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Afleveradres Post Mw. S.Roozen
Universiteit Maastricht

Work & Social Psychologie, Postbus616(UNS40)
6200 MD MAASTRICHT

NL

Fax
E-mail sylvia.roozen@maastrichtuniversity.nl
Ftp
Ariel
Telefoon

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Fetal Alcohol Syndrome in Twin Pregnancy

Ira J. Chasnoff

*Departments of Pediatrics and Psychiatry, Northwestern University Medical School, and
Prentice Women's Hospital and Maternity Center, Chicago*

Abstract. In recent years, it has been realized that some infants of frankly alcoholic mothers escape the stigmata of fetal alcohol syndrome (FAS) and others have only a few of the characteristics. These infants are thought to display fetal alcohol effects (FAE). The controversy regarding the amount of alcohol a woman can safely drink during pregnancy and the effects of timing and individual physiology on producing FAS vs FAE in the infant are important questions which can perhaps be partially answered through examining twin pregnancies and offspring. Data are presented regarding the long-term growth and development of a set of dizygotic twins, one with FAS and one with FAE, delivered to a mother who drank moderate amounts of alcohol during pregnancy. The variation in the degree of abnormality found in dizygotic twins exposed to similar amounts of alcohol at the same time during gestation indicates that differences in fetal susceptibility to ethanol dysmorphogenesis are of prime importance to the expression of the fetal alcohol syndrome.

Key words: Fetal alcohol, Twin pregnancy, Teratogenesis

The abnormalities that characterize some of the offspring of alcoholic mothers have been well described and are considered to constitute the fetal alcohol syndrome [5,6]. The syndrome includes prenatal and postnatal growth deficiency, delayed motor and mental development, microcephaly and abnormal facies. In recent years, it has been realized that some infants of frankly alcoholic mothers escape the stigmata of fetal alcohol syndrome (FAS) and others have only a few of the characteristics. These infants with only partial expression are thought to display fetal alcohol effects (FAE) [3]. The controversy regarding the amount of alcohol a woman can safely drink during pregnancy and the effects of timing and individual physiology on producing FAS vs FAE in the infant are important questions which can perhaps be partially answered through examining twin pregnancies

and offspring. This paper will present data regarding the long-term growth and development of a set of twins, one with FAS and one with FAE, delivered to an alcoholic mother.

CASE PRESENTATION

A pair of dizygotic twin females was delivered at 36 weeks gestation to a 20-year-old primigravida who drank an average of 2 to 3 ounces of alcohol at least three times per week throughout pregnancy. She also smoked ten cigarettes per day but denied any other drug use or abuse. At birth, twin A weighed 1470 g, and twin B 1311 g, both well below the fifth percentile for weight. The twins remained with their mother through 18 months of age when they were hospitalized for multiple injuries inflicted through abuse. Subsequently, the two girls were taken from their biologic mother and adopted by another couple. It was at this time that the diagnosis of fetal alcohol exposure was made.

On examination at 18 months of age, Twin A weighed 7900 g, height was 74 cm and front-occipital head circumference was 45 cm. All of these parameters were well below the third percentile for age [8]. Developmental testing with the Bayley Scales of Infant Development [1] revealed an MDI of 60 and PDI of 66, both scores being well below the normal range. Examination of twin A revealed the facies typical for FAS with small short eyes, prominent epicanthal folds, short upturned nose with a long flat philtrum, thin upper lip, small mouth and underdeveloped mandible. No other significant features or malformations were noted.

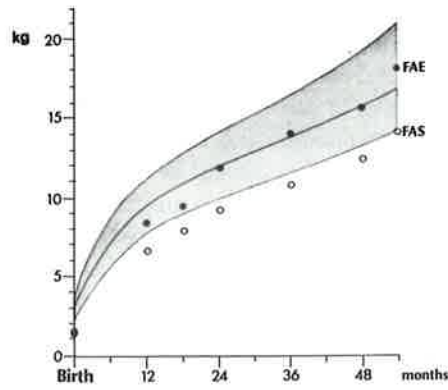
Twin B, the smaller of the twins at birth, weighed 9500 g at 18 months of age, was 81 cm tall and had a fronto-occipital head circumference of 46½ cm. All of these growth parameters are within the normal range for age [8]. Developmental testing revealed, however, that this twin also exhibited marked delay in mental and motor capabilities with an MDI of 73 and a PDI of 66. Twin B exhibited some of the stigmata of fetal alcohol exposure with small short eyes, prominent epicanthal folds, short upturned nose with a long flat philtrum, thin upper lip and small mouth. The mandible was well developed, and there were no other significant features noted.

This discrepancy in size, coupled with features of fetal alcohol exposure in both girls, is consistent with the diagnosis of FAS in twin A and FAE in twin B. A review of growth data on the two girls (Figure) from birth through 4½ years reveals that in all parameters of growth, including head circumference, twin A has consistently fallen below the third percentile for age while twin B has consistently been within the normal range [8]. Developmental testing of the girls over time showed an immediate response to the change in environment at the time of adoption. The MDI at 24 months of age for twin A had risen to 111 and PDI was 94, while the MDI for twin B rose to 94 and PDI to 93. All of these scores fall into the low normal range. By 4½ years of age, testing with the Stanford Binet revealed an IQ of 110 for twin A and 118 for twin B, scores which are well within the normal range.

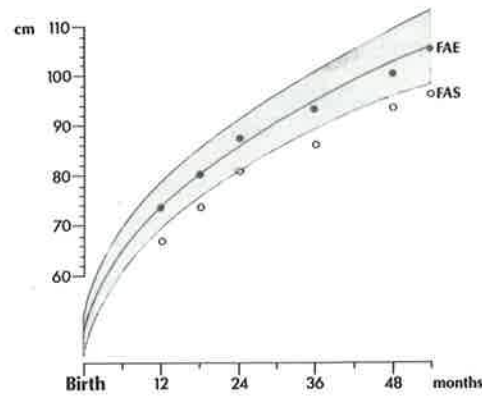
DISCUSSION

There have been only isolated case reports of twin pregnancies in which one or both of the infants have been affected by the mother's use of alcohol during the pregnancy [2]. The data presented here are the first long-term information on the effects of intrauterine alcohol exposure on twin fetuses. The discordant teratogenesis found in this set of

Weight



Length



Head Circumference

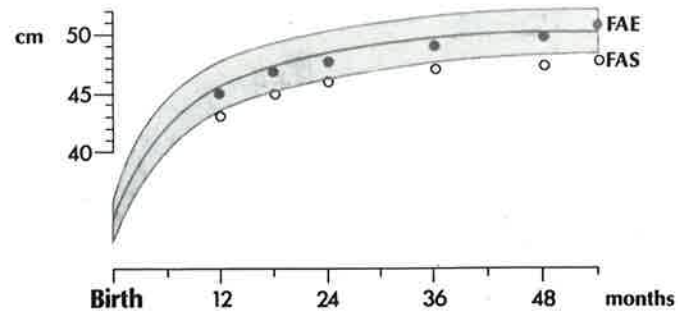


Figure - Sequential weight, length and head circumference growth for twin A (FAS) and twin B (FAE). Data for normal growth curves and ± 2 standard deviations (shaded area) adapted from National Center for Health Statistics Growth Charts [8].

dyzygotic twins exposed to similar amounts of alcohol at the same time during gestation, producing FAS in one twin and FAE in other, leads one to realize that differences in fetal susceptibility to ethanol dysmorphogenesis are of prime importance to the expression of the fetal alcohol syndrome. The mechanisms underlying this difference in susceptibility could involve discordance of fetal and placental vasculature [4], different rates of organogenesis with resultant differences in susceptibility to teratogenesis at different times [7], or different rates of ethanol degradation and elimination on the part of each fetus [9]. Whatever the mechanism, it is clear that current debates regarding the "safe" amount of alcohol which can be ingested during pregnancy are futile, since individual fetal susceptibility to dysmorphogenesis is an important, yet not predictable factor in the development of the fetal alcohol syndrome.

Examination of twin pregnancies with discordant dysmorphogenesis from alcohol serves to emphasize that future research on the teratogenic effects of alcohol should focus on the action of alcohol at the placental and fetal levels rather than on the differences in amounts of alcohol imbibed by the mother.

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Correspondence: Dr. Ira J. Chasnoff, 1325 W. Howard, Evanston, IL 60202, USA.