RENAL FUNCTION RISK ASSESSMENT IN CAMEROONIAN WELDERS OCCUPATIONALLY EXPOSED TO WELDING FUMES

Wadaka Mamaï, Tchana N. Angèle and Moundipa F. Paul

Laboratory of Molecular Toxicology and Pharmacology, Department of Biochemistry, University of Yaoundé I, Cameroon

Abstract: Welding generates fumes that may contain many toxic compounds including heavy metals (cadmium, lead, manganese, arsenic) and toxic gases (carbon monoxide, ozone and nitrogen oxides). Long term exposure to these compounds may lead to serious health deterioration such as renal failure. The present work was done in order to evaluate the working conditions of welders and to relate these to their health status by analysing some biochemical markers associated with renal failure. Using a questionnaire and a written consent, we carried out a survey among welders in Yaounde (capital city of Cameroon) on the equipment used for their protection at their work place. Blood and urine samples were collected from 30 male welders occupationally exposed and 17 unexposed healthy subjects. Serum was assayed for creatinine and thiobarbituric acid reactive substances (TBARS) while urinary proteins were isolated, quantified and, electrophoretically analysed. The effects of age, smoking, alcohol intake and length of occupation on the assessed biochemical parameters were evaluated also. The values were analysed statistically by Mann – Whitney and Kruskal – Wallis tests using Medcalc® software. Survey data indicated that 55.77% of welders were not protected, while 11.24% were protected and 32.69% fairly protected. Welding was significantly associated with increased levels of creatinine and proteins in blood and urine (P<0.05). Electrophoresis analysis of the urinary protein revealed the presence of two proteins with molecular weights (MW) more than 148 kDa and four proteins of lower MW less than 66 kDa. These proteins did not appear in the samples collected from control individuals. There was also a significant positive correlation between length of occupation and these biomarkers of renal function. These results suggest that welding without protection could lead to imbalances in the biochemical markers that may be associated with the impairment of renal function.

Keywords: welding, chemical exposure, protein, creatinine, renal function, Cameroon.