



### **Serial Serum Beta Hcg Levels in Second Trimester as Predictor of Placenta Previa**

<sup>1</sup>Dr Atruba Mehboob, Post Graduate, Department of Obstetrics and Gynaecology, ASCOMS and Hospital, Sidra, Jammu, Jammu and Kashmir

<sup>2</sup>Dr Sapna Puri, Professor and HOD, Department of Obstetrics and Gynaecology, ASCOMS and Hospital, Sidra, Jammu, Jammu and Kashmir

<sup>3</sup>Dr Akshita Sharma, Post Graduate, Department of Obstetrics and Gynaecology, ASCOMS and Hospital, Sidra, Jammu, Jammu and Kashmir

**Corresponding Author:** Dr Atruba Mehboob, Post Graduate, Department of Obstetrics and Gynaecology, ASCOMS and Hospital, Sidra, Jammu, Jammu and Kashmir

**How to citation this article:** Dr Atruba Mehboob, Dr Sapna Puri, Dr Akshita Sharma, “Serial Serum Beta Hcg Levels in Second Trimester as Predictor of Placenta Previa”, IJMACR- October - 2024, Volume – 7, Issue - 5, P. No. 44 – 49.

**Open Access Article:** © 2024, Dr Atruba Mehboob, et al. This is an open access journal and article distributed under the terms of the creative common’s attribution license (<http://creativecommons.org/licenses/by/4.0>). Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**Type of Publication:** Original Research Article

**Conflicts of Interest:** Nil

#### **Abstract**

**Introduction:** An anomalous placement of placenta poses a significant life threatening risk for expectant mothers. There is ongoing debate regarding early detection methods and management strategies aimed at reducing both mortality and morbidity rates. Placenta previa is the complete or partial covering of the internal os of the cervix with the placenta. It is a major risk factor for postpartum hemorrhage and can lead to morbidity and mortality of the mother and neonate. This study was conducted to assess serial serum beta hcg levels in the second trimester as a predictor of placenta previa.

**Aim of Study:** To evaluate the role of beta-human chorionic gonadotropin (B-HCG) levels in the second trimester as a marker for predicting placenta previa.

**Study Design:** This was a prospective study conducted in Acharya Shri Chander College of Medical Sciences and hospital, Sidra, Jammu from May 15, 2024 to September 15, 2024.

**Material and methods:** This study was conducted to assess the levels of B- HCG in the second trimester as a predictor of placenta previa. There were 100 women in this study belonging to the age range of 18-35 years. The mean age of the women was 26.9 years. Serum beta hcg levels were examined among these women in the second trimester. The women were explained about the procedure and were asked to give consent for further participation in the study. Those who were willing to participate and give consent had been included in the study. Patients were diagnosed on the basis of bleeding per vaginum in the second trimester for the development

of placenta previa. All patients were advised to do a routine ultrasound scan who came up with vaginal bleeding so as to confirm the presence of placenta previa.

**Results:** In this study, there were 100 women of which 12 belonged to the age group of 18-25 years, 59 belonged to the age group of 26-30 years and 29 belonged to the age group of 31-35 years. Out of 100 women, 23 women had placenta previa and were assigned to Group 2 while Group 1 consisted of 77 healthy controls. Serum Beta-HCG levels in controls was in the range of 40000 to 42000 IU and among the women of Group 1 with placenta previa, it was 2,00,000 to 2,50,000 IU.

**Conclusion:** This study showed that there is significant difference in the serum beta-HCG levels of healthy pregnant women and that of pregnant women with placenta previa. Among women with placenta previa, the serum beta-HCG levels are much higher as compared to the serum beta-HCG levels among healthy pregnant women and can be used as a predictor marker for placenta previa.

**Keywords:** Pregnancy, Placenta Previa, B-HCG

### Introduction

Placenta previa is a potentially serious condition that occurs during pregnancy when the placenta implants abnormally low in the uterus, either partially or completely covering the cervical os. This positioning can lead to various complications, including bleeding during pregnancy and delivery, putting both the mother and the baby at risk. The incidence of placenta previa varies, typically ranging from 0.5% to 1% of pregnancies, though rates may be higher in certain populations or with specific risk factors.

The pathogenesis of placenta previa involves abnormal

implantation of the placenta within the uterus, leading to its placement low in the uterine cavity, often covering the os or lying just proximal to it. More than 90% of these placentae migrate away from the cervix as the pregnancy proceeds termed as placental migration which is explained by the theory of trophotropism which means that placenta grows towards a better vascularised fundus. While the exact cause of abnormal placentation remains unclear, several factors are believed to contribute to the development of this condition:

- Impaired trophoblastic invasion and inadequate remodeling of the maternal spiral arteries during early pregnancy preventing placenta from attaching to the upper segment of the uterus.
- Uterine scarring due to prior uterine surgeries, such as, cesarean section, myomectomy, dilatation and curettage procedures. Scar may disrupt the normal vascular architecture of the uterus, increasing the likelihood of placental implantation abnormalities.
- Advanced maternal age, multiparity, assisted reproductive technologies.

Diagnosis of placenta previa is primarily achieved through ultrasound imaging. During the ultrasound examination, the sonographer carefully evaluates the location of the placenta in relation to the cervix and uterine wall. Placenta Previa is diagnosed when placenta is found to partially or completely cover the cervix. Additionally, the ultrasound can reveal the degree of placental coverage, which informs the level of risk and guides clinical decision making. In cases where placenta previa is suspected but not definitely diagnosed on routine ultrasound, additional imaging modalities such as transvaginal ultrasound (TVS) or MRI may be utilized to provide further clarity.

Human Chorionic Gonadotropin (HCG) is a

glycoprotein hormone produced by the syncytiotrophoblast cells of the placenta during pregnancy. It consists of two sub-units: An Alpha subunit, which is structurally similar to the alpha subunit of other glycoprotein hormones like Luteinising hormone, Follicle stimulating hormone, thyroid stimulating hormone, and a unique Beta subunit, which confers specificity to B-HCG. Primary function of B-HCG is to support and maintain pregnancy by promoting the production of progesterone from corpus luteum in early stages of pregnancy thereby supporting implantation and development of the embryo. It is used as a marker for [pregnancy detection and monitoring. Overall B-HCG is a multi-functional hormone critical for the establishment and maintenance of pregnancy, as well as fetal development. Its structure and functions make it an essential biomarker in obstetrics and reproductive medicine.

Prompt and accurate diagnosis of placenta previa is crucial for appropriate prenatal care and delivery planning. Early identification allows healthcare providers to monitor the condition closely, manage potential complications, and make informed decisions regarding delivery mode and timing to optimize maternal and fetal outcomes.

**Material and Methods:**

**Setting**

This study was a prospective study conducted in the Department of Obstetrics and Gynaecology, ASCOMS and hospital, Sidra, Jammu after getting approved by the Institutional Ethics Committee. There were 100 women in this study belonging to the age range of 18-35 years with the following criteria:

**Inclusion criteria**

- Age - 20- 30 years

- Intrauterine singleton pregnancy.

**Exclusion criteria**

- Denied giving consent
- Multifetal gestation
- Molar pregnancy
- Ectopic pregnancy
- Associated medical comorbidity: Diabetes mellitus, hypertension, hypothyroidism.

The mean age of the women was 26.9 years. Serum beta hcg levels were examined among these women in the second trimester. The women were explained about the procedure and were asked to give consent for further participation in the study. Those who were willing to participate and give consent had been included in the study. Patients were diagnosed on the basis of bleeding per vaginum in the second trimester for the development of placenta previa. All patients were advised to do a routine ultrasound scan who came up with vaginal bleeding so as to confirm the presence of placenta previa. It was found that out of 100 women, 23 had placenta previa. Hence, these women were divided into two groups. Group 1 consisted of healthy pregnant women and Group 2 consisted of women with placenta previa. Statistical analysis was conducted using SPSS software.

**Results**

Table 1: Age-wise distribution of subjects

Age group	Number of women	Percentage
18-25 years	12	12
26-30 years	59	59
31-35 years	29	29
Total	100	100

In this study, there were 100 women of which 12 belonged to the age group of 18-25 years, 59 belonged to the age group of 26-30 years and 29 belonged to the age group of 31-35 years.

Table 2: Group-wise distribution of subjects based on presence of placenta previa

Group	Number of women Percentage
Group 1 (Control)	77 77
Group 2 (Placenta previa)	23 23
Total	100 100

Out of 100 women, 23 women had placenta previa and were assigned to Group 2 while Group 1 consisted of 77 healthy controls.

Table 3: Average Serum Beta Human Chorionic Gonadotropin (HCG) Levels among women in second trimester

Groups	Average Serum Beta-HCG Levels (IU)
Group 1 (Control)	42000
Group 2 (Placenta previa)	2,50,000

Serum Beta-HCG levels in controls was on an average 42000 IU and among the women of Group 2 with placenta previa, it was 2,50,000 IU.

**Discussion**

Placenta Previa is defined as a condition that occurs in pregnancy when the placenta is abnormally implanted in the lower uterine segment, Partially or totally covering the internal cervical os. Complete placenta previa is when it covers the internal os, partial is when the

placenta partially covers the os, and marginal is when the placenta approaches the border of the os. The rising incidence of cesarean sections in the last 50 years is partially a causative factor to the increasing number of cases of placenta previa. Risk factors associated with an increased risk of placenta previa were advanced maternal age, grand multiparity, history of previous C/S, previous abortion, and smoking during pregnancy. This study was conducted to assess serial serum beta hcg levels in the second trimester as predictor of placenta previa.

In this study, there were 100 women of which 12 belonged to the age group of 18-25 years, 59 belonged to the age group of 26-30 years and 29 belonged to the age group of 31-35 years. Out of 100 women, 23 women had placenta previa and were assigned to Group 2 while Group 1 consisted of 77 healthy controls. Serum Beta-HCG levels in controls was 42000 IU and among the women of Group 1 with placenta previa, it was 2,50,000 IU. Murmu S et al (2020) assessed the serum beta-human chorionic gonadotropin (hCG) and serum lipid profile in the early and late trimesters of at-risk mothers and to analyze whether these parameters can be used to predict pregnancy-induced hypertension (PIH) and its time of onset. All patients were followed up till delivery and observed for the development of PIH. Results were evaluated and analyzed statistically. The incidence of PIH in their study was 14.67% (n = 27). Most of the patients had late-onset PIH (88.88%, n = 27), whereas 11.12% (n = 3) had an early onset of the disease. Of 27 patients, 6 patients developed preeclampsia and none had eclampsia. The mean beta-hCG level in the study population at the early second trimester was 91,723.97, whereas in the late second trimester, it was 22,456.25. In PIH patients, a significant increase in the level of serum

cholesterol, triglyceride, and very-low-density lipoprotein was noted in both the early and late second trimesters. Their study showed that serum beta-hCG and lipid profile in the second trimester are useful indicators to identify women who are likely to develop PIH, preeclampsia, or eclampsia. Hussein SS et al (2024) evaluated the role of beta-human chorionic gonadotropin (B-HCG) level in the first half of pregnancy as a marker for prediction of placenta previa. This is a prospective study done in Al-Yarmouk Teaching Hospital from first of January 2020 till first of January 2021. A total of 57 patients have been recruited. For all participating women in this study were sampled between 14 and 18 weeks of gestational age for serum human chorionic gonadotropins measured in international units. Patients who developed placenta previa were diagnosed on the basis of development of vaginal bleeding either late in the second trimester or early in the second trimester. After developing vaginal bleeding, all patients were sent for routine ultrasound scan to confirm the presence of placenta previa. After recruiting a total of 57 women among which 14 patients were found to have placenta previa, ANOVA test shows a statistically significant difference between women with normal placenta and women with placenta previa  $P$  value  $< 0.001$ . Receiver operator characteristics curve was constructed to evaluate the optimum cutoff value for serum HCG between normal women and women with placenta previa sampled at 14-18 weeks of gestation. The optimum cutoff value is mean serum HCG  $> 105,380$  IU in 14 weeks of gestation, and the sensitivity and specificity were calculated as 100% and 72.2%, respectively. B-HCG level in the first half of pregnancy can be used as a predictor marker for placenta previa.

## **Conclusion**

This study showed that there is significant difference in the serum beta-HCG levels of healthy pregnant women and that of pregnant women with placenta previa. Among women with placenta previa, the serum beta-HCG levels are much higher as compared to the serum beta-HCG levels among healthy pregnant women.

## **References**

1. Anderson-Bagga FM, Sze A. Placenta Previa. 2023 June 12. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. PMID: 30969640.
2. Betrán AP, Merialdi M, Lauer JA, Bing-Shun W, Thomas J, Van Look P, et al. Rates of cesarean section: analysis of global, regional and national estimates. *Paediatr Perinat Epidemiol.* 2007; 21:98–113.
3. Stavrou EP, Ford JB, Shand AW, Morris JM, Roberts CL. Epidemiology and trends for Cesarean section births in New South Wales, Australia: a population-based study. *BMC Pregnancy Childbirth.* 2011; 11:8.
4. Blackwell SC. Timing of delivery for women with stable placenta previa. *Semin Perinatol.* 2011; 35:249–251.
5. Räisänen S, Kancherla V, Kramer MR, Gissler M, Heinonen S. Placenta previa and the risk of delivering a small-for-gestational-age newborn. *Obstet Gynecol.* 2014;124(2 Pt 1):285–291.
6. Oyelese Y, Smulian JC. Placenta previa, placenta accreta, and vasa previa. *Obstet Gynecol.* 2006; 107:927–941.
7. Ferrazzani S, Guariglia L, Triunfo S, Caforio L, Caruso A. Conservative management of placenta previa-accreta by prophylactic uterine artery ligation

- and uterine tamponade. *Fetal Diagn Ther.* 2009; 25:400–403.
8. Lala ABH, Rutherford JM. Massive or recurrent antepartum hemorrhage. *Current Obstet Gynaecol.* 2002; 12:226–230.
  9. Marshall NE, Fu R, Guise JM. Impact of multiple cesarean deliveries on maternal morbidity: a systematic review. *Am J Obstet Gynecol.* 2011; 205:262.
  10. Milosević J, Lilić V, Tasić M, Radović-Janosević D, Stefanović M, Antić V. [Placental complications after a previous cesarean section] *Med Pregl.* 2009; 62:212–216. Serbian.
  11. Faiz AS, Ananth CV. Etiology and risk factors for placenta previa: an overview and meta-analysis of observational studies. *J Matern Fetal Neonatal Med.* 2003; 13:175–190.
  12. Murmu S, Dwivedi J. Second-Trimester Maternal Serum Beta-Human Chorionic Gonadotropin and Lipid Profile as a Predictor of Gestational Hypertension, Preeclampsia, and Eclampsia: A Prospective Observational Study. *Int J Appl Basic Med Res.* 2020 Jan-Mar;10(1):49-53.
  13. Hussein SS, Qader MMA, Akram W. Prediction of Placenta Previa from Serial Reading of Serum Human Chorionic Gonadotropin Late in the First Half of Pregnancy. *J Obstet Gynaecol India.* 2024 Feb;74(1):27-30