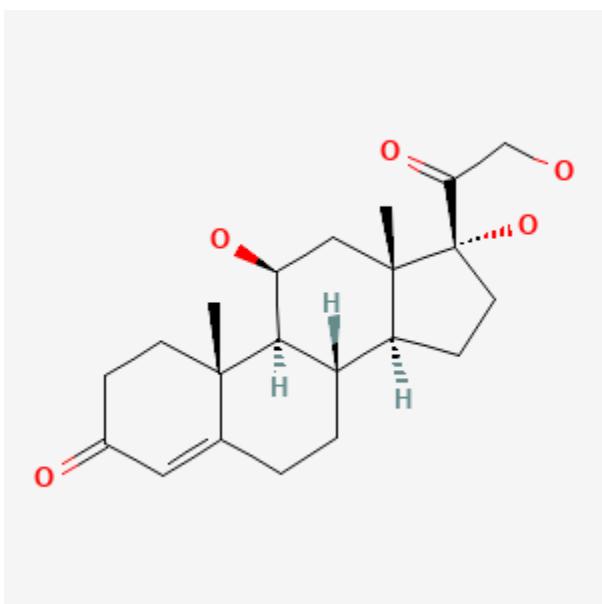




Hydrocortisone

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CASRN: 50-23-7



Drug Levels and Effects

Summary of Use during Lactation

Hydrocortisone (cortisol) is a normal component of breastmilk, but it has not been studied in milk after exogenous administration in pharmacologic amounts. Although it is unlikely that dangerous amounts of hydrocortisone would reach the infant, a better studied corticosteroid might be preferred. Maternal use of hydrocortisone as an enema would not be expected to cause any adverse effects in breastfed infants. Local maternal injections, such as for tendinitis, would not be expected to cause any adverse effects in breastfed infants. Medium to large doses of corticosteroids given systemically or injected into joints or the breast have been reported to cause temporary reduction of lactation. See also [Hydrocortisone, Topical](#).

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Cortisol in breastmilk might have a role in intestinal maturation, the intestinal microbiome, growth, body composition or neurodevelopment, but adequate studies are lacking.[1] Concentrations follow a diurnal rhythm, with the highest concentrations in the morning at about 7:00 am and the lowest concentrations in the late afternoon and evening.[2,3] Cortisol concentration in milk also increase with infant age and decrease with complementary feeding and infant illness.[4] Cortisol in milk may protect against later infant obesity, especially in girls;[5] however, in another study, milk glucocorticoid levels were positively associated with percent fat mass, adiposity and head circumference at 1 year of age.[6] Maternal stress can increase breastmilk cortisol levels, especially with preterm births.[7,8] Some information indicates that maternal adverse childhood experiences may decrease cortisol concentration in their breastmilk.[9]

Drug Levels

Numerous methods have been used to measure cortisol in milk. Some have measured only unconjugated cortisol and others have hydrolyzed sulfate and glucuronide conjugates to measure total cortisol. Neonates are unable to deconjugate these moieties, so the age of the infant affects the relevance of findings.[10]

Maternal Levels. Cortisol was measured in the colostrum and milk of 11 women monthly for up to 12 months postpartum. Levels in late pregnancy averaged 24.5 mcg/L and fell over the first 10 days postpartum to an average of 1.8 mcg/L. Milk cortisol levels between months 2 and 12 averaged 7.2 mcg/L, but varied with time and among individuals (range 0.2 to 32 mcg/L).[11]

Free cortisol was measured in 13 women on days 1, 2, and 3 postpartum (7 spontaneous births) or days 3, 4, and 5 postpartum (6 elective cesarean sections). Milk levels were measured before and after nursing, but the values were not statistically different. In the women with spontaneous deliveries, before and after milk levels averaged 17.2 mcg/L on day 1, 16.8 mcg/L on day 2, and 7.4 mcg/L on day 3 postpartum. In the women with cesarean deliveries, before and after milk levels averaged 26.5 mcg/L on day 3, 15.1 mcg/L on day 4, and 14.1 mcg/L on day 6 postpartum.[12]

Thirteen full-term mothers donated milk between 8 and 28 weeks postpartum. Unconjugated cortisol concentrations ranged from 1.45 to 8.34 mcg/L.[10]

A study compared 10 mothers who delivered preterm (<32 week) infants to 10 who delivered at 37 weeks or greater. Breastmilk cortisol concentrations were 50% lower in mothers of preterm infants in the first week postpartum, although the difference was not statistically significant.[3]

A study of 23 mothers found that the average cortisol concentration in breastmilk was 1.6 mcg/L over 24 hours. Concentrations were highest in the morning between 4:00 am and 10:00 am and lowest in the evening between 4:00 pm to 10:00 pm.[2]

Cortisol was measured in the breastmilk of 22 women who delivered preterm infants between 28 and 32 weeks of gestation. The average cortisol concentration in breastmilk was 4.48 mcg/L with considerable variation. Mothers who gave birth before 30 weeks of gestation had an average cortisol concentration of 1.61 mcg/L and those who delivered after 30 weeks had an average concentration of 2.16 mcg/L.[13]

Three hundred fifty-four milk samples were collected by 170 mothers of preterm infants in the morning at about 5 and 10 days and at 4 months corrected age. The median concentration of cortisol in preterm milk was 0.5 mcg/L (range 0.03 to 3.7 mcg/L) and of cortisone was 4.3 mcg/L (range 0.3 to 15.5 mcg/L). Cortisone concentrations were greater than cortisol at all time points. The cortisol concentration was higher in mature milk than in samples collected on days 5 and 10: day 5: 0.6 mcg/L; day 10: 0.5 mcg/L; 4 months 1.2 mcg/L. In contrast, cortisone concentrations did not change significantly over time: day 5, 5.2 mcg/L; day 10, 5.0 mcg/L; 4 months, 4.5 mcg/L. Mothers who received a complete course of antenatal corticosteroids had lower

concentrations of cortisol (mean difference -0.3 mcg/L) and cortisone (mean difference -1.8 mcg/L) than mothers who did not.[14]

Thirty-eight healthy nursing mothers provided 24-hours milk samples during the first, third and sixth month of lactation. Cortisol concentrations averaged 11.2, 11.2, and 12 mcg/L, respectively. No associations were detected related to maternal or infant characteristics that were measured such as maternal psychological status and infant psychomotor development.[15]

Forty-eight women from upstate New York donated milk samples for cortisol analysis. Milk cortisol levels ranged from 0.98 to 10.07 mcg/L. Milk cortisol increased by 7.1% with each month of child age. Introduction of complementary foods was associated with a 41% lower milk cortisol and current symptoms of child illness were associated with 33% lower milk cortisol.[4]

Infant Levels. Relevant published information was not found as of the revision date.

Effects in Breastfed Infants

None reported with any systemic corticosteroid.

Effects on Lactation and Breastmilk

Published information on the effects of hydrocortisone on serum prolactin or on lactation in nursing mothers was not found as of the revision date. Medium to large doses of corticosteroids given systemically or injected into joints or the breast have been reported to cause temporary reduction of lactation.[16-20]

A study of 46 women who delivered an infant before 34 weeks of gestation found that a course of another corticosteroid (betamethasone, 2 intramuscular injections of 11.4 mg of betamethasone 24 hours apart) given between 3 and 9 days before delivery resulted in delayed lactogenesis II and lower average milk volumes during the 10 days after delivery. Milk volume was not affected if the infant was delivered less than 3 days or more than 10 days after the mother received the corticosteroid.[21] An equivalent dosage regimen of hydrocortisone might have the same effect.

A study of 87 pregnant women found that betamethasone given as above during pregnancy caused a premature stimulation of lactose secretion during pregnancy. Although the increase was statistically significant, the clinical importance appears to be minimal.[22] An equivalent dosage regimen of hydrocortisone might have the same effect.

Alternate Drugs to Consider

(Systemic) [Methylprednisolone](#), [Prednisolone](#), [Prednisone](#)

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Substance Identification

Substance Name

Hydrocortisone

CAS Registry Number

50-23-7

Drug Class

Breast Feeding

Lactation

Milk, Human

Corticosteroids, Systemic

Glucocorticoids

Anti-Inflammatory Agents