

ULTRASOUND SCANNING IN FIRST TRIMESTER HEMORRHAGE AND ITS CORRELATION WITH HUMAN CHORIONIC GONADOTROPINS

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ABSTRACT: Objective: To study the correlation of Gestational sac diameter with serum levels of human chorionic gonadotropin levels in early pregnancy haemorrhage: **Methodology:** This prospective interventional study was carried out at the Department of Obstetrics and Gynaecology of a Teaching Hospital, Lahore from January 2012 to March 2013. 100 patients having early pregnancy and vaginal bleeding were selected from the out patients and emergency departments of a Teaching Hospital, Lahore. A pelvic ultrasound was carried out and mean gestational sac diameter was taken. At the same time Blood sample was withdrawn for Beta hCG determination. The same procedure was repeated weekly for three weeks and the pregnancy outcome was correlated. All data was analyzed using SPSS 20: **Results:** In normal pregnancies there was positive (significant) correlation in Serum hCG miu/ml and MSD/GSD, $r=0.42$ (p -value 0.164) and in aborted patients there was negative (insignificant) correlation in Serum hCG miu/ml and MSD/GSD., $r= - 0.396$ (0.292). **Conclusion:** There was a strong positive correlation between Gestational sac diameter and serum hCG levels.

Key words: Human chorionic gonadotropin, gestational sac, pregnancy, fetus, trimester

1. INTRODUCTION

The time of pregnancy is one of high health-related risks, uncertainties, hopes, and medical challenges. While pregnancy is defined as the time a single or multiple offspring(s) attach to the lining of the uterus, early pregnancy, on the other hand, is defined as the time duration from implantation of the zygote to the 6th week since the last menstrual cycle [1]. A number of clinical methods, including pelvic ultrasound and human chorionic gonadotropins (hCG), are used for different purposes to ensure a healthy pregnancy [2]. The first aimed to find dimensions and fluids, and the latter aimed to see the presence of trophoblastic cells, which are considered the foundation of pregnancy [3]. It is clinically very difficult to specify the ovarian cycle because there are ambiguous days each month, and hence, obstetricians use the last menstrual period as the onset of pregnancy to avoid such ambiguities. This, which serves as a good estimate, is kept for any days between the 1st and 25th days of the ovarian cycle [4]. Similarly, inter-menstrual blood loss is sometimes confused with menstruation; after amenorrhea, ovulation is followed by the return of the menstrual cycle [5]. A number of diagnostic procedures are used to find trophoblastic cells and embryonic tissues [6]. A woman who wants to conceive or her healthcare consultant may use the information to start prenatal care, which includes screening for multiple pregnancies, detecting anembryonic gestation, a retained dead embryo, and ectopic pregnancies at other sites. An early investigation result will assist a woman in to recognize and monitoring an early miscarriage [7]. In earlier times, only physiological signs and symptoms were used to make relevant diagnoses. However, with the advancement of bioassays, other testing methods, including urine and serum hCGs, developed and now have become imperative for the diagnosis of normal fetal development and the presence of any anomaly [8]. Similarly, transabdominal ultrasound is a good tool to confirm pregnancy and then the functioning of the offspring with its heartbeat and other dimensional findings. First trimester bleeding is one of the commonly reported signs of the onset of any abnormality that may hinder the normal development of an early gestation [9]. A number of reasons could play a part in such abnormalities, including incomplete abortion, threatened abortion, blighted

ovum, missed abortion, ectopic pregnancy and hydatidiform moles [10]. In such cases, patients need to visit a doctor immediately and go through the necessary clinical procedures to identify the cause of bleeding, increase the chances of viable delivery, decrease the chances of worse fetal outcomes, and reduce hospital costs associated with frequent visits, hospitalization, and medication [11]. In such cases, doctors use one or a combination of USG and hCG to monitor the progress of the growth of the fetus and the possible outcome of any anomaly for further action. Ultrasonography uses a number of morphologic features to identify any possible non-viability of pregnancy, including the bizarre or irregular shape of the sac, an unusually large sac that lacks an embryo, incompletely or poorly formed decidual reaction, absence of a double decidual sac finding. The progress of pregnancy can be monitored by the growth of the gestational sac, which is reasonably stable before a fetus becomes clearly observable. In addition, the gestational age can be determined by using gestational sac dimensions. Conventional transabdominal sonography and the second international standard for hCG calibration have shown that normal gestational sacs should be seen when hCG levels surpass 1800 m.i.u.ml. Endovaginally sonography recommends 500–1000 m.i.u./ml. Studies have reported that there is a quadratic association between gestational age and sac diameter. For confirmation of "threatened abortion" correlation may be helpful, provided that the human chorionic gonadotropin (hCG) levels remain within the forecasted period for a particular mean gestational sac size [9]. Likewise, patients with a history of "recurrent spontaneous abortion" may be reassured by consecutive examination of their serum hCG levels and comparing them with the obtained information on ultrasound scanning. Since hCG levels in normal intrauterine gestations are known to double every 1.4 to 2 days, through serial quantitative levels, patients with high risk may be observed [12]. A decline, plateau, or less than normal rise in values is suggestive of an abnormal intrauterine or extrauterine gestation. A timely diagnosis has crucial surgical implications in that unruptured ectopic pregnancy may be operated on and the involved tube and ovary saved. In early molar pregnancies, the vesicles are often weakly developed and the ultrasound appearance may

be indistinguishable from a missed abortion [13]. Sac size and certain hCG levels may also indicate proper gestational development [14]. A difference in this association supports a nonviable pregnancy diagnosis. Disproportionally low hCG levels compared to gestational sac size have also been reported to indicate improper fetal development [15]. This study, hence, aims to find a correlation between first-trimester hemorrhage and human chorionic gonadotropins using ultrasound.

2. MATERIAL AND METHODS

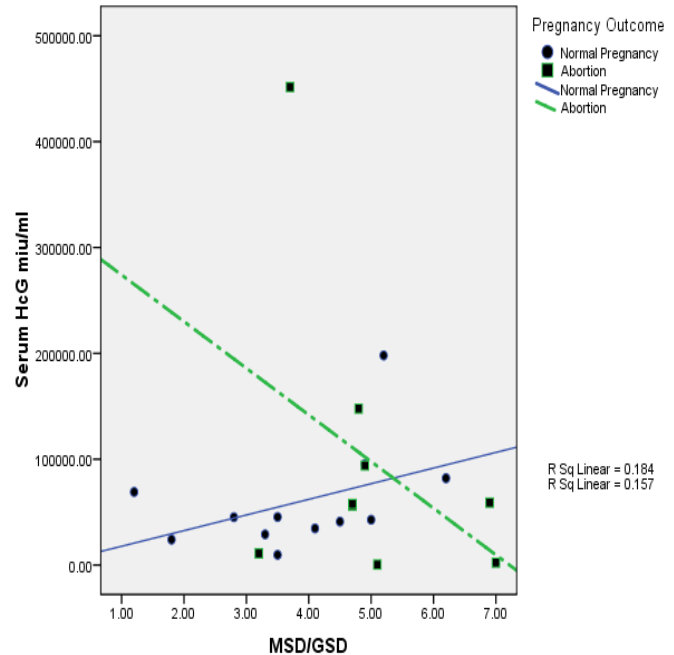
This prospective study design was conducted on patients who were admitted through the gynecologic outpatients and emergency departments of a teaching hospital in Lahore and were followed on an OPD basis through non-probability purposive sampling. One hundred women were selected for study, regardless of parity, in the reproductive age range between four and nine weeks of pregnancy, presenting with early pregnancy and vaginal bleeding. whereas extrauterine pregnancies, women with multiple pregnancies, molar pregnancies, and women with heavy bleeding and hemodynamic instability were excluded.

Pregnant women with a singleton pregnancy present with the complaints of amenorrhea and vaginal bleeding in the first trimester of pregnancy. The mean sac diameter was determined by using the standard formula, i.e., the averaging of two orthogonal dimensions (transverse and longitudinal). A blood sample was drawn to check the level of serum hCG by radioimmunoassay at the time of each ultrasound scan. Only 3 sonograms and hCG levels per patient were used for the purpose of data analysis using the sector scanner with a 5 MHz probe frequency. The route of ultrasonography used was transabdominal in hospital settings. A senior sonologist from the department of radiology was involved throughout the study to take care of interobserver error. The presence or absence of embryonic cardiac activity was noted. The sonogram results were compared to a quantitative blood hCG level taken the same day. The hospital laboratory tested serum hCG using a commercial kit, hCG IRMA. The analysis of clinical data was done using the statistical program SPSS 20. The pregnancy outcome was categorized as normal intrauterine pregnancy. "Abnormal intrauterine pregnancy (Blighted ovum, missed abortion, incomplete abortion, complete, abortion or subsequent spontaneous abortion) and ectopic pregnancy: All ectopic and molar pregnancies were excluded from the study.

3. RESULTS

A total of 100 cases of vaginal bleeding during the first trimester of pregnancy were assessed during the study and the following results were obtained. 40 cases showed showing normal increase in serum hCG level only, progressed normally and entered the 2nd trimester. 10 cases showing a decrease in the serum hCG level with a static gestational sac growth rate ended in missed abortions. 20 cases showing a plateau in the serum hCG level despite an increase in gestational sac diameter resulted in spontaneous abortion. 10 cases of diagnosed ectopic pregnancy were excluded from the study. Five cases of molar pregnancy were diagnosed due to unusually high levels of serum hCG and

typical ultrasonographic findings. 15 cases of incomplete abortion were detected on the basis of minimal concentration of serum hCG and failure of detection of intra or extra uterine pregnancy. In normal pregnancies, there was a positive (significant) correlation between serum hCG miu/ml and MSD/GSD, $r = 0.42$ (p-value 0.164). and in aborted patients there was a negative (insignificant) correlation in serum hCG miu/ml and MSD/GSD, $r = -0.396$ (0.292).



Pearson correlation in Serum hCG miu/ml and MSD/GSD

For normal pregnancy = 0.429 (0.164)

For abortion = -0.396 (0.292)

4. DISCUSSION

Advances in medical research and technology have enabled early recognition of fetomaternal issues using different tests that help physicians make beneficial decisions in a timely manner and improve pregnancy outcomes [16]. Studies have reported that using the correlation between hCG measures and bleeding in the first trimester can identify early outcomes. With the use of radioimmunoassay techniques, extraordinary low levels of beta-hCG, up to 1 ng/ml, can be detected, making it possible for investigators to confidently detect a pregnancy before a woman misses her first period [17]. In our study, the discriminatory level, i.e., the level of hCG at which the gestational sac was visible with a transabdominal ultrasound, was 2150 miu/ml. Corresponding levels in another study were 1800 miu/ml [21]. The same levels with transvaginal ultrasound were reported at 800 mIU/mL in a study. Our study also showed that an initial subnormal level of B-hCG was associated with a poor outcome. The range of serum levels of hormone also varied from patient to patient at the same stage of pregnancy. A plateau or a decrease in the serum hCG levels can very confidently predict the outcome of pregnancy, thereby reducing undue Hospitalization, bed rest, and time off work [18].

Out of the total 100 cases in our study, serial scanning and hCG levels showed normal progression of gestation in 40 cases, and the pregnancies remained uneventful. This was in accordance with a study in which patients were given reassurance. In 20 cases, the initial normal level of hCG showed a plateau over the next two weeks with a static sac diameter, and the patients ended up miscarrying. In [12] patients, the hCG levels ranged between 4500 and 6000 miu/ml, and the gestational sac diameter remained between 7mm and 10mm. This was quite an important finding and was helpful in-patient counseling [14].

The main drawback of the study is that the menstrual dates should be accurately known by the patient. Secondly, transvaginal USG for assessing the gestational sac diameter is more appropriate for the detection of early pregnancy, in which the presence of the gestational sac can be detected at 32 days [19].

It can also be concluded that the administration of certain hormones, like injectable human chorionic gonadotropins, for the management of threatened miscarriage by some physicians can only alter the normal course of abortion only giving a false sense of security to the pregnancy. A decrease in the serum level of these hormones is the result, not the cause, of abortion [20].

5. CONCLUSION:

Monitoring pregnancy with simple blood tests and ultrasonography is a reliable method for predicting pregnancy outcomes. It can be routinely applied in a health care setting, thus avoiding undue apprehension on the part of the patient and the physician.

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