



Early onset preeclampsia in subsequent pregnancies correlates with early onset preeclampsia in first pregnancy



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ABSTRACT

Objective: Preeclampsia is a major complication of pregnancy and its occurrence in a first pregnancy is a major risk factor for recurrence in subsequent pregnancies. Whether the time of onset or the severity of preeclampsia in a first pregnancy is associated with the incidence of recurrent preeclampsia is not clear. We performed a retrospective study to analyse the incidence of recurrent preeclampsia and associations of the time of onset and the severity of preeclampsia between first preeclampsia and recurrent preeclampsia.

Study design: Ninety-two women with previous preeclampsia who had a second pregnancy in a 4 year period were included. Data on the first and second pregnancies were obtained and included maternal age, maternal height and weight, gestation week at onset of preeclampsia and at delivery, blood pressure, proteinuria, interval between pregnancies and birth weights.

Results: Fifty-five women with previous preeclampsia developed recurrent preeclampsia (59.8%). The difference in the incidence of recurrent early and late onset preeclampsia was not significant different (65.3% versus 53.4%, $p > 0.05$). The difference in the incidence of mild or severe disease in those who experienced recurrent preeclampsia was also not significant (59.6% versus 60%, $p > 0.05$). The severity of preeclampsia in second pregnancy was not associated with the severity of preeclampsia in first pregnancy. However 93.7% women with previous early onset preeclampsia developed early onset preeclampsia in second pregnancy and 56.5% women with previous late onset preeclampsia developed early onset preeclampsia in second pregnancy. In addition, 76.2% women with previous mild preeclampsia developed severe preeclampsia in second pregnancy. The baby weight in recurrent preeclampsia was significantly decreased compared to that in first pregnancy with preeclampsia.

Conclusion: Our data demonstrate that there was no association between the incidence of recurrent preeclampsia and the time of onset or severity of preeclampsia in first pregnancy. But our data here may suggest that women with early onset preeclampsia in first pregnancy are more likely to experience early onset preeclampsia in second pregnancy. The severity of recurrent preeclampsia is increased regardless the severity in first pregnancy.

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Introduction

Preeclampsia is a placental specific disorder that becomes clinically apparent after 20 weeks of gestation or within the first 4–6 weeks postpartum. Preeclampsia can affect both the mother and the unborn baby and is estimated to affect between 5 and 8% of

healthy pregnancies [1]. It is responsible for about 76,000 maternal deaths and 500,000 infant deaths per year [2]. The clinical symptoms and signs of preeclampsia are high blood pressure, proteinuria, sudden weight gain, headaches, swelling and blurred vision and risk of eclampsia in addition to fetal complications including growth restriction and stillbirth. Although the pathogenesis of preeclampsia is not fully understood, it is widely accepted that both maternal and placental factors contribute to the pathogenesis of this disease. It is primarily a disease of endothelial activation, inflammation, vasoconstriction and multi-organ damage. Maternal risk factors at antenatal include maternal age, parity, previous preeclampsia, multiple pregnancy, body mass index (BMI) and pre-existing

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medical conditions such as antiphospholipid antibodies syndromes [3], and chronic hypertension or renal disease. Of these risk factors, women with previous preeclampsia, particularly if the onset had been before the third trimester have seven times the risk of developing preeclampsia in a second pregnancy suggesting previous preeclampsia is the single largest risk factor for developing recurrent preeclampsia [4].

Although there are not many studies looking at the incidence of recurrent preeclampsia in subsequent pregnancies, studies showed that the incidence of recurrent preeclampsia is around 13 to 65% depending on the time of onset and the severity of preeclampsia in the first pregnancy [5–7]. It has also been suggested that there are geographical variations in incidence of preeclampsia [5–7]. To reduce the risk of recurrent preeclampsia, there is growing evidence suggesting that low dose aspirin, calcium or possibly folic acid supplementation may have some benefits for women who suffered preeclampsia in a previous pregnancy. Most previous studies have focused on the incidence of recurrent preeclampsia and potential risk factors for this in subsequent pregnancies in women with a prior history of the condition [3,4,8,9]. Whether the time of onset or the severity of preeclampsia in first pregnancy is associated with the incidence of recurrent preeclampsia is far from clear. In addition, only a few studies have compared women with previous preeclampsia who developed recurrent preeclampsia with who did not develop recurrent preeclampsia. China instituted a “one child policy” at the end of the 1970s, however after 30 years of strict enforcement, recently it has become apparent that there has been relaxation in the application of that policy. Therefore we undertook this study to analyse the incidence of recurrent preeclampsia in subsequent pregnancies in women with a history of preeclampsia and to define the potential maternal risk factors for recurrent preeclampsia.

Material and methods

Study population

This retrospective study was performed at a university teaching hospital serving a diverse urban and rural population of around 8 million in China. Data on 92 primiparous women with previous preeclampsia was collected from Department of Obstetrics and Gynaecology, First Hospital of Xian, Jiaotong University of China from January 2008 to December 2012. Data recorded included maternal age, maternal height and weight, gestation at presentation of preeclampsia, gestation at delivery, blood pressure on admission, proteinuria, baby weight, interval between two pregnancies (live birth), partner information (whether changed the partners in second pregnancy), and delivery modes in the first and second pregnancies. All women were non-smoking and had no family history of preeclampsia. In the second pregnancy, all patients received treatment with calcium supplementation after 12 weeks gestation. Of the 92 primiparous women, 55 women developed recurrent preeclampsia.

Preeclampsia was defined as a maternal systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg measured on two occasions separated by at least 6 h, and proteinuria >300 mg on a 24 h urinary collection or qualitatively, $>1+$, after 20 weeks of gestation following the guidelines of the International Society for the Study of Hypertension in Pregnancy (ISSHP) [10]. Maternal systolic blood pressure ≥ 160 mmHg and/or diastolic blood pressure ≥ 110 mmHg on admission was defined as severe preeclampsia. Early onset preeclampsia was defined as occurring at less than 34 weeks. Body mass index (BMI) was calculated as the ratio of maternal weight and height (kg/m^2) at the first booking visit (around 12 weeks of gestation). According to the WHO classification of BMI for Asian/Indian women, the BMI for normal,

overweight and obese is $18.5\text{--}22.9$ kg/m^2 , $23\text{--}27.4$ kg/m^2 and greater than 27.5 kg/m^2 , respectively.

Statistical analysis

The statistical differences in maternal age, gestation week at presentation or delivery in the first pregnancy or second pregnancy, and birth weight, and BMI between women with recurrent preeclampsia and without recurrent preeclampsia were assessed by Mann–Whitney *U*-test using Prism software package. The statistical differences in the incidence of recurrent preeclampsia in relationship to the severity or the time of onset of preeclampsia between recurrent preeclampsia and no recurrent preeclampsia were assessed by a Fisher's exact test using Prism software. *p*-Values of <0.05 were considered significant.

Results

There were 1252 women who developed preeclampsia from January 2008 to December 2012 in the Department of Obstetrics & Gynaecology, First Hospital of Xian, Jiaotong University. Of these, 92 primiparous women with previous preeclampsia had subsequent pregnancies and of these, 55 women developed recurrent preeclampsia. The incidence of recurrent preeclampsia was 59.8%.

The general clinical characteristics of the women with previous preeclampsia ($n = 92$) are summarised in Table 1. In the first

Table 1

The clinical characteristics of the women with preeclampsia and recurrent preeclampsia.

	Women with or without recurrent preeclampsia	
	Recurrent PE (N=55)	No recurrent PE (N=37)
Characteristics of the first pregnancy (N=92)		
Maternal age (years, median/range)	25 (21–37)	25 (19–33)
Gestation week at presentation	32 (18–41) [*]	35 (26–42)
Gestation week at delivery (median/range)	36 (23–41)	36 (32–42)
Baby weight (g, median/range)	3073 (1345–3865)	3201 (2015–3810)
Systolic BP (mmHg, median/range)	160 (140–185)	160 (140–200)
Diastolic BP (mmHg, median/range)	100 (90–110)	100 (90–130)
Proteinuria	+–+++	+–+++
Stillbirth	2 (3.6%)	1 (2.7%)
Body mass index (BMI)	24.13 (20.32–30.39) [*]	22.04 (19.92–24.13)
Delivery model		
Vaginal delivery (number of women)	13	5
Caesarean section (number of women)	42	32
Characteristics of the second pregnancy (N=92)		
Maternal age (years, median/range)	32 (20–40)	27 (22–36)
Gestation week at presentation	34 (18–41)	N/A
Gestation week at delivery (median/range)	35 (24–41) [*]	39 (36–41)
Baby weight (g, median/range)	2778 (1513–3446) ^{*#}	3276 (2715–3655)
Systolic BP (mmHg, median/range)	165 (130–220) [*]	125 (110–135)
Diastolic BP (mmHg, median/range)	110 (90–140) [*]	75 (65–85)
Proteinuria	+–+++	Negative
Stillbirth	2 (3.6%)	0
Body mass index (BMI)	23.53 (19.95–29.14) [*]	21.63 (19.72–25.15)
Time interval between pregnancies (years)	4 (1–16) [*]	3 (1–6)
Delivery model		
Vaginal delivery (number of women)	18	3
Caesarean section (number of women)	37	34

^{*} $p < 0.05$, Women who developed recurrent preeclampsia versus women who did not develop recurrent preeclampsia.

[#] $p = 0.03$, baby weight in first pregnancy versus in second pregnancy in women who developed recurrent preeclampsia.

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