



INTERFERENCE OF ENVIRONMENTAL FACTORS IN SERUM BILIRUBIN LEVELS: A PRELIMINARY STUDY

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1. INTRODUCTION

Bilirubin is a toxic metabolite produced by the normal catabolism of hemoglobin and other proteins. It is also a key marker of liver and hematological disorders.

In absence of disease, there are considerable variations of bilirubin levels within subjects that have been reported to be associated with genetic background, but some reports suggest the involvement of environmental factors.

Some studied determinants of serum bilirubin levels include, sex¹, age², smoking status³ current oral contraceptive use in women and fasting status⁴.

The aim of this work was to evaluate the effect of this and other factors that could contribute for the changes of serum bilirubin concentration in a normal Portuguese population.

2. MATERIAL AND METHODS

Subjects and assays

We studied 80 volunteer healthy young adults (17 males, 66 females; average age: 20.3 ± 1.9 years), with no history of haematological, hepatic diseases. All patients gave their informed consent to participate in this study. In all individuals we perform:

- a questionnaire which included questions about smoking habits, oral contraceptive therapy, caloric intake (validated by Faculdade de Medicina, Universidade do Porto), fasting time and physical activity (adapted from International Physical Activity Questionnaire - IPAQ);
- body fat estimated by bioelectrical impedance (TANITA BC532);
- body mass index (BMI) determination according to OMS recommendations;
- blood samples were drawn from fasting individuals; for serum bilirubin measurement (ABX Pentra CP).

Data Analysis

For statistical analysis, we used the Statistical Package for Social Sciences (SPSS; version 15.0 for Windows, Inc. Chicago, IL, USA). Kolmogorov Smirnov statistics were used to evaluate sample normality distribution. Comparison between groups were performed using the Kruskal-Wallis test and the Mann-Whitney U test (data with a non-Gaussian distribution) or one-way ANOVA supplemented with tukey's HSD post-hoc test (data with a Gaussian distribution). Spearman's rank correlation coefficient was used to evaluate relationships between sets of data. Multiple regression analysis using the stepwise method was used to determine independent factor affecting serum bilirubin levels. Significance was accepted at $p < 0.05$.

3. RESULTS

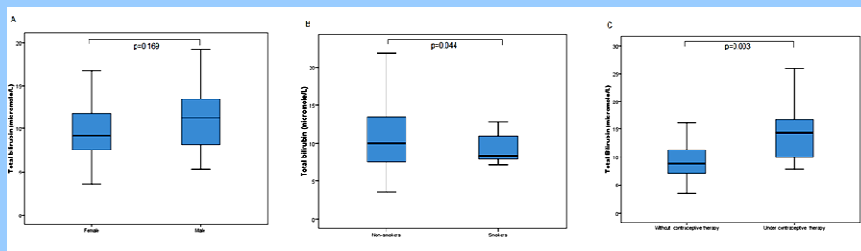


Fig. 1. Total serum bilirubin levels. Differences between: males and females (A), smokers vs. non-smokers (B), women under contraceptive therapy and without contraceptive therapy (C).

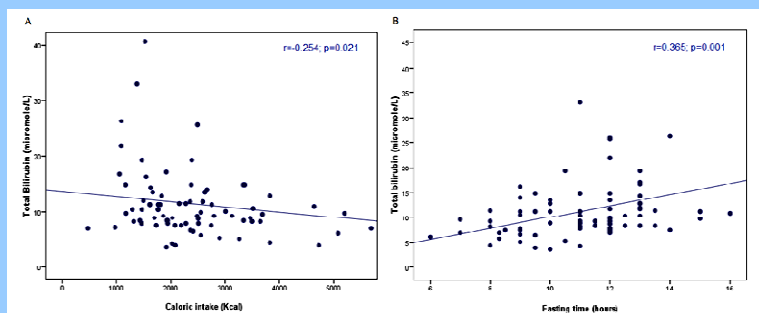


Fig. 2. Correlations between serum bilirubin levels and caloric intake (A) and between serum bilirubin levels and fasting time (B).

Table 1. Significance of dependence of total serum bilirubin levels on some relevant variables.

Variables	Standardized Coefficients	
	β	p
Smoking status	- 0.25	0.04
Caloric intake	0.052	0.018
Contraceptive therapy	0.36	0.01

($R^2=0.264$)

4. CONCLUSION

Results showed that a trend to higher serum bilirubin levels was found in males than in females, higher serum bilirubin levels were found in non-smoking subjects and in female subjects that were under oral contraceptive therapy.

Statistically significant correlations were found between bilirubin serum levels and fasting time as well as, between bilirubin serum levels and caloric intake.

No significant association was found between serum bilirubin levels and physical activity, BMI and body fat.

This preliminary study show that bilirubin levels are dependent and influenced by smoking status, fasting time, caloric intake and oral contraceptive use. Further studies including genetic variables are required to better understand what interferes with serum bilirubin levels.

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