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PP149

HEAVY METAL LEVELS AND SPERM PARAMETERS IN MEN LIVING IN AN ENVIRONMENTAL RISK AREA COMPARED WITH INHABITANTS OF A NON-INDUSTRIAL AREA

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Background: Impaired fertility and elevated levels of heavy metals in blood and seminal plasma have been reported in industrial workers, but less clear is the role of environmental metal exposure. Objectives: To evaluate sperm parameters and the most ubiquitous metal levels in blood and seminal plasma of men living in an industrial area (IA) compared with those of a non-industrial area (NIA). Subjects and methods: 96 men with median age of 33 years, living in Melilli (IA in Eastern Sicily, Italy), and 83 men with median age of 30 years, living in Regalbuto (NIA in Central Sicily, Italy) were recruited. Fifty-one (53%) IA men were also industrial workers. Blood and seminal plasma Pb, Hg, Cd, Ni, As, V, Se concentrations were measured by a Perkin-Elmer Elan DRC, ICP-MS. The following reference values were used ($\mu\text{g/L}$): Pb ≤ 400 , Cd ≤ 5 , Hg ≤ 5 , As ≤ 12 , Ni ≤ 4 . Conventional sperm parameters were evaluated according to the WHO 2010 guidelines. Non-conventional parameters were assessed by flow-cytometry. Results: Comparing IA vs. NIA: cigarette smokers were 37% (vs. 53.2%, $p=0.04$); asthenozoospermia was found in 58% (vs. 37%, $p=0.005$), oligozoospermia in 20% (vs. 10%, $p=0.06$); high degree of sperm chromatin compactness (CC) in 43% (vs. 23%, $p=0.005$). In a multivariate analysis, CC was significantly higher ($p=0.002$) in IA vs. NIA. Elevated levels of As, Ni, Se in blood, and Cd, As, Ni, Se in seminal plasma were found in a significantly higher percentage in IA vs. NIA. In a multivariate analysis, As, Ni, Se (blood), and Se (seminal plasma) were significantly higher in IA vs. NIA ($p<0.001$). Conclusions: Environmental exposure to heavy metals resulted in higher their levels in blood and in seminal plasma and impaired sperm parameters, mostly in men living in an IA. Ackn: this study is supported in part by Frisone Foundation.

PP150

IN-VITRO EFFECTS OF AIR EXTRACTS FROM AN INDUSTRIAL AREA OF EASTERN SICILY ON SPERM PROGRESSIVE MOTILITY

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Background: Several in-vivo and in-vitro studies suggested that male fertility may be impaired by environmental exposure to pollutants. Our preliminary data in men living in the industrial area (IA) of Melilli, Eastern Sicily, and in men living in the non-industrial area (NIA) of Regalbuto, Central Sicily, showed a higher rate of altered sperm parameters, mostly progressive motility (PM), along with higher levels of heavy metals and PCBs in blood and seminal plasma in IA compared with NIA. Objective: To evaluate the effects of exposure to contaminants present in the air extract from IA (AE-IA) and of NIA (AE-NIA) on PM. Materials and methods: Polycyclic aromatic hydrocarbons (PAH) and heavy metals (As, Cd, Ni, V, Pb, Hg) were measured on AE by HPLC and AAS, and values compared with limit values (DL 155/2010). Four experiments were performed incubating spermatozoa obtained by swim-up from normozoospermic non-smoker men with AE of both IA and NIA, saline (CTL), and filter extract (FE). PM was evaluated according to the WHO 2010 criteria after 0, 3, 6, and 24 h of incubation. Results: PAH were within normal limits in AE-IA and below the assay-limit in AE-NIA. As and Ni levels were the only heavy metals above normal limit in AE-IA. Hg concentrations were higher in AE-NIA vs. AE-IA. A more profound time-dependent decrease (6 h > 3 h) of PM was observed in AE-IA vs. AE-NIA: 21.5% vs. 43% (3 h), 7% vs. 32% (6 h). The effect of EA was more evident than FE or CTL. PM was near to zero at 24 h in all cases. Conclusions: These results confirmed the effect of environmental toxicant on sperm motility also with an in-vitro experimental model. This effect is more pronounced by exposure to the air derived from an IA.