



BRIEF COMMUNICATION

C-reactive protein during normal pregnancy and preeclampsia

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Received 29 November 2004; accepted 4 February 2005

KEYWORDSC-reactive protein;
Pregnancy;
Preeclampsia

Preeclampsia (PE) is a common (~7% of all pregnancies) disorder of human pregnancy in which the normal hemodynamic response is compromised. C-reactive protein (CRP) was higher in women with established PE compared to normal pregnant (NP) women [1], and no differences were found between NP and PE if CRP was measured in early pregnancy [2,3]. However, recently it was reported that elevated CRP appears to be an independent predictor of PE [4]. Therefore, the purpose of this

study was to investigate the variations of CRP in NP women and those complicated with PE.

Between April/01 and November/02 a prospective study was conducted, approved by the Bioethics Committee-Biomedical Center-Central University of Ecuador. There were 278 healthy pregnant women included, primigravidae, <25 years old, and attending to the “Hospital Gineco Obstetrico Isidro Ayora” in Quito, Ecuador.

From week 16 to 36 all women had a careful obstetrical control and blood sample withdrawal every four weeks and then every two weeks up to

Table 1 Characteristic of women studied

	Normal pregnancy (n = 183)	Preeclampsia (n = 24)	p
Age (years)	21.2 ± 3.1	21.1 ± 2.9	NS
SBP (mm Hg)	105.6 ± 10.9	143.2 ± 6.3	<0.0001
DBP (mm Hg)	67.4 ± 9.0	95.0 ± 5.8	<0.0001
Proteinuria (mg/24 h)	—	570 ± 190.2	
Delivery (weeks)	38.6 ± 2.2	36.8 ± 2.7	0.0004
Newborn weight (g)	2941 ± 455	2737 ± 297	0.03

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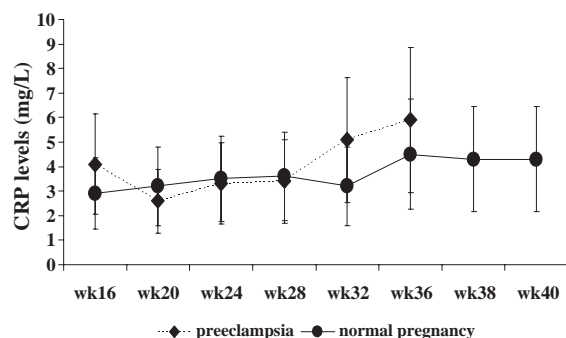


Figure 1 Evolution of C-reactive protein levels in women with normal pregnancy and those who developed preeclampsia.

delivery. High sensitivity latex C-reactive protein was measured by immunoturbidimetry (Roche Diagnostics, Switzerland), and PE was defined as a blood pressure $>140/90$ mm Hg and proteinuria >300 mg/dl.

Two hundred and seven women completed the study and 24 developed PE (11.6%; Table 1).

CRP in NP women increased from week 16 to 28 (2.9 ± 2.5 vs. 3.6 ± 2.3 mg/l, $p=0.003$), and dropped at week 32 (3.2 ± 2.2 mg/l, $p=0.05$). Then CRP increased up to delivery (4.3 ± 2.5 mg/l, $p<0.0001$; Fig. 1).

In women who developed PE, CRP was lower at week 20 compared to 16 (2.6 ± 2.8 vs. 4.1 ± 3.8 mg/l, $p=0.06$), but then it recovered at week 24 (3.3 ± 2.0 mg/l, pNS). Later CRP was increasing until week 32 (5.1 ± 2.5 mg/l, pNS), and up to delivery (5.9 ± 2.2 mg/l; $p=0.02$).

CRP was different between PE and NP at week 32 (5.1 ± 2.5 vs. 3.2 ± 2.2 mg/l, $p=0.0007$), and delivery (5.9 ± 2.2 vs. 4.3 ± 2.5 mg/l, $p=0.001$), but not at week 16 (4.1 ± 3.8 vs. 2.9 ± 2.5 mg/l, $p=0.07$).

Using the average value of CRP in NP at week 16 (2.9 mg/l) as a cut-off point, we did not find any risk for developing PE (RR=1.09, IC 95% 0.9–1.2). This follow up study demonstrates that women who developed PE increased CRP until delivery more than those with NP. However, CRP measured at week 16 is not a predictor for development of PE.

Acknowledgments

ET was a grantee of a PhD studentship from “Fundación para la Ciencia y la Tecnología”, FUNDACYT, Ecuador. Financial Support: Sustainable Science Institute (SSI).

References

- [1] Teran E, Escudero C, Moya W, Flores M, Vallance P, Lopez-Jaramillo P. Elevated C-reactive protein and pro-inflammatory cytokines in Andean women with preeclampsia. *Int J Obstet Gynecol* 2001;75:243-9.
- [2] Dyurovic S, Clausen T, Wargeland R, Brosstad F, Berg K, Henriksen T. Absence of enhanced systemic inflammation response at 18 weeks of gestation in women with subsequent pre-eclampsia. *Br J Obstet Gynaecol* 2002;109:759-64.
- [3] Savvidou MMd, Lees CC, Parra M, Ignoran AD, Nicolaides KH. Levels of C reactive protein in pregnant women who subsequently develop preeclampsia. *Br J Obstet Gynaecol* 2002;109(3):297-301.
- [4] Qiu C, Luthy DA, Zhang C, Walsh SW, Leisenring WM, Williams MA. A prospective study of maternal serum C-reactive protein concentrations and risk of preeclampsia. *Am J Hypertens* 2004;17:154-60.