Spontaneous Fetal Loss Rates in a Low Risk Second Trimester Maternal Serum Screening (MSS) Population

F.M. Lai, P.C. Khong, T.Y.T. Tan, G.S.H. Yeo

Antenatal Risk Assessment Unit,KK Women's & Children's Hospital, Singapore

Introduction

It is known that spontaneous fetal loss occurs in 10 – 15% of pregnancies, the majority of which occur in the first trimester and it increases with maternal age.[2] There is scant data on spontaneous loss rates from the second trimester onwards. During the review of our 5 year data on mothers with MSS done, we investigated the relationship of pregnancies with spontaneous losses with maternal age at expected date of delivery (EDD) and ethnicity.

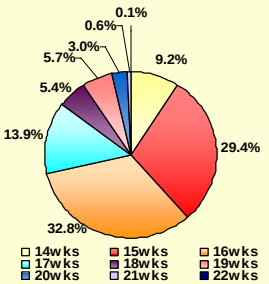
Objectives

To determine the spontaneous fetal loss rates in a population from 14 weeks gestation and its relationship to maternal age, ethnicity and gestational age.

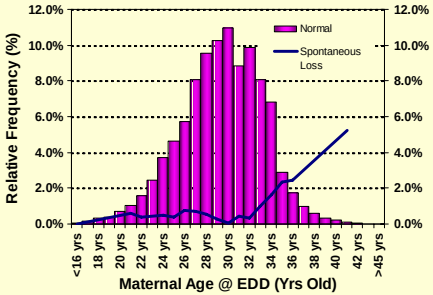
Materials And Methods

We analysed 15,921 singleton pregnancies with serum screening done between March 1999 and February 2004 which had outcome data. We excluded pregnancies with any structural or chromosomal anomalies, medical history of insulin dependent diabetes mellitus and with amniocentesis performed. Maternal age and ethnicity were analysed using multiple logistic regression to determine if they were independent predictors of miscarriages. In this population 72.8% were Chinese, 11.8% Malays, 10.0% Indians and 5.4% Other Races.

Chart 1 shows the Gestation Distribution



Graph 2 shows Age Distribution



Findings

The spontaneous pregnancy loss was 0.62% (98/15,921 or 1:162 pregnancies). The median gestational loss was at 21.4 weeks with three quarters of the loss occurring before 24 weeks of gestation. The likelihood percentage loss for any pregnancy before 20 weeks of gestation was 0.17% (1:590), between 20 weeks to 24 weeks was 0.30% (1:339) and above 24 weeks was 0.13% (1:796).

The different fetal loss rates among the different ethnic group were statistically significant (p=0.002) with Indians having a significantly higher loss rate of 1.25% (1:80) while the Chinese had the lowest loss rate of 0.49% (1:203). Fetal loss rates increased with maternal age for all groups (p=0.001 and R^2=0.9363). Using multiple logistic regression, maternal age and ethnicity were independent predictors of spontaneous fetal loss**.**

Table 3 shows various Age Risk Losses

Maternal Age	Spontaneous Loss Rate
30 yrs old	0.1% (1:1000)
35 yrs old	2.4% (1:42)
37 yrs old	3.2% (1:31)
40 yrs old	4.4% (1:23)
< 35 yrs old	0.54% (1:185)
≥ 35 yrs old	1.61% (1:62)

Table 4 shows Race Risk Losses

Race	Spontaneous Loss Rate
Chinese	0.49% (1:203)
Indians	1.25% (1:80)
Malays	0.69% (1:145)
Others	0.93% (1:108)

Table 5 shows the analytes levels in MoM

Markers in MoM	Normal	Spontaneous Loss
AFP > 2	2.8%	18.4%
hCG >2	12.4%	24.5%
AFP & hCG > 2	0.8%	5.1%

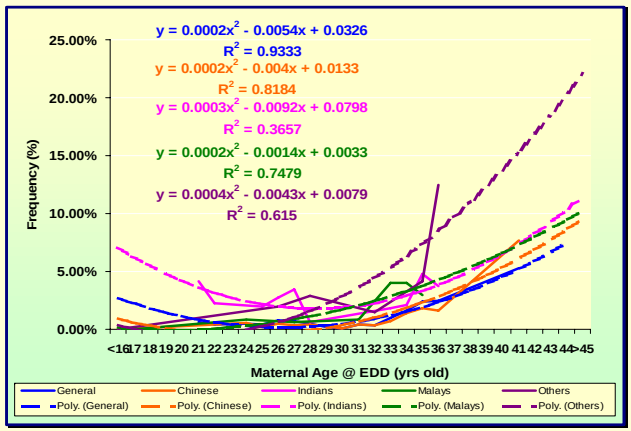
Discussion

We found that in addition to maternal age, ethnicity was an independent risk factor for pregnancy losses. This was a surprise finding as we had expected the mother's age to be the only risk predictor. On further analysis of the 98 spontaneous losses, one was a confirmed fetal anomaly, 6 were due to infection, 12 were macerated and the rest (79) were unknown with no post-mortem done. As such, we were unable to ascertain if the racial differences in spontaneous losses could be accounted for by differences in rates of structural or chromosomal abnormalities amongst them.

In a separate analysis of our MSS data, we found the incidence of Down Syndrome was 1:334 in Indians, 1:1106 in Chinese and 1:1927 in Malays. Data from the National Birth Defects Registry suggests that there are racial differences in the incidence of congenital birth defects in live births and stillbirths with Malays having the highest rates and the Chinese the lowest. Problems in extrapolating this finding include the differing gestation at entry into the registry (e.g. after karyotyping from chorionic villus sampling or amniocentesis following an abnormal ultrasound finding or at the time of delivery), the influence of selective termination on the numerator data, and the low post-mortem rates in stillbirths.

In this study, mothers with higher than 2 AFP MoMs and 2 hCG MoMs were found to be the ones at higher risk of spontaneous fetal losses. The majority of fetal losses that occurred in this group of mothers followed up prospectively after 14 weeks of pregnancy (with low risk MSS results) did not have an obvious cause. 72.4% of these losses occurred after 20 weeks when typically, a routine obstetric screening scan would be scheduled. This remains a very difficult area to study as this is considered a "pre-viable" stage of pregnancy. However, with the increasing use of nuchal translucency (NT) assessment before 14 weeks coupled with outcome data for this group and with the introduction of earlier screening for structural anomalies, more research and answers into this area is likely.

Graph 6 shows the fetal loss rates for different races



Conclusions

The background spontaneous fetal loss rate for "normal" (low risk MSS with "normal" ultrasound screening scan) pregnancies was 1 in 162 pregnancies. Mothers older than 35 years had a 3 times increased risk of spontaneous pregnancy loss compared to younger mothers. Both maternal age and ethnic groups were independent predictors of fetal losses beyond 15 weeks. A large national database to look at age-specific Down Syndrome rates in various ethnic groups would be needed to confirm if there are indeed ethnic differences.

References

1. Wyatt, P.R., Owolabi, T., Meier, C. and Huang, T. Age-specific risk of fetal loss observed in a second trimester serum screening population. Am J Obstet Gynecol. 2005 Jan; 192(1):240-6
2. Andersen, A. M. N., Wohlfahrt, J., Christens P, Olsen, J, Melbye M. Maternal age and fetal loss: population based register linkage study. BMJ 2000; 320: 1708-1712