

# **The Lead Content of the Aorta in Male Residents of Baltimore, Maryland**

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Lead is an ubiquitous environmental contaminate and as a result one of the most abundant nonessential trace metals in man. The lead content of human tissues has been determined by various researchers, however, only TIPTON and COOK (1963) have examined the lead content of the aorta. In reviewing this work, SCHROEDER and TIPTON (1968) noted that concentration of lead in the aorta increased with age and presumably with atherosclerosis in persons living in the United States. This communication presents the lead content of the aortas of eighteen male residents of Baltimore, Maryland. The data tend to support the earlier observations of SCHROEDER and TIPTON (1968).

## Materials and Methods

Aortas were collected at autopsy from eighteen male residents of Baltimore who had died suddenly and who had no apparent disease conditions at the time of death. The tissues of the subjects exhibited no gross pathological conditions with the exception of atherosclerosis of the aorta. The aortas were carefully handled to prevent contamination and were placed in individual polyethylene bags and quickly frozen. Each sample was labeled as to case number, age, sex and manner of death of the subject. Special notice was made of samples with dense arteriosclerotic plaques.

The samples were thawed, trimmed of excess connective tissue, weighed, and wet digested with nitric and perchloric acid. The digest was extracted and analyzed by Atomic Absorption Spectrophotometry by the method of YEAGER et al. (1971). Recoveries of lead spiked aorta samples were 98-102%. The standard error of the method was less than five percent.

## Results and Discussion

The results of the study are presented in Table 1. The concentration of lead in eighteen aortas ranged from 0.6-7.6 micrograms per gram of fresh tissue. It is apparent from a comparison of the mean and median values in Table 1 that the distribution of lead concentration values is not normal. Therefore the median was chosen as the estimate of the central tendency of the data.

TABLE 1

Age, cause of death, and concentration of lead in the aorta of eighteen male residents of Baltimore, Maryland.

	<u>AGE</u>	<u>CAUSE OF DEATH</u>	<u>MICROGRAMS LEAD/GRAM OF FRESH AORTA</u>
1	17	Intravenous Narcotism	1.1
2	18	Multiple Injuries	2.9
3	19	Intravenous Narcotism	1.8
4	24	Intravenous Narcotism	2.4
5	24	Multiple Injuries	0.6
6	28	Multiple Injuries	3.1
7	30	Multiple Injuries	2.7
8	31	Multiple Injuries	1.1
9	38	A.S.C.V.D. <sup>a</sup>	4.7
10	38	A.S.C.V.D.	4.7
11	39	Fracture of Cervical Spine	2.7
12	41	Drowning	4.9
13	46	Multiple Injuries	2.0
14	47	A.S.C.V.D.	4.7
15	51	A.S.C.V.D.	4.8
16	53	A.S.C.V.D.	7.6
17	73	A.S.C.V.D.	4.0
18	74	Multiple Injuries	7.4
		Mean	3.5
		Median	3.0
		Median S.D.	2.1

<sup>a</sup> Arterial Sclerotic Coronary Vascular Disease

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The rank correlation coefficient by age ( $r$ ) for concentration of lead in the aorta, 0.74 ( $P < 0.001$ ).

Pair rank correlation was used to evaluate the increase of lead in the aorta with age. The paired rank correlation coefficient ( $r$ ) was 0.74 ( $P < 0.001$ ) revealing a significant correlation of lead content of the aorta with the age of the subject. Using the same statistical method, SCHROEDER and TIPTON (1968) reported  $r = 0.98$  ( $P < 0.001$ ). Although less dramatic, the present study does confirm the association of aortic lead content with age.

Factors which must be considered in using human aortic lead values to evaluate the association of lead with atherosclerosis are the increase of lead in the aorta with age and the effects of coincident pathology on lead metabolism. The data in Table 1 show that the highest aortic levels of lead occurred in those subjects who were 38 years old or older. These subjects, with the exception of two, had dense atheromas present. Subjects 11 and 13 had no apparent atherosclerotic plaques and had relatively low aortic lead concentrations. This tends to support the hypothesis of SCHROEDER and TIPTON (1968) that lead accumulation in the aorta may be associated with atherosclerosis.

#### REFERENCES

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