Maternal Serum Alpha-Fetoprotein and Detection of Hydatidiform Mole in Second Trimester of Pregnancy.

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Maternal serum alpha-fetoprotein (MS-AFP) levels in 142 pregnant patients were studied between 14-20 weeks of gestation. Association between age , parity and incidence was also studied. In high risk group, 4 subjects with complete hydatidiform mole had significantly low MS-AFP levels compared to the controls. The results also show no appreciable association between age and parity of these subjects with development of molar pregnancy.

Key Word: Hydatidiform Mole

Complete hydatidiform mole has been recognized as a distinct form of abnormal pregnancy lacking an intact fetus since the 6th century A.D[1]. It is one of the most common form of gestational trophoblastic disease with the reported incidence range of 1:200-2000 pregnancies.[2-4]

During normal pregnancy, maternal serum alpha-fetoprotein (MS-AFP) concentration peaks between 12 toe 14 weeks and then shows a decreasing trend.[5,6] High MS-AFP levels have been reported to occur during the second trimester with neural tube defects,[7,8] late fetal and perinatal death and a variety of other anomalies and complications.[9,10,11] Sowere and Burton and other workers[12,13] detected significantly low MS-AFP levels in cases of molar pregnancy and Down's syndrome. Matalon and Modan and others[14,15,16] observed that hydatidiform mole occurs more frequently in older women with low MS-AFP levels.

This study attempted to establish an association between age, parity, MS-AFP concentration (in second trimester) of subjects and the incidence of molar pregnancy. These findings, yet unreported, are part of study reported elsewhere.[5]

Material and Methods

One hundred and forty two pregnant females between 14-20 weeks of gestation, age 20-40 years, visiting or admitted from the Out-patient department of Obstetrics and Gynaecology of Lahore General Hospital and Lady Willingdon Hospital, Lahore were included in this study.The diagnosis of pregnancy was established in all cases by a positive pregnancy test for human chorionic gonadotrophin. Serum samples were collected between 14 to 40 weeks of pregnancy and kept frozen until tested. Forty serum samples comprised the control group having normal, uncomplicated, single pregnancy. One hundred and two samples comprised the higher risk group according to high risk factor score[17] (Table 1). Subjects scoring even one point were included.

Table-1 Index of high risk pregnancy[17]

Factor	Score
Maternal age	
Upto 16 years	2
16-17 years	1
18-29 years	0
30-34 years	1
35+ years	2
Parity*	
Nulliparity	1
1-3	0
4-6	1
7+	2
Gravidity**	
Nulligravidity	1
1-3	0
4-6	1
7+	2
Bad obstetric history***	
a) None	0
b) One	1
c) More than one	2
Antepartum condition in pregnancy	
No pathological condition	0
Any pathological condition	1

* parity=no. of deliveries at 20 weeks or more whether live or stillborn.
**Gravidity=no. of live births, stillbirths, spontaneous and induced abortions.
***Bad obstetric history
a) previous stillbirths
b) previous spontaneous abortions
c) previous caesarian sections

Gastational age was determined by sonographic estimation of biparietal diameter and the last menstruation. Maternal serum AFP was estimated, in duplicate, by the method of Albert et al[18]. All reagents used were of analytical grade.

Results

Table 2 presents the data regarding age, parity, gravidity, ante-partum condition and high risk score in four identified pregnant females with hydatidiform mole. Table 3 shows the MS-AFP concentration (+SEM) in normal controls and subjects with molar pregnancy in the respective weeks of gestation.

Table-2 Subjects identified with complete mole

Age (Years)	Gravidity	Parity	Present Antepartum condition	Score
38	6	3	1	4
35	5	4	1	5
25	2	1	1	1
20	1	0	1	2

Table-3MS-AFP* levels in control and molar pregnancies.

Weeks of gestation	Control+/-SEM		Molar pregnancy
17	33.07 +/- 1.06	(7)	5.1
18	30.78 +/- 0.79	(5)	6.8
19	29.31 +/- 0.53	(6)	8.5
19	29.31 +/- 0.53	(6)	6.8

* MS-AFP= Maternal serum Alpha-fetoprotien
no.in parentheses indicate no. of subjects

In the 17th week of gestation mean MS-AFP concentration was 5.1ng/ml in a 38 years old molar pregnancy patient and 33.07 +/- 1.06ng/ml in the seven controls. In the 18th week, 35 years old molar pregnancy subject's MS-AFP concentration was 6.8ng/ml, whereas the five controls had a mean concentration of 30.78 +/-0.79ng/ml. Two subjects (25 and 20 years old) with molar pregnancy in the 19th week showed MS-AFP concentration of 8.5ng/ml and 6.8ng/ml, while the six controls had a mean concentration of 29.31+/- 0.53ng/ml.

Discussion

An estimation of maternal serum alpha- fetoprotein concentration has become an established obstetrical procedure and is considered to be an important adjunctive tool for identification of high risk pregnancy and adverse neonatal outcome[7,13]. We had suggested a marker role for high MS-AFP concentration and an unfavourable sign as to the outcome of pregnancy[5].

In recent years, knowledge about the gestational trophoblastic diseases has considerably increased in terms of their cytogenetic origin, histopathology, and natural history. Molecular biological studies have now clearly demonstrated that completed molar pregnancies are an outcome of the fertilization of an anucleate, "empty ovum"[19].

Many research workers had detected low levels of MS-AFP to be associated with complete molar pregnancy[3,12,13]. Interestingly, Zelet et al [20] reported a case of combined partial mole and neural tube defect with elevated levels of MS-AFP during the second trimester.

The results of our study show that all four high risk subjects had low MS-AFP levels when compared with controls. These patients were sonographically confirmed to have molar pregnancy with large-for-date uterine size. The previous studies had associated the occurrence of hydatidiform mole with older age and parity[3,14,16]. Two of our patients, 20 and 25 years of age, were nulliparous and uniparous respectively, while the others were older and multiparous. Table 1 indicates that with advancing age the high risk score also increases.It appears from these results that there is no association of age and parity with the development of molar pregnancy. Our results also indicate a higher incidence of about 4% molar pregnancy in the high risk population.The low levels of MS-AFP indicate risk and unfavourable fetal outcome. The results of our study underscore the importance of identifying patients with abnormally low MS-AFP levels. A careful monitoring and follow-up of such pregnancy with ultrasonography and optimum antenatal management is suggested.

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