

Association of prenatal cerebroplacental ratio and postnatal respiratory capacity in young age- A follow-up cohort study

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Objective

To investigate the association of prenatal cerebroplacental ratio (CPR) and postnatal respiratory capacity in young age.

Methods

Follow-up of a perinatal cohort of 106 young people aged between 12 to 21 years subdivided according to the prenatal CPR (n=78 normal CPR vs. n=28 abnormal CPR below 5th centile). Respiratory capacity was assessed in postnatal young age including spirometry, CO diffusing capacity of the lung (DLCO) and fraction of exhaled nitric oxide (FeNO). Results are expressed as % of reference values.

Results

Young people with abnormal prenatal CPR had lower birthweight and gestational age at delivery. No significant differences in postnatal age, comorbidities, body surface area, smoking and pulmonary diseases were demonstrated between groups. Table 1 shows that those with abnormal prenatal CPR showed lower forced expiratory volume in the 1st second (FEV1), mean forced expiratory flow rate over the middle 50% of the vital capacity (F25-75), peak expiratory flow rate (PEF), DLCO as compared to controls. Multivariate analysis including CPR, birthweight centile and gestational age at delivery showed that respiratory changes were mainly related to prematurity (FEV1, F25-75 and PEF) and birthweight (DLCO). Within the population born low birthweight, a significant and independent correlation between CPR and FEV1 ($p = 0.045$, $\rho = 0.312$) was demonstrated. (Figure 1)

	Normal CPR (n=78)	Altered CPR (n= 28)	P value
FEV1 (% pred.)	95.0 ± 10.1	89.3 ± 11.3	0.017
FEV1/FVC (% pred.)	100.8 (95.3 – 106.4)	96.7 (94 – 103.6)	0.173
PEF (% pred.)	87.2 ± 11.7	71.4 ± 9.4	<0.001
F25-75 (% pred.)	99.4 ± 23.7	80.2 ± 19.4	0.002
DLCO (% pred.)	103.0 ± 15.9	90.3 ± 14.9	0.001
FeNO (ppb), %	18 (24)	4 (19)	0.439

Table 1. Evaluation of respiratory capacity in postnatal young age.

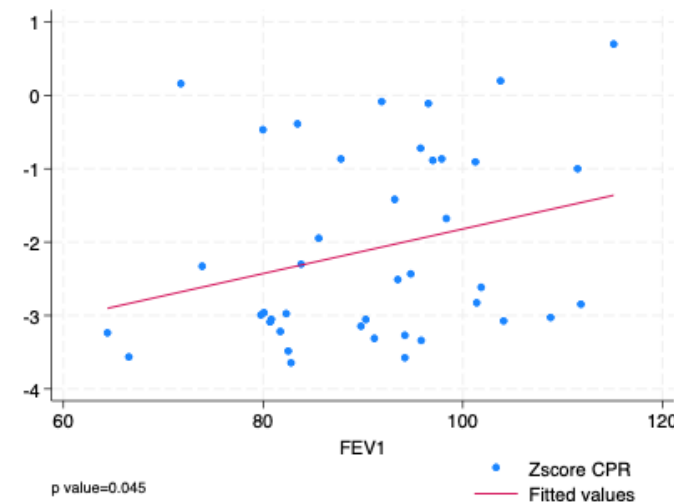


Figure 1. Correlation between CPR and FEV1 in postnatal young age.

Conclusions

Prenatal abnormal Doppler CPR is associated with worse postnatal respiratory capacity in youth; however, these changes seem to be mainly mediated by prematurity and low birthweight.