



The American College of Obstetricians and Gynecologists

Women's Health Care Physicians

COMMITTEE OPINION

Number 462 • August 2010

(Reaffirmed 2016)

Committee on Obstetric Practice

This document reflects emerging clinical and scientific advances as of the date issued and is subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed.

Moderate Caffeine Consumption During Pregnancy

ABSTRACT: Moderate caffeine consumption (less than 200 mg per day) does not appear to be a major contributing factor in miscarriage or preterm birth. The relationship of caffeine to growth restriction remains undetermined. A final conclusion cannot be made at this time as to whether there is a correlation between high caffeine intake and miscarriage.

Because caffeine crosses the placenta (1) and increases maternal catecholamine levels, concerns have been raised about a potential relationship between caffeine exposure and the incidence of spontaneous miscarriage. However, studies investigating the association between caffeine intake and miscarriage have been limited by small sample size and the retrospective collection of data influenced by recall bias, particularly in patients interviewed after pregnancy loss (2, 3).

Two recent studies have attempted to overcome this limitation by prospectively monitoring a large population of women receiving prenatal care before 16 weeks of gestation, collecting data on caffeine consumption during early gestation, and adjusting for relevant confounders. A study conducted by Savitz et al examined 2,407 pregnancies that resulted in 258 pregnancy losses before 20 weeks of gestation (4). Caffeine exposure was analyzed with respect to intake: none; less than or equal to the median consumption, which was approximately 200 mg per day; or greater than 200 mg per day (Table 1). Three time points were analyzed: 1) before pregnancy; 2) 4 weeks after the most recent menstrual period; and 3) at the time of the interview, which occurred before 16 weeks of gestation. Applying an adjusted survival model, levels of caffeine consumption at all three time points and at all levels of consumption were unrelated to the risk of miscarriage. Reported caffeine exposure at the time of the interview was associated with an increased miscarriage risk among those women with pregnancy losses before the interview. This was thought to reflect recall bias. Ultimately, the study did not show an association between caffeine consumption and miscarriage, regardless of the amount consumed.

Weng et al performed a population-based prospective cohort study in which women were interviewed regard-

ing caffeine exposure at a median gestational age of 71 days (10 weeks) (5). Caffeine exposure was divided into none, less than 200 mg per day, and greater than 200 mg per day. Of the 1,063 pregnant women interviewed, 172 experienced a miscarriage during their pregnancies. The investigators found an increased risk of miscarriage with higher levels of caffeine consumption, with an adjusted hazard ratio of 2.23 (95% confidence interval [CI] 1.34–3.69) for intake of 200 mg per day or more. In contrast

Table 1. Caffeine Content of Foods and Beverages

Food and Beverages	Milligrams of Caffeine (Average)
Coffee (8 oz)	
Brewed, drip	137
Instant	76
Tea (8 oz)	
Brewed	48
Instant	26–36
Caffeinated soft drinks (12 oz)	37
Hot cocoa (12 oz)	8–12
Chocolate milk (8 oz)	5–8
Candy	
Dark chocolate (1.45 oz)	30
Milk chocolate (1.55 oz)	11
Semi-sweet chocolate (1/4 cup)	26–28
Chocolate syrup (1 tbsp)	3
Coffee ice cream or frozen yogurt (1/2 cup)	2

U.S. Department of Agriculture, Agricultural Research Service, 2000.

to the findings of the Savitz et al study, the timing of the interview in relation to a miscarriage did not affect the positive association identified between caffeine consumption and miscarriage.

Although both studies involved appropriate statistical analyses and large study populations, they reached contradictory conclusions. Factors that may account for the discrepancy include 1) differences in populations studied, 2) different analytic approaches, and 3) issues related to the baseline risk of miscarriage and corresponding statistical power. Because of the conflicting results of these two large studies, a recommendation regarding higher levels of caffeine consumption and the risk of miscarriage cannot be made at this time. Neither report demonstrated a significant increase in the risk of miscarriage with levels of caffeine intake less than 200 mg per day.

Two large studies have been performed to assess the relationship between caffeine intake and preterm birth. A randomized double-blind controlled trial of caffeine reduction in 1,207 women evaluated birth data for 1,153 singleton live births (6). An average intake of 182 mg per day of caffeine did not affect length of gestation. Additionally, a prospective, population-based cohort study conducted by Clausson et al evaluated the effect of caffeine consumption on gestational age at delivery in 873 singleton births (7). Again, no association was found between caffeine and preterm birth. Consequently, it does not appear that moderate caffeine intake is a contributor to preterm birth.

Studies also have investigated whether caffeine contributes to intrauterine growth restriction (IUGR). Although caffeine does cross the placenta, it has been shown that caffeine does not cause a decrease in uterine blood flow or fetal oxygenation (8). Two studies have assessed the relationship between caffeine consumption and mean birth weight differences (6, 7), and two others have recently reported on IUGR. A study of 2,635 low-risk pregnant women recruited between 8 weeks and 12 weeks of gestation was performed to determine if a relationship exists between caffeine consumption and IUGR (9). Intrauterine growth restriction was the primary outcome measure and was defined by birth weight less than the 10th percentile on a personalized growth chart. Of the 2,635 women, IUGR was identified in 343 (13%) of the newborns. The association of caffeine intake with the incidence of IUGR was equivocal at all levels of caffeine consumption. Compared with an average daily consumption of less than 100 mg, odds ratios (OR) for IUGR at increasing levels of caffeine intake are as follows: consumption of 100–199 mg per day (OR, 1.2; 95% CI, 0.9–1.6), 200–299 mg per day (OR, 1.5; 95% CI, 1.1–2.1), and more than 300 mg per day (OR, 1.4; 95% CI, 1.0–2.0).

A prospective cohort study found no association between caffeine consumption and IUGR (3). Thus, at this time, there is no clear evidence that caffeine exposure increases the risk of IUGR.

Moderate caffeine consumption (less than 200 mg per day) does not appear to be a major contributing factor in miscarriage or preterm birth. The relationship of caffeine to IUGR remains undetermined. A final conclusion cannot be made at this time as to whether there is a correlation between high caffeine intake and miscarriage.

References

1. Goldstein A, Warren R. Passage of caffeine into human gonadal and fetal tissue. *Biochem Pharmacol* 1962;11:166–8.
2. Maconochie N, Doyle P, Prior S, Simmons R. Risk factors for first trimester miscarriage—results from a UK-population-based case-control study. *BJOG* 2007;114:170–86.
3. Mills JL, Holmes LB, Aarons JH, Simpson JL, Brown ZA, Jovanovic-Peterson LG, et al. Moderate caffeine use and the risk of spontaneous abortion and intrauterine growth retardation. *JAMA* 1993;269:593–7.
4. Savitz DA, Chan RL, Herring AH, Howards PP, Hartmann KE. Caffeine and miscarriage risk. *Epidemiology* 2008;19:55–62.
5. Weng X, Odouli R, Li DK. Maternal caffeine consumption during pregnancy and the risk of miscarriage: a prospective cohort study. *Am J Obstet Gynecol* 2008;198:279.e1–279.e8.
6. Bech BH, Obel C, Henriksen TB, Olsen J. Effect of reducing caffeine intake on birth weight and length of gestation: randomised controlled trial. *BMJ* 2007;334:409.
7. Clausson B, Granath F, Ekblom A, Lundgren S, Nordmark A, Signorello LB, et al. Effect of caffeine exposure during pregnancy on birth weight and gestational age. *Am J Epidemiol* 2002;155:429–36.
8. Conover WB, Key TC, Resnik R. Maternal cardiovascular response to caffeine infusion in the pregnant ewe. *Am J Obstet Gynecol* 1983;145:534–8.
9. Maternal caffeine intake during pregnancy and risk of fetal growth restriction: a large prospective observational study. CARE Study Group. *BMJ* 2008;337:a2332.

Copyright August 2010 by the American College of Obstetricians and Gynecologists, 409 12th Street, SW, PO Box 96920, Washington, DC 20090-6920. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, posted on the Internet, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the publisher. Requests for authorization to make photocopies should be directed to: Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, (978) 750-8400.

ISSN 1074-861X

Moderate caffeine consumption during pregnancy. Committee Opinion No. 462. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2010;116:467–8.