Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr ICV 2018= 82.06

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Evaluation of Association of Serum Human Chorionic Gonadotrophin level with Early Pregnancy Failure

Kanika Agarwal, Mridula Sharma

Department of Obstetrics & Gynaecology, Rajshree Medical Research Institute, Bareilly, Uttar Pradesh, India

***ABSTRACT*:**

Background: Early pregnancy failure (EPF) is a common event in human pregnancy, accounting for 10–20% of recognized pregnancies. The present study was conducted to determine association of serum hCG level with Early pregnancy failure. **Materials & Methods:** The present study was conducted on 228 asymptomatic pregnant women with a gestation of 6 to 16 weeks reported to the department. Patients were followed upto 20 weeks or EPF was diagnosed by ultrasound scanning. Measurement of serum HCG was performed using the Siemens Immulite 2000 and results were expressed as mIU/ml. Mean hCG level in women with EPF <10 days was 40225.2 mIU/ml. Women with EPF 10-20 days was 44682.7. The mean hCG level in women with EPF >20 days was 65327.8. The mean hCG level in women without EPF was 92114.5. The difference was significant (P< 0.05). **Results:** The mean hCG in women with EPF was 451563.4 mIU/ml and in women without EPF was 92144.5 mIU/ml. The difference was significant (P< 0.05). We observed that mean hCG level in women with EPF <10 days was 40225.2 mIU/ml. Women with EPF 10-20 days was 44682.7. The mean hCG level in women with EPF >20 days was 65327.8. The mean hCG level in women without EPF was 92114.5. The difference was significant (P< 0.05). **Conclusion:** There was low level of hCG in women with EPF than women without EPF.

Key words: Early pregnancy failure, hCG, Women, EPF.

Received: 24 March, 2019 Revised: 28 April, 2019 Accepted: 29 April, 2019

Corresponding Author: Dr. Mridula Sharma, Department of Obstetrics & Gynaecology, Rajshree Medical Research Institute, Bareilly, Uttar Pradesh, India

This article may be cited as: Agarwal K, Sharma M. Evaluation of Association of Serum Human Chorionic Gonadotrophin level with Early Pregnancy Failure. J Adv Med Dent Scie Res 2019;7(7): 152-155.

INTRODUCTION

Early pregnancy failure (EPF) is a common event in human pregnancy, accounting for 10–20% of recognized pregnancies. Early pregnancy loss is defined as a nonviable, intrauterine pregnancy with either an empty gestational sac or a gestational sac containing an embryo or fetus without fetal heart activity within the first 12 6/7 weeks of gestation.[1] In the first trimester, the terms EPF, spontaneous abortion, and early pregnancy loss are used interchangeably, and there is no consensus on terminology in the literature. EPF is defined as spontaneous pregnancy loss prior to 24 weeks of gestation..[1] However, later during gestation, other causes of EPF, such as placental insufficiency, intrauterine infection, and thrombosis, become more common. Abnormal placentation (placental development) is found in two-thirds of cases of EPF.[2]

Progesterone and human chorionic gonadotrophin (hCG) are the most common serum markers for assessing pregnancy viability when ultrasound findings are inconclusive. Progesterone, initially from the corpus luteum, is essential for maintaining early pregnancy. HCG, from villous trophoblast, supports luteal progesterone production, and facilitates the shift of progesterone and oestradiol production to the placenta around 8–9 weeks of pregnancy. The purpose of this hormone is to prepare body to continue to produce progesterone, which prevents menstruation from occurring. This protects the endometrial uterine lining and pregnancy.[3] Standard hCG levels vary quite massively from woman to woman. This is because hCG levels really depend on what is normal for patient, how female body responds to pregnancy, as well as how many embryos patient is carrying. The way a woman's

body reacts to pregnancy is entirely unique. In early pregnancy, hCG levels usually double every two to three days. Interestingly, when the measurements start off high they don't expand at the same rate. If they start off more slowly, the increase ends up happening much quicker.[4]
Few studies have explored the hormonal environment antecedent to symptoms of Early pregnancy failure. The present study was conducted to determine association of serum hCG level and Early pregnancy failure.

MATERIALS & METHODS

The present study was conducted in the department of Obstetrics & Gynaecology, Rajshree Medical Research Institute, Bareilly, Uttar Pradesh, India to evaluate association of serum human chorionic gonadotrophin level with Early pregnancy failure. It comprised of 228 asymptomatic pregnant women with a gestation of 6 to 16 weeks reported to the department. Equal number of control was also included. All were informed regarding the study. Ethical approval was obtained from institute prior to the study.
General information such as name, age, gender etc. was recorded. Patients were followed upto 20 weeks or EPF was diagnosed by ultrasound scanning. Measurement of serum HCG was performed using the Siemens Immulite 2000 and results were expressed as mIU/ml. Data was entered into a master sheet and necessary statistical tables were constructed. To test hypothesis, tests like Chi square test and Odds ratio were used. P value less than 0.05 was considered significant.

RESULTS

Table I Analysis of the HCG among patients

hCG (mIU/ml)	Women with EPF	Women without EPF	P value
	Mean	Mean	
	451563.4	92144.5	0.02

Table I, graph I shows that mean hCG in women with EPF was 451563.4 mIU/ml and in women without EPF was 92144.5 mIU/ml. The difference was significant (P< 0.05).

Graph I HCG among patients

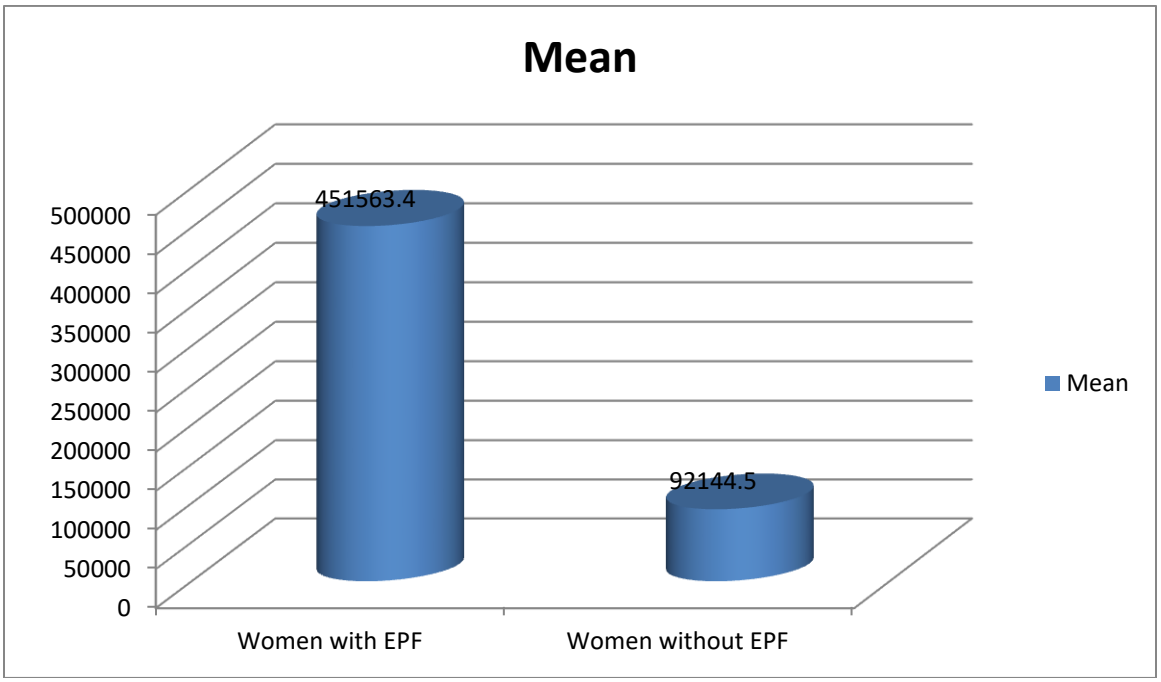
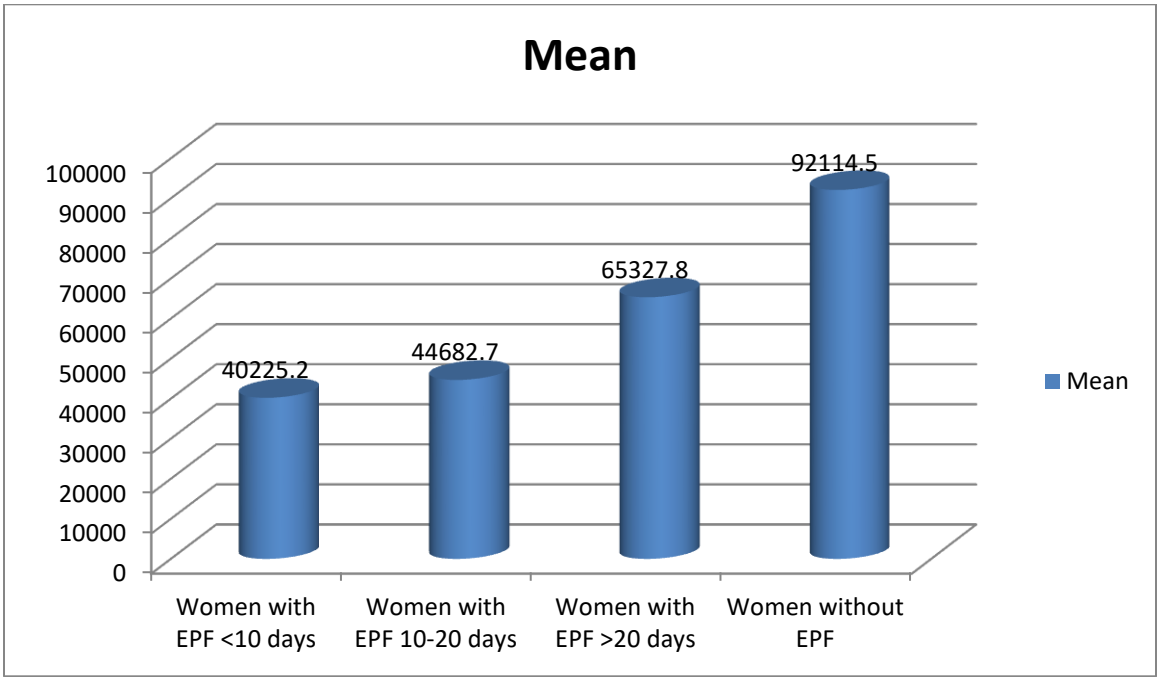


Table II Serum hCG level in different time of EPF

Groups	Mean	P value
Women with EPF <10 days	40225.2	0.04
Women with EPF 10-20 days	44682.7	
Women with EPF >20 days	65327.8	
Women without EPF	92114.5	

Table II, graph II shows that mean hCG level in women with EPF <10 days was 40225.2 mIU/ml. Women with EPF 10-20 days was 44682.7. The mean hCG level in women with EPF >20 days was 65327.8. The mean hCG level in women without EPF was 92114.5. The difference was significant (P< 0.05).

Graph II Serum hCG level in different time of EPF



DISCUSSION

The World Health Organization defines a biomarker as 'any substance, structure or process that can be measured in the body or its products and influence or predict the incidence of outcome or disease'. In early pregnancy, the most commonly used biomarkers to predict outcome have been maternal serum human chorionic gonadotrophin (hCG) and progesterone. Maternal serum hCG and in particular its subunit β-hCG is the most widely available biomarker used in routine clinical practice for the assessment of women with suspected early pregnancy complications. β-hCG level is directly related to the amount of active villous trophoblast, which doubles every 1.4–1.6 days from the time of first detection to day 35 of pregnancy, and then every 2.0–2.7 days until day 42 of pregnancy.

Women affected by EPF not only suffer devastating emotional consequences but are also at increased risk of developing serious antenatal morbidities such as preeclampsia and preterm delivery during subsequent pregnancies.[5] Therefore it is important to developed simple and safe test to identify pregnancies at high risk of EPF, because this could improve the diagnostic accuracy and potentially improve obstetric outcomes. Although it is clear that low levels of hCG around days 12–16 after conception (fourth week of gestation) are associated with preclinical early pregnancy loss, the precise relationship between early hCG levels and clinical (later) EPF remains uncertain.[6] Previous studies have generally grouped clinical EPFs with preclinical early pregnancy loss and ectopic pregnancies as a single outcome and have not separated twins from the analysis. Twins would introduce a significant bias because they are associated with higher early hCG levels and rates of clinical EPF may be different from those of singletons.[7] The present study was conducted to determine association of serum hCG level with EPF in early pregnancy.

In this study we found that mean hCG in women with EPF was 451563.4 mIU/ml and in women without EPF was 92144.5 mIU/ml. The difference was significant (P< 0.05).

Buchmayer et al[8] conducted a retrospective study of 1,054 women who underwent in vitro fertilization and achieved an ultrasound-confirmed live singleton pregnancy with cardiac activity. The incidence of EPF diagnosed at 8–19 weeks +6 days of gestation was estimated in these 3 subgroups according to their hCG concentrations at day 16 after conception: less than the 25th, 25th–75th, and more than the 75th percentiles. The overall incidence of EPF was 11.1% (117/1,054), and the median gestational age at diagnosis was 10 weeks and 4 days. The median (95% confidence interval) day 16 hCG level in the EPF group was 182 mIU/mL (157–211), significantly lower than the median level in those who had an ongoing pregnancy (223 mIU/mL [213–233], P < .003). There was an increasing risk of EPF associated with decreased hCG levels (8.0% at > 75th percentile; 9.9% at 25th–75th percentiles; 16.7% at < 25th percentile.

We observed that mean hCG level in women with EPF <10 days was 40225.2 mIU/ml. Women with EPF 10-20 days was 44682.7. The mean hCG level in women with EPF >20 days was 65327.8. The mean hCG level in women without EPF was 92114.5. The difference was significant (P< 0.05).

Bhattacharya et al[9] found that the median level for hCG was 87351.00 mIU/ml (range 12836.00 - 269800.00). The mean level of serum hCG in women without EPF (N=165) 97137.53±53745.46 mIU/ml and women with EPF (N=13) 48725.31±21933.20 mIU/ml (P<0.002). Further distribution of women with EPF (N=13) according to time to diagnosis (days) into three group [<10days (N=3) 44016.67±28495.53, 10-20days (N=8)45903.25±21413.01,>20days (N=2) 67076.50± 11636.86].

Puget et al conducted a study to assess the value of serial hCG and progesterone serum level in the diagnosis of early pregnancy viability. The diagnosis value of serial plasmatic hCG levels on the first day and 48 h after as well as the initial progesterone level were evaluated to diagnose pregnancy viability. They concluded that serial hCG levels alone permitted an early viability diagnosis within 48 h for 41.1% of patients with PUV (pregnancy of uncertain viability) instead of 7 to 14 days with TVS (transvaginal ultrasound scan).[10] The serial measurement of serum hCG concentrations is an important clinical tool used to differentiate normal from abnormal pregnancies. At hCG values below which ultrasonography can be diagnostic, the comparison of a patient's hCG dynamics to those of established expected curves of rise or fall can aid the clinician in determining when to follow expectantly and when to intervene. Still, this method has some limitations and should never supersede clinical judgment based on symptoms or signs.[2]

CONCLUSION

Authors found that there was low level of hCG in women with EPF than women without EPF.

REFERENCES

1. Barnhart KT. Early Pregnancy Failure: Beware of the Pitfalls of Modern Management. Fertil Steril. 2012 Nov; 98(5): 1061–1065.
2. Seeber B. What serial hCG can tell you, and cannot tell you, about an early pregnancy. Fertil Steril. 2012
3. Hustin J, Jauniaux E, Schaaps JP. Histological study of the materno-embryonic interface in spontaneous abortion. Placenta. 1990; 11:477-486.
4. Jauniaux E, Zaidi J, Jurkovic D, Campbell S, Hustin J. Comparison of colour Doppler features and pathological findings in complicated early pregnancy. Hum Reprod. 1994; 9:2432-2437.
5. Fournier T1. Human chorionic gonadotropin: Different glycoforms and biological activity depending on its source of production. Ann Endocrinol (Paris). 2016; 77(2):75-81.
6. Laurence A Cole. Biological functions of hCG and hCG-related molecules Reprod Biol Endocrinol. 2010; 8:102.
7. Lee C, Slade P. EPF as a traumatic event: a review of the literature and new implications for intervention. J Psychosom Res. 1996; 40:235–244.
8. Buchmayer SM, Sparen P, Cnattingius S. Previous pregnancy loss: risks related to severity of preterm delivery. Am J Obstet Gynecol. 2004; 191:1225-1231.
9. Bhattacharya S, Townend J, Shetty A, Campbell D, Bhattacharya S. Does EPF in an initial pregnancy lead to adverse obstetric and perinatal outcomes in the next continuing pregnancy? Br J Obstet Gynecol. 2008; 115:1623-1629.
10. Puget C, Joueidi Y, Bauville E, Laviolle B, Bendavid C, Lavoué V, Le Lous M. Serial hCG and progesterone levels to predict early pregnancy outcomes in pregnancies of uncertain viability: A prospective study. Eur J Obstet Gynecol Reprod Biol. 2018 Jan;220:100-105.