

One month of Ketogenic Diet alters short chain fatty acids production in drug-resistant epileptic patients

Ferraris C.^{1*}, Meroni E.², Casiraghi M.C.², Tagliabue A.¹, Erba D.²

*(lead presenter) cinzia.ferraris@unipv.it

¹ Human Nutrition and Eating Disorder Research Center, Department of Public Health, Experimental and Forensic Medicine University of Pavia, Pavia, Italy

² Department of Food, Environmental and Nutritional Sciences, University of Milan, Milan, Italy

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Ketogenic diet (KD), a high fat and very low carbohydrates diet, is used worldwide for the treatment of drug resistant epilepsy but, due to its composition, it might exert an impact on microbiota, by altering bacterial concentrations and diversity, and affecting overall gut health. Even though data of KD effects on intestinal microbiota changes are recently emerging, its influence on gut environment has been scarcely addressed so far.

The aim of this study was to investigate whether one month of KD affects gut environment in patients with refractory epilepsy, by analyzing short chain fatty acids (SCFA) production and fecal water toxicity.

A total of 7 patients were enrolled. Stool samples were collected before (T=0) and after one month of KD (4:1 ketogenic ratio) (T1). SCFA were determined by GC-FID and fecal water toxicity in Caco-2 cell culture.

Concentrations of SCFA significantly decreased after KD ($p<0.05$): in particular, we found a 45% reduction of total SCFA level, 50% reduction of acetate and 40% of propionate and butyrate ($p<0.05$). Branched chain fatty acids were not statistically affected. Cyto- and geno- toxicity of fecal water extracted from stool samples, were not significantly altered by diet and were consistent with data previously obtained from healthy Italian population.

The present study shows that one month of KD significantly reduce SCFA production probably as a consequence of the development of dysbiosis. Since SCFA produced by gut microbiota exert many health promoting effects on either gut environment as well as human metabolism, these results open a new branch of investigation of KD effects.