



Low Visual Pathway Alterations and Neurological Toxic Effects after Acute Mercury Poisoning in Zinc Manufacturer Workers

[View Session](#)[View Presentation](#)[Add to Schedule](#)[Print Abstract](#)**Posterboard#:** B0378**Abstract Number:** 259 - B0378**AuthorBlock:** *Salvador Pastor*^{1,2}, *Yrbani Lantigua*¹, *ROSA COCO*^{1,2}, *Itziar Fernandez*^{1,3}, *Antonio Dueñas-Laita*^{1,4}, *JOSE LUIS Pérez-Castrillon*^{1,4}, *Jose Carlos Pastor*^{1,2}¹Ophthalmology, IOBA-University of Valladolid, Valladolid, Spain; ²Red Temática de Investigación Cooperativa en Salud (RETICS), Oftared, Instituto de Salud Carlos III, Valladolid, Spain., , Spain;³CIBER-BBN (Biomedical Research Networking Center Bioengineering, Biomaterials and Nanomedicine), Carlos III National Institute of Health, Spain, , Spain; ⁴Department of Medicine and Toxicology, Medicine School, University of Valladolid, Valladolid, Spain, , Spain;**DisclosureBlock:** Salvador Pastor, None; Yrbani Lantigua, None; ROSA COCO, None; Itziar Fernandez, None; Antonio Dueñas-Laita, None; JOSE LUIS Pérez-Castrillon, None; Jose Carlos Pastor, None;

Purpose

To describe the alterations in both the morphology and the function of the low visual pathway of a series of patients with acute intoxication due to inorganic mercury.

Methods

Observational case series consisting of 29 out of 50 patients who had been exposed to acute mercury poisoning at a multinational zinc manufacturing company located in Spain. Fifteen of them underwent late chelation for heavy metal intoxication. Complete ophthalmic examination including optical coherence tomography (OCT), visual field testing and functional tests such as ERG, pERG, mERG and VEP (Metrovision, following ISCEV standard) were used to confirm the retinal and visual pathway alterations. In addition, systemic symptoms and neurological examination including electromyography (EMG) and audiometry tests were recorded. Blood and urine samples were collected to assess initial mercury levels. Values were compared among different groups: non-chelated, late chelated, and healthy groups.

Results

There were significant high blood and urine levels of mercury in the chelated group (503.13 ± 291.92 ng Hg/ml and $492.93 \pm 489.56\mu\text{g Hg /L}$, respectively). 89.6% of patients exhibited erethism mercurialis symptoms insomnia and anxiety disorders. The chelated group exhibited more psychiatric involvement ($p=0.025$). EMG and audiometry tests showed similar decreased nerve conduction velocity and hearing loss of 25 to 40 dB in the intoxicated groups. Loss of contrast sensitivity in all frequencies, color vision alterations, a significant increase of latency and decrease of the extent of the b wave in ERG, and p50 of PERG were seen in all intoxicated groups. VEP latency was found over 100 m/s, and visual field alterations were registered in 62.1% in both eyes such as concentric constriction or widespread reduction of sensitivity in all intoxicated cases. No differences were seen among all groups in OCT tests. mERG test showed a significant decrease of N1-P1 wave at rings 10° - 15° and $>15^\circ$ in all intoxicated cases. The most common patterns were peripheral loss and generalized loss (Figure 1 and 2).

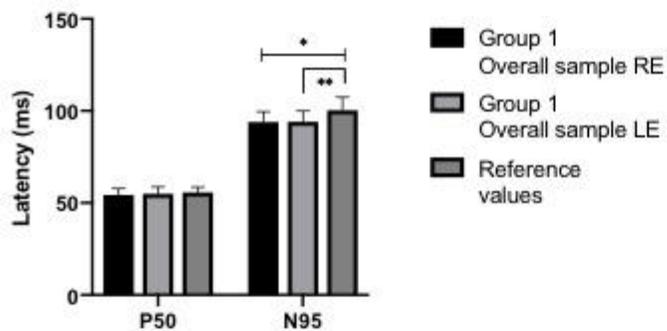
Conclusions

Late chelation for mercury intoxication may not result in satisfactory relief of the symptoms. Although neurological and visual pathway involvement is clearly demonstrated, the electrophysiology tests (ERG, pERG, mERG and VEP) additionally established a clear retinal involvement.

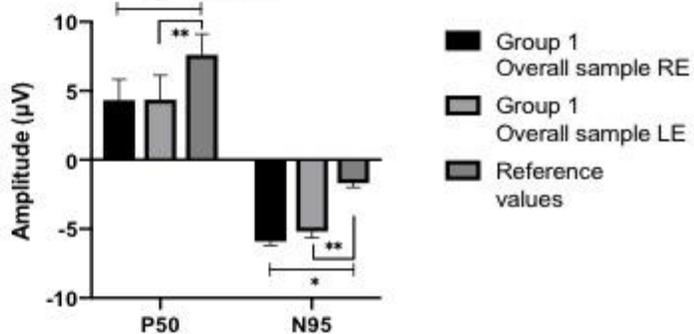
Layman Abstract (optional): Provide a 50-200 word description of your work that non-scientists can understand. Describe the big picture and the implications of your findings, not the study itself and the associated details.

Despite recent worldwide stricter environmental and workplace health legislation and guidelines, have drastically reduced mercury intoxication cases, unfortunately, 50 workers doing maintenance work in a heat exchanger from a multinational zinc manufacturer located Spain were exposed to dangerous mercury levels when cutting pipes in a heat exchanger. The mercury levels reached in these subjects were over the biological limits recommended for occupational exposure. Although none of these patients died after the acute poisoning, most of them developed severe chronic effects after their initial acute mercury exposure on neurological and visual system. This incident entered the public domain when workers filed for industrial accident compensation. To our knowledge, this is one of the most severe events of acute inorganic mercury intoxication occurred in Europe. The goal of this project is to draw attention to the importance of public education on the potentially hazardous effects of mercury regarding preventive community health.

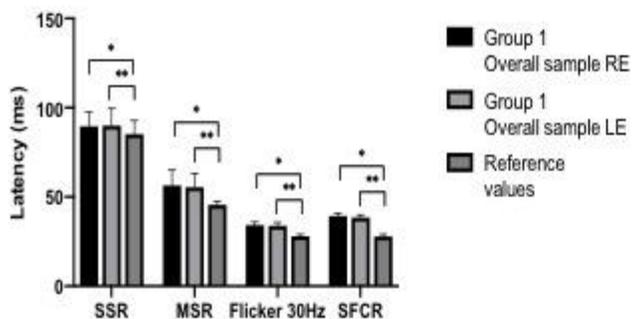
PERG



PERG



Full-field ERGs



Full-field ERGs

