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THE GALACTOPHARMACOPEDIA

Alcohol and Breastfeeding

Philip O. Anderson, PharmD, FASHP

Alcohol use during lactation has been the subject of a considerable amount of research in both animals and humans. It has focused on three broad areas: the effect of alcohol on lactation; the excretion of alcohol into milk; and the short- and long-term effects of alcohol on the nursing infant.

EFFECTS OF MATERNAL ALCOHOL INGESTION ON LACTATION

The two principal hormones that regulate lactation are prolactin and oxytocin. Both hormones are released by the hypophysis following stimulation of the nipple during nursing. Milk production is stimulated by prolactin; milk ejection is stimulated by oxytocin.

Effect on prolactin release. Several studies in lactating rats have demonstrated decreases in suckling-induced acute prolactin release and milk yield after alcohol ingestion.¹⁻³ This relationship is complex, though, because the inhibition can be overcome by prolonged suckling.⁴ Infants of mothers who drank during pregnancy may have an altered ability to suck, further complicating this relationship.⁵

Folklore holds that beer is a galactagogue and mothers are often told to drink beer to increase their milk supply. Beer (both regular and nonalcoholic) has been found to increase serum prolactin in men and nonlactating women; this phenomenon has not been studied during lactation.^{6,7} Although increased prolactin secretion may account for beer's reputation as a galactagogue, the exact component of beer that causes this prolactin increase is not known. It is often stated that it is the "B vitamins" or "brewer's yeast" that increases the milk supply. However, no scientific

evidence supports either of these contentions. More important, though, is the fact that when regular (alcoholic) beer is given to mothers prior to nursing, their infants decrease their milk intake (see below).⁸

Effects on oxytocin release. It was shown many years ago that alcohol inhibits the milk ejection reflex in a dose-dependent fashion. An early study measured intramammary pressure and found doses of alcohol below 0.5 g/kg to have little effect on the suckling-induced increase in pressure (i.e., milk ejection).⁹ Alcohol doses between 0.5 and 1 g/kg had varying results: most women showed no effect, but others showed a partial or complete block of the response. Alcohol doses between 1 and 1.5g/kg completely blocked response in about half of women and partially blocked response in the remainder. Doses from 1.5 to 2 g/kg decreased the ejection response in all women; the average was 80 percent. It appears that doses over 2 g/kg completely block the response.⁹ Alcohol affects response by blocking the release of oxytocin, rather than by affecting the response of the breast to the hormone.

PASSAGE OF ALCOHOL INTO MILK

Alcohol is one of the most rapidly absorbed drugs known. After oral ingestion of alcohol, maximum blood levels are often achieved in 15 minutes or less. Alcohol likewise passes rapidly between the bloodstream and the milk. Milk concentrations of alcohol closely parallel maternal blood alcohol concentration at an equal or slightly greater level.¹⁰⁻¹²

Lactating and nonlactating women handle alcohol differently. One small study found that alcohol was less bioavailable in lactating women than in nonlactating women—about 25 percent less of a dose reached the bloodstream after ingestion.¹² Trends towards lower peak blood levels and faster alcohol elimination in lactating women did not reach statistical significance.¹²

Peak alcohol levels in the milk of nursing mothers occur later than expected, 30-60 minutes after ingestion on an empty stomach^{12,13} and 60-90 minutes when taken with food.^{11,14} The alcohol content of milk falls as the blood alcohol level falls because retrograde

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diffusion of alcohol from the milk back to the bloodstream occurs. Emptying the breasts (i.e., "pumping and dumping") does *not* increase the speed of elimination of alcohol either from the milk or from the body as a whole.^{11,15}

EFFECTS ON THE INFANT

The direct effects of alcohol on the nursing infant are determined by many factors: the quantity of alcohol consumed, the mother's pattern of drinking, probably the time interval between alcohol ingestion and nursing, and the age of the infant. Indirect effects of chronic alcoholism, such as maternal malnutrition and impaired parenting skills, are undoubtedly important also but are not discussed here.

Short-Term Effects. The amount of alcohol excreted into milk with doses less than 1g/kg of absolute alcohol is usually not sufficient to cause noticeable effects in infants.¹¹ However, a case of "drunkenness" (deep unarousable sleep with snoring, deep respiration, no reaction to pain, inability to suck, excessive perspiration and a feeble pulse) was reported in an eight-day-old infant whose mother drank 750 mL of port wine in a 24-hr period.¹⁶ This volume of alcohol represents a large dose to a newborn who is not as capable of metabolizing alcohol as an older infant.¹⁷

Alcohol imparts a detectable odor to the milk, which apparently stimulates sucking initially.¹³ However, an amount of alcohol equivalent to just one drink (see Table 1) taken just before nursing has the net effect of decreasing milk intake by almost one-fourth during the nursing session.^{9,13} The reason for the decrease in milk intake is not established, but it usually goes unnoticed by the mother and by other observers. The decrease can only be detected by weighing infants before and after nursing.

Long-Term Effects. Whether the effect of alcohol reducing acute milk intake translates into poorer long-term nutrition has not been well studied. However, some evidence exists in humans. The infants of Mexican Indian mothers who consume pulque as a part of their normal diet were studied.^{14,18} Pulque, a beverage made by fermenting the agave plant, has a relatively low alcohol content of about 3 percent. These mothers may drink up to 2L of pulque daily, usually with meals. The amounts of alcohol calculated to be

ingested by the infants under these circumstances is low, and infants grow at rates comparable to control infants.^{14,18} However, more subtle indicators of mental and motor development have not been studied.

A large, carefully controlled study of infants of white, well-educated, middle-class mothers who consumed alcohol during long-term (one to three months) nursing was performed in a health maintenance organization population in Washington state.¹⁹ The study did not attempt to correlate results with the time of alcohol consumption relative to breastfeeding, only with average daily alcohol consumption. Infants were tested at one year of age for mental and motor development. No apparent effect on the mental development of their infants was found, but a dose-related decreased motor development was detected. The motor effect was small (4-5 percent decrease in test scores), with moderate alcohol intake (1-2 drinks/day), and appeared to be marked (over 15 percent decrease in test scores) in a small number of infants whose mothers were heavy drinkers (6 or more drinks/day). This difference persisted even when more than 100 possibly confounding variables were considered. No similar studies have been published to confirm or deny these findings. No follow-up has been reported to answer the question of whether the motor impairment persists.

Chronic, heavy alcohol use by a nursing mother resulted in pseudo-Cushing syndrome in her infant.²⁰ At 4 months of age, the infant was short and obese for her age and had the typical "moon face" of Cushing syndrome. The nearly continuous presence of alcohol in milk elevated the infant's endogenous serum cortisol levels, causing the Cushing-like syndrome (see Table 2). After her mother stopped drinking alcohol, the infant's growth pattern gradually returned to normal. The mother had been drinking at least 50 cans of beer weekly plus "generous" amounts of other more concentrated alcoholic beverages "in order to promote milk production."

Studies in mice and rats have shown that continuous high alcohol intake by the nursing mother can induce release of some liver enzymes in neonatal rats²¹ and impair the immunity of pups.^{22,23} The relevance of these findings to humans is not clear at this time.

SUMMARY

Alcohol has a wide range of pharmacologic activities and our knowledge of its effects on nursing infants is still incomplete. To avoid all risks, completely avoid alcohol during breastfeeding. Daily alcohol consumption, even a glass or two of wine with dinner, appears

Table 1. Alcohol Content of Common Alcoholic Beverages.

Beverage	Amount of Absolute Alcohol
Beer 4.5%, 12 fluid ounces	12.6 g
Table wine, 12% alcohol, 4 fluid ounces	11.2 g
Whiskey 100 proof, 1 fluid ounce	11.7 g

Table 2. Effects on Breastfed Infants of Maternal Ingestion of Various Amounts of Alcohol

Effects*	Amounts
Infant motor development decreased by 8 percent ¹⁹	23g daily (chronic)
Infant motor development decreased by 15 percent ¹⁹	46g daily (chronic)
Infant milk intake decreased by 23 percent ^{9,13}	18g at once
Milk ejection blocked in 50 percent of women ¹	60-90g at once
Milk ejection blocked in all women ¹	>120g at once
Pulque intake by some Mexican Indians ¹⁸	3-58g daily (chronic)
Pseudo-Cushing syndrome in one infant ²⁰	>90g daily (chronic)
Infant "drunkenness" in one infant ¹⁶	124g in one day

* a body weight of 60 kg is assumed where necessary

not to be advisable. Mothers who drink beer to stimulate lactation should use a nonalcoholic beer. For those who consume alcohol occasionally, such as for a party or other social event, I currently recommend that they not nurse for at least 2 hours per drink. That is, if a mother takes three drinks, at least six hours should elapse after the last alcohol intake before she resumes nursing. This minimum time period does not ensure complete elimination of alcohol from the milk, but it will be well past its peak level. Pumping the breasts and discarding the milk does not hasten the disappearance of alcohol and is not necessary, except as required for the mother's own comfort.

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