The Role of Beta-2-Microglobulin as early predictor for renal dysfunction in petrol station workers in Fayoum governorate

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Presented by

Mohamed Ragab Teleb

Assistant Lecturer of Forensic Medicine and Clinical Toxicology
Faculty of Medicine – Fayoum University.

Under Supervision of

Prof. Dr. Ghada Mustafa El-Gallad

Professor of Forensic Medicine and Clinical Toxicology
Head of Forensic Medicine and Clinical Toxicology Department
Faculty of Medicine – Fayoum University.

Asst.Prof. Dr. Amro Abdelghany Saleh

Assistant professor of Forensic Medicine and Clinical Toxicology
Faculty of Medicine – Fayoum University.

Dr. Mohamed Hussein Hamdy Roby

Associated professor of chemistry and food analysis
Faculty of Agriculture-– Fayoum University

Dr. Ahmed Salah Eid El-Sayed

Lecturer of Forensic Medicine and Clinical Toxicology
Faculty of Medicine – Fayoum University

Faculty of Medicine
Fayoum University
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Summary and Conclusion

Polycyclic aromatic hydrocarbons are typically the chief components in many types of fuels and products used every day. Exposure to these substances can cause significant health risks including respiratory disorder, kidney disease, liver disease, cancer and hematotoxicity

Occupational exposure to hydrocarbons has been associated with an elevated risk of renal dysfunction with rapidly increase morbidity and mortality rates for chronic kidney disease

The traditional markers of renal dysfunction; blood urea and serum creatinine, are not sensitive in the detection of earlier renal damage, so there need for new markers to detect early renal damage

Beta-2-Microglobulin, a low molecular weight protein, is freely filtered in the glomerulus and totally reabsorbed and degraded in the renal tubules. Thus, it is a sensitive marker of the glomerular filtration capacity of the kidney

This study was conducted to assess the possible role of B2 microglobulin as early predictor of renal dysfunction in benzene filling workers.

The current study presents a prospective case-control study carried out in petrol station workers in Fayoum governorate during the period from beginning of March 2023 till end of December 2023 and included 90 benzene filling workers and 30 healthy volunteers divided in four group according work duration.

The personal history (socio-demographic data, medical history), laboratory parameters (complete blood picture, serum urea, serum creatinine, urine analysis, urinary B2 microglobulin, serum PAHs) for each participant were recorded

The findings of the present study indicate that benzene exposure can induce significant alterations in renal functions and hematological changes among gasoline exposed study participants compared to control groups.

Hematological changes including increase in RBCs, WBCs and Platelets, which significantly higher in benzene filling workers groups compared with control group

Kidney functions tests, S.urea and s. creatinine, are higher in exposed workers than healthy volunteers with significant difference and in direct relationship with work duration, although their values are still within the highest accepted normal ranges

Regarding urinary B2microglobulin there was significant difference between studied groups, in direct relationship with work duration.

Regarding determination of PAHs compounds in different benzene samples from different petrol stations in Fayoum governorate, result in presence of more than 14 compounds, in line with the United States Environmental Protection Agency (USEPA) which specified 16 PAHs as priority compounds due to their toxicity on human health

Determination and quantification of PAHs compounds in serum samples results in the same compounds present in

benzene samples and there was significant higher level of hydrocarbons among group 4 compared to other groups, hydrocarbons level positively correlates with work duration

There was significant relation between Beta-2-Microglobulin and age, work period, serum creatinine, total leukocytic count and hydrocarbon level

There was significant correlation between hydrocarbons level and different variables, there was significant relation between hydrocarbon level and age, work period, serum creatinine, total leukocytic count and Beta-2-Microglobulin

B2 microglobulin can be used as early predictor of renal dysfunction in benzene filling workers, and has high sensitivity and specificity to detect renal tubular dysfunction