

Hypertension Risk from Iron Brake Particulate Matter

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Introduction:

Of 12 moon walkers, James Irwin on day after return from Apollo 15 mission, showed extraordinary bicycle (B) stress test (ST) hypertension (275/125) after 3 minutes exercise; supervising > 5000 maximum treadmill ST, author never witnessed ST- blood pressure approaching this level. Symptom-limited maximum B stress test showed “cyanotic fingernails”; possibly venous blood trapped peripherally, supporting author’s “Apollo 15 Space Syndrome,” postulating that severe fingertip pain during space walks, triggered by plasma fluid, trapped distally; mechanism could be related to endothelial dysfunction, providing “silent ischemia” warning. Neil Armstrong returned to Earth with severe diastolic hypertension (160/135), consistent with ischemic left ventricular dysfunction; 50 mm increase in comparison with resting BP 110/85. With inhalation of lunar dust, brought into habitat on space suit, with high lunar iron (I) this dust inhalation, along with reduced (R) space flight- transferrin, R antioxidant, calcium (Ca) blocker - magnesium, conducive to severe oxidative stress, Ca overload with potential endothelial injuries. Using moon walker studies as example, my recent editorials show that I dust, released from brakes, with over 90% of brakes made of I, is a major hypertension factor and may also contribute to myocardial infarctions.

I read with interest the paper by Vidale et al. My studies of moon walkers, Neil Armstrong and James Irwin, show that these findings can be applied to the hazards of Earth iron dust inhalation. Armstrong returned with extraordinary elevation of his diastolic blood pressure (BP) (160/135), predicting cardiovascular risk. Irwin returned with extraordinary BP after only 3 min of exercise with a BP 275/125. Having supervised over 5000 symptom limited, hospital based maximum Bruce treadmill stress tests, I have never seen this. Since there are with space flight, invariable magnesium (Mg) deficiencies, this could be an important contributing factor. Dehydration, with increased catecholamines, vicious cycles with Mg ion deficiencies, would intensify these effects. At least 60% of those living in the United States have a Mg deficiency. A European study, has shown that inhalation of iron dust in 12 year olds could trigger hypertension which may persist to adulthood. Very fine particulate matter can be taken up by the respiratory tract and then disseminated throughout the cardiovascular system; in the presence of a Mg deficiency there would be impairment in the ability of transferrin in binding tightly to iron with in turn, severe oxidative stress, triggering endothelial dysfunction. As to the source of dust, brakes are usually made of cast iron, with iron dust, airborne. Apparently, legislation will be required to use some other metal; an alternative might be to effectively seal brakes.