cardiovascular function… These results indicated that chronic mercury exposure affects cardiovascular function by interfering with the baroreflex mechanisms and/or the reactivity to catecholamines. Higher amounts of mercury were found in kidney, but the metal was significantly accumulated also in urine, blood, and brain. Mercury exposure greatly increased the levels of copper and zinc, but not that of iron, in brain and kidney. The increased accumulation of copper and zinc in tissues may be related in part to the mercury-induced synthesis of metallothionein, a protein able to bind these essential metals. It may be suggested that zinc and copper interact with mercury in inducing cardiovascular changes.