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Long-term risk of chronic arterial hypertension in pregnant women with a history of preeclampsia

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Objective

Preeclampsia (PE) is a multisystem disorder that affects 3% of pregnant women in the world. It is related to substantial maternal and neonatal morbidity and mortality. The consequences of this disease do not end with the delivery. Numerous studies have shown that PE is associated with an increased risk of chronic arterial hypertension, ischemic heart disease, stroke, and death from cardiovascular causes. The relative risk of chronic (AHT) would be between 2.3 and 11 times higher according to published data. All of this leads us to propose our study hypothesis: a history of PE during pregnancy is a predictive risk factor for developing chronic AHT years or decades later. The main objective is to investigate whether having PE is related to a higher incidence and/or earlier onset of long-term chronic hypertension or to the severity of PE. As secondary objectives it is intended to study the possible relationship of risk factors associated with PE with the development of subsequent long-term chronic hypertension, to identify possible predictors for the development of chronic hypertension after PE and to investigate possible increases in the prevalence of other chronic pathologies such as cardiovascular disease (CVD).

Methods

We performed a retrospective study of cohorts based on an experimental cohort and a control cohort stratified by age, parity and date of delivery (the previous and next of each case). A follow up will be carried out for at least 10 years after pregnancy (up to the present or the last identifiable contact in the clinical history).

Results

We had a total sample of 105 patients included during the study period (years 2011 and 2012); 35 in the study cohort and 70 in the control cohort. We obtained an incidence of PE of 1.57%. As expected from the study design, there were no differences between cohorts in age or parity. It highlights the non-statistically significant higher frequency of pregnancy with assisted reproductive techniques (ART) in the PE group (11.42% and 4.28% respectively), the high prevalence of obesity among pregnant women with a history of PE (28.57% compared to 12.85% in the control group), finding significant differences and finding that patients with PE have a higher body mass index (BMI). Statistically significant differences were also found in the percentage of twin gestations in the PE group (17.4%) versus the control group (1.42%). Regarding our main study variable, we found statistically significant differences between both groups, with a higher incidence of chronic AHT in the case cohort (Fisher's test: 8.58, $p<0.05$) in the first decade after pregnancy with PE with a relative risk (RR) of 5.33. Of the analysed factors that could influence on the risk of chronic AHT after PE, BMI>30 is the most relevant, and contrary to what we would expect to find in the analysis of our variables, no influence was observed for smoking, diabetes, twin gestation and the use of assisted reproduction techniques as predictors of chronic AHT in pregnant women with PE. Nor has it found any association between early/late PE or gestational age at PE diagnosis with the development of chronic AHT in the group of pregnant women with PE. Our results also suggest that PE in multiparous women reflects a higher risk of subsequent HTN than in nulliparous women. On the other hand, we observed that pregnant women with PE with higher diastolic blood pressure (DBP) in the 1st and 2nd trimester had higher incidence of chronic AHT during the follow up, so, an association could be established between DBP values and the subsequent development of chronic AHT in pregnant women with PE.

Conclusion

It is shown that the inclusion of a history of PE during pregnancy should be considered a significant risk factor for developing AHT in the long termand could be useful in predicting the risk of CVD in women with such a history. Our results corroborate the hypothesis and show an RR in the range of that published in the literature. Of the potential risk factors for developing chronic AHT in patients with PE, those that seem most relevant, but require confirmation, are PE in women with BMI>30, multiparous women and/or those having somewhat elevated DBP within the normal range in the first and second trimester.

Variables	PE group	Control group	
	$\bar{X}$ ± STD (range)	$\bar{X}$ ± STD (range)	Statistical significance
Age	33,46 ± 4, 88 (19-42)	33,10 ± 4,97 (19-42)	NS
BMI	27,25± 5'84 (18-38)	24,5± 5,21 (19-44)	p<0,05
	N (%)	N (%)	Statistical significance
Nulliparous	23 (65,7)	46(65,7)	NS
Multiparous	12 (34,3)	24 (34,3)	NS
Total	35(100)	70(100)	
Prevalence of smokers	6(17,1)	7(10)	NS
Prevalence of pregestational DM	1(2,86)	1(1,43)	NS
Diagnosed cases of gestational diabetes	4(11,43)	4(5,71)	NS
Achievement of current pregnancy by ART	4(11,43)	3(4,29)	NS
Cases with twin gestation	6(17,14)	1(1,43)	p<0,05
History of PE in previous pregnancy	1 (2,86)	0 (0,0)	-

	PE GROUP	DEGREE OF PREMATURITY
WEEKS	N (%)	
<28	1(4,35)	Extrem premature
28-31	7(30,43)	Severe premature
32-33	2(8,70)	Moderate premature
34-36	13(56,52)	Mild premature
≥ 37	12(34,29)	Term gestation

Variables	PE group	Incidence with respect to the total number of deliveries attended in the study period (n=2228
	N (%)	(1,57)
Early PE	11 (31,43)	-
Late PE	24(68,57)	-
total	35(100)	
Severe PE	19(54,29)	-
Mild PE	16(45,71)	-
total	35(100)	
Cases with Hellp syndrome	2(5,71)	-
Cases with Eclampsia	3(8,57)	-
	$\bar{X}$ ± STD (range)	
GA at diagnosis of PE	34,66 ± 3,52 (27-39)	-

	PE GROUP	CONTROL GROUP	DEGREE OF PREMATURITY
WEEKS	N (%)	N (%)	
<28	1(5,56)	1(33,33)	Extrem premature
28-31	4(22,22)	0	Severe premature
32-33	5(27,78)	0	Moderate premature
34-36	8(44,44)	2(66,67)	Mild premature
≥ 37	17(48,57)	68(97,14)	Term gestation
Variables	PE GROUP	CONTROL GROUP	
	$\bar{X}$ ± STD (range)	$\bar{X}$ ± STD (range)	*Statistical signficance*
SBP 1	115,51 ± 11,54(86-131)	106,57 ± 12,02 (87-133)	p<0,05
DBP 1	70,97± 9'99 (90-50)	62,48 ± 8,11(80-45)	p<0,05
SBP 2	119,4 ± 15'65 (180-94)	106,69 ± 12,56 (88-140)	p<0,05
DBP 2	71,37 ± 11,26 (58-100)	63,96 ± 6,47 (52-88)	p<0,05