Early-life risk factors and their association with hypertension in Spanish children and adolescents

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Introduction

Hypertension in children has increased in the last years, this problem often continues into adult life favoring cardiovascular disease. There are some factors that can affect the onset of hypertension in childhood such as family history, pregnancy characteristics or feeding in the first months of life.

Due to the above mentioned, the aim of this study was to investigate the association between early life risk factors and hypertension in children and adolescents.

Material and Methods

A total of 794 children between 5 and 18 years were recruited in three Spanish cities (53,3% girls, 49,7% prepubertal, 73,6% with overweight/obesity) and classified as having obesity or not using the criteria by Cole *et al*. (2000). They were also classified as hypertensive or not when systolic blood pressure (BP) was higher than the P90 (Task Force 1996). BP was measured with a digital manometer (Omrom, M6 AC) three times with a 5 minutes interval.

In addition, information regarding family history, pregnancy characteristics, feeding in the first months of life, as well as nutritional habits was recorded through an interview with the parents.

Associations between hypertension and early life risk factors were analyzed with a binary logistic regression adjusted for age, sex and body mass index (BMI). All analyses were conducted with SPSS 21.0.

Table 1. Association between antenatal risk factors and children hypertension

	N	%	OR	P	95%CI
Parents' Hypertension					
Yes	74	10.0	**2.03**	**0.000**	1.42-2.90
No (ref)	539	73.0			
Pregnancy hypertension					
Yes	74	10.0	**3.10**	**0.000**	1.91-5.04
No (ref)	663	90.0			
Gestational diabetes					
Yes	64	8.7	**2.06**	**0.007**	1.21-3.48
No (ref)	671	91.3			
Tobacco and/or alcohol during pregnancy					
Yes	156	21.1	1.31	0.179	0.88-1.95
No (ref)	585	78.9			
Weight gain during pregnancy					
T1 (0-8.9 kg)	164	24.3	1.43	0.138	0.89-2.31
T2 (9-13 kg)	303	44.9	1.34	0.169	0.88-2.05
T3 (>13 kg) (ref)	208	30.8			

Table 2. Association between postnatal risk factors and children hypertension

	N	%	OR	P	95%CI
Gestational Age					
30-36.9 weeks	58	8.6	**2.26**	**0.004**	1.30-3.94
37-42 weeks (ref)	616	91.4			
Birth Weight					
2000-2499 g	43	6.1	0.63	0.305	0.26-1.52
2500-4000 g	595	84.8	0.59	0.061	0.34-1.02
> 4000 g	64	9.1			
Born by cesarean section					
Yes	17	2.3	**2.13**	**0.000**	0.77-5.94
No (ref)	728	97.7			
Exclusive breastfeeding during 6 months					
Yes	178	29.7	1.09	0.667	0.73-1.64
No (ref)	422	70.3			
Complementary feeding before 4 months					
Yes	45	6.3	**2.83**	**0.001**	1.53-5.26
No (ref)	666	93.7			

P significance of the logistic and regression analysis was adjusted for age, sex and body mass index.T1: Tercile 1; T2: Tercile 2; T3: Tercile 3, OR: Odds Ratio, CI: confidence interval, N: sample size.

Results

A total of 201 children from the study population had systolic hypertension (53,3% girls, 49,7% prepubertal, 73,6% with overweight/obesity). Significant associations were found between the studied early-life risk factors and hypertension in childhood (Tables 1 and 2). Children whose parents had a history of hypertension had an increased risk of hypertension themselves. In addition, children whose mothers had gestational diabetes or pregnancy-induced hypertension showed an increased hypertension risk than those born to mothers with healthy pregnancies (Table 1). Hypertension risk also increased in premature children (30-36.9 weeks) as well as in children born by cesarean-section. In addition, children who had an early start of complementary feeding before 4 months of age almost tripled their risk of hypertension (Table 2). No significant associations were observed between birth weight or exclusive breastfeeding and childhood hypertension.

Conclusion

Parental history of hypertension, pregnancy complications, mainly pregnancy hypertension, premature or cesarean delivery and an early complementary feeding introduction before 4 months increase the risk of hypertension in children and adolescents independently of BMI. Children with these perinatal factors should be controlled to prevent future health alterations.