

Asymmetric septal hypertrophy in children on long-term parenteral nutrition – the glucose role?

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Introduction

Long-term parenteral nutrition(PN) is an effective method of treatment in children with intestinal failure, however it is related to several complications. Hypothetically there are several factors related to PN which might influence cardiac status, such as volume overload and metabolic influence of administered nutrition mixtures.

Objectives

The aim of this cross-sectional study was to evaluate the cardiac status in children with intestinal failure on long-term PN and to identify factors that might influence it.

Methods

71 children with intestinal failure aged from 0,92 to 19,84 years (average – 7,6 year), being on parenteral nutrition for average of 4,9 years were examined by echocardiography with assessment of basic functional and structure parameters, chest X-ray with assessment of CTR and NTproBNP serum concentration. Results were compared with normal values established on the base of epidemiological studies and analyzed by T-student test. Correlation of the cardiac results with potential risk factors related to PN such as: nutrients and fluid content, fluid flow, frequency of PN administration per week, the period from initiating PN were analyzed with Spearman correlation test.

Results

The main stated aberrations were: the augmentation of the echocardiographic IVSd diameter and IVSd/LVPWd ratio above normal limits ($>2SD$ and $>1,3$) in 19% patients (average of the abnormal IVSd diameter: 140% of the mean normal value (130%-170%); average percentile in the studied group – 70th; $p<0,001$), and elevation of CTR in 44% and of NTproBNP serum level in 32% .

Those aberrations correlated with glucose content in the PN mixture (CTR: $p=0,008$; $r=0,329$; NTproBNP: $p<0,001$; $r=0,491$; IVSd: $p=0,024$; $r=0,273$), with PN's frequency (CTR: $p=0,032$; $r=0,276$; NTproBNP: $p=0,013$; $r=0,295$) and with PN mixture's volume (CTR: $p<0,001$; $r=0,395$; NTproBNP: $p<0,001$; $r=0,327$; IVSd: $p=0,014$; $r=0,306$)

Conclusions

The main aberration of the cardiac status in children on long-term PN was the enlargement of IVSd diameter, which correlated significantly with glucose content in PN (resembling the situation of ASH in infants of diabetic mothers) and elevation of IVSd/LVPWd ratio. There was also frequently stated elevation of CTR on chest X-ray and of NTproBNP serum concentration, which both correlated significantly with PN volume.