

Research Article

Progesterone Serum Level in-Labor Women does not Differ with not in-Labor Women

Kadar Serum Progesteron pada Perempuan Inpartu tidak Berbeda dengan Kadar pada Perempuan yang tidak Inpartu

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Abstract

Objectives: To find out the relation of serum progesterone level between patients in-labor and pregnant patients not in-labor.

Methods: This was an analytic cross-sectional study, comparing serum progesterone level between in-labor gravida and not in-labor gravida. Subjects were in-labor gravida (n=21) and not in-labor gravida (n=24) admitted to Sanglah Hospital from April to August 2011. The data were analyzed by SPSS 16.0. Independent sample t-test and Fisher's exact test were used.

Results: Mean serum progesterone level were 214.90±92.06 in-labor gravida and 190.69±76.02 not in-labor gravida (t = 0.966 and p = 0.399).

Conclusions: There is no difference in serum progesterone level between in-labor and not in-labor pregnant women.

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Keywords: labor, progesterone, progesterone withdrawal

Abstrak

Tujuan: Untuk mengetahui hubungan kadar serum progesteron dengan perempuan hamil inpartu dan tidak inpartu.

Metode: Dilakukan suatu penelitian cross sectional di mana dilakukan pengukuran kadar progesteron perempuan hamil, dibandingkan pada yang inpartu dan tidak inpartu. Kadar progesteron diukur pada 45 ibu hamil dengan usia kehamilan > 28 minggu. Penelitian dilaksanakan di ruang bersalin dan poliklinik 108 bagian diperiksa Kebidanan dan Kandungan RSUP Sanglah Denpasar dari bulan April sampai bulan Agustus 2011. Kadar serum progesteron diperiksa di Laboratorium RSUP Sanglah. Data dianalisis dengan SPSS 16.0. Uji analisis yang digunakan adalah independent sample t-test dan Fisher'S Exact Test, dengan nilai p < 0,05 dianggap bermakna secara statistik.

Hasil: Didapatkan rerata kadar serum progesteron kelompok inpartu adalah 214,90±92,06 dan rerata kelompok tidak inpartu adalah 190,69±76,02. Analisis kemaknaan dengan uji t-independent menunjukkan bahwa nilai t = 0,966 dan nilai p = 0,399. Hal ini berarti bahwa rerata kadar serum progesteron pada kedua kelompok tidak berbeda (p > 0,05).

Kesimpulan: Berdasarkan hasil penelitian didapatkan simpulan sebagai berikut: Kadar serum progesteron perempuan hamil inpartu tidak berbeda bermakna dibandingkan dengan yang tidak inpartu.

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Kata kunci: inpartu, pelucutan progesteron, progesteron

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INTRODUCTION

The essential role of progesterone in the maintenance of pregnancy is already accepted. Its withdrawal is required to activate the myometrium, initiate labor and be a prerequisite of pregnancy termination. But the mechanisms that suppress progesterone's function to allow labor and delivery are still shrouded in uncertainty.¹⁻⁴

In 1977, Csapo argued "if progesterone is indispensable in normal pregnancy maintenance, then progesterone withdrawal has to be a prerequisite of pregnancy termination".⁵⁻⁷

In 1994 Challis and Lye established that plasma progesterone level do not decrease before labor and decline only after delivery of the placenta. This apparent paradox has spawned the concept of "functional progesterone withdrawal". But the intimate mechanisms that underlie this key process of human parturition remain unknown. Based on the background, the purpose of this study is to find out the relation of serum progesterone level between in-labor gravida and not in-labor gravida.⁵⁻⁸

METHOD

A cross sectional analytic study with samples collected consecutively conducted from April 2011 to August 2011 at the obstetrics and gynecology emergency room and outpatient clinic of Sanglah General Hospital, Denpasar, Bali, Indonesia. The study population was pregnant women with gestational age above 28 weeks that check-up at Sanglah General Hospital. The requirement of the sample is minimum of 42 women, consisting of a minimum 21 in-labor gravida and 21 not in-labor gravida. All of the study sample are managed in accordance with the Obstetrics and Gynecology Department of the Udayana University/Sanglah General Hospital Denpasar guidelines therapy. The steps undertaken in this study were: anamnesis, physical examination, work-up diagnostic and examination of progesterone serum.

Examination of the serum progesterone was performed by drawing 5 cc blood from the cubiti vein and inserting it into a plain tube. Plain tube was labeled with the patient's identity and the sequence number and then performed centrifugation 3,000 rpm for 10 min to obtain the serum. Then the serum was diluted until 1/8 of the concentration and then taken and inserted as much as 200 μ l to the container that has been provided in the kit of the Vidas Progesterone. Progesterone kit that has been filled with the serum sample is introduced into the machine from Biomerieux. Once processed it would automatically display the value of serum progesterone levels on the machine display. The value that appeared on the display screen is then multiplied by eight. This process was done at the Clinical Pathology of Sanglah General Hospital, Denpasar.

All statistical analysis were conducted on SPSS for windows 16th version. Normality of the data was examined using the Shapiro Wilk test and the homogeneity test using the Levene test. Comparability of the characteristics between in-labor gravida and not in-labor gravida using the Chi-Square test.

RESULT

Results obtained from 45 women who meet the inclusion and exclusion criteria, consisted of 21 in-labor gravida and 24 not in-labor gravida. Based on the analysis, we found there was a insignificant differences between groups on the age, parity and

abortion variables ($p>0.05$). While on the gestational age variable there was significant difference ($p<0.05$). The mean levels of serum progesterone for in-labor group was 214.90 ± 92.06 and not in-labor group was 190.69 ± 76.02 . Analysis of significance with t-independent test showed that the difference of mean serum progesterone levels in both groups was not significantly different ($p>0.05$).

Table 1. Subject Characteristic between Groups Variable age, parity, gestational age dan miscarriage history

Variable	In Labor		Not In Labor		p
	n	(%)	n	(%)	
Age (yrs)					
< 20	0	(0.0)	1	(4.2)	0.633
20 - 35	17	(81.0)	19	(79.2)	
35	4	(19.0)	4	(16.7)	
Parity					0.202
Nulipara	13	(61.9)	19	(79.2)	
Multipara	8	(38.1)	5	(20.8)	
Gestational Age (wks)					0.023
< 37	3	(14.3)	11	(45.8)	
\geq 37	18	(85.7)	13	(54.2)	
Miscarriage History					0.195
0	15	(71.4)	15	(71.4)	
1	4	(19.0)	4	(19.0)	
2	2	(9.5)	2	(9.5)	

Table 2. Comparison of Serum Progesterone Level between in Labor and not in Labor

Subject Group	n	Mean	SD	p
In Labor	21	214.90	92.06	0.339
Not In Labor	24	190.69	76.02	

DISCUSSION

From the study, we found in significant differences between both groups on the age, parity and miscarriage history variable. This means that age, parity and miscarriage history variable has no effect on serum levels of progesterone, so that its influence is negligible.

But on gestational age variable there was significant difference between groups. On the gestational age variable less than 37 weeks, there were 3 people (14.3%) in in-labor group and 11 people (45.8%) in not in-labor group, whereas on gestational age greater than or equal to 37 weeks, there were 18 people (85.7%) in in-labor group and 13 people (54.2%) in not in-labor group. Based on the analysis, we found that both groups differ signifi-

cantly ($p < 0.05$). This is consistent with the theory in which the serum progesterone levels continue to rise and decline after the placenta is born. The older the mean gestational age, the higher the levels of serum progesterone.

The mean levels of progesterone serum in in-labor group was 214.90 ± 92.06 and in not in-labor group was 190.69 ± 76.02 . Analysis of significance with t-independent test showed that the mean progesterone serum levels in both groups was not significant ($p > 0.05$). Progesterone serum levels did not differ in in-labor and not in-labor gravida. This fits with the Challis and Lye theory in 1994, which stated that plasma progesterone levels do not decrease before labor and decline only after delivery of the placenta.

The different is in the amount of progesterone receptors, instead of the serum progesterone levels. The fact that progesterone level do not fall at term in humans, raising the paradox as to how labor can occur under the continued influence of progesterone, which this has spawned the concept of functional progesterone withdrawal. Functional progesterone withdrawal theory states that human labor is not induced by the fall of systemic progesterone levels but by decreased progesterone receptors.^{8,9}

Functional progesterone withdrawal mediated by increased myometrial expression of PRA, in this case PRB is relatively decreased, where PRB mediates the progesterone action in the myometrium. Decrease in this receptor that could explain why the initiation of labor may occur despite serum progesterone levels remain high. Then Functional progesterone withdrawal induces functional estrogen activation by means of increased myometrial ER α expression. Functional estrogen activation with circulating estrogen increases CAP expression and uterotonin production that transform uterus to a contractile phenotype that will lead to the process of labor.^{8,9}

During human pregnancy, progesterone may not only suppress expression of CAP genes directly involved with myometrial contractility but also diminish the myometrial responsiveness of the myometrium to the estrogenic drive. This would explain why the myometrium is refractory to estrogenic drive for most of the pregnancy. Early in the parturition cascade myometrial PRA expres-

sion increases leading to a decrease in genomic progesterone responsiveness due to a repression of PRB transcriptional activity. The gradual inhibition of PRB mediated progesterone actions removes the inhibition of ER α expression leading to a concomitant increase in ER α expression levels, which would allow circulating estrogens to increase expression of CAP genes and transform the uterus to a contractile phenotype.^{8,9}

CONCLUSION AND SUGGESTION

From this study it can be concluded that there is no significant difference in the serum progesterone between in-labor and not in-labor women. Further research is needed to investigate more about progesterone receptor (PR) and to find out whether the progesterone serum level does decrease in women who had delivered the placenta.

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