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Lamotrigine

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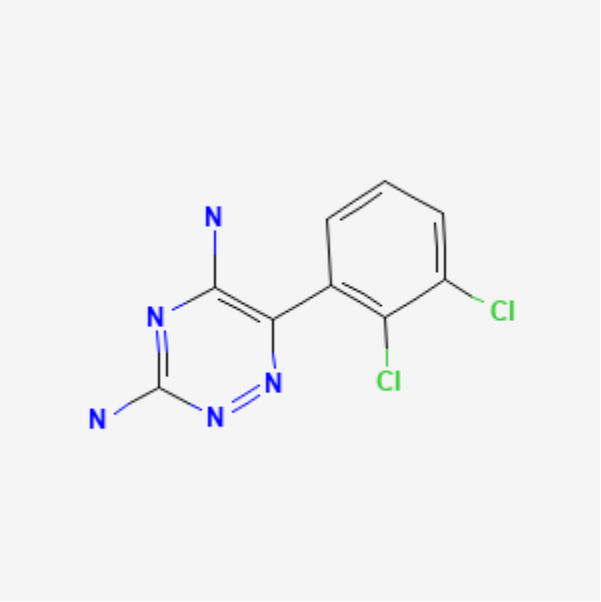

Drug Levels and Effects

Summary of Use during Lactation

Breastfeeding during lamotrigine monotherapy does not appear to adversely affect infant growth or development in most infants. Breastfed infants had higher IQs and enhanced verbal abilities than nonbreastfed infants at 6 years of age in one study.[1] Occasional adverse reactions have been reported in infants who receive lamotrigine in milk. Breastfed infants should be carefully monitored for side effects such as apnea, rash, drowsiness or poor sucking, including measurement of serum levels to rule out toxicity if there is a concern. Monitoring of the platelet count and liver function and infant serum concentrations before and after increases in maternal lamotrigine dosage might also be advisable. If an infant rash occurs, breastfeeding should be discontinued until the cause can be established. If the mother requires lamotrigine, it is not a reason to discontinue breastfeeding. A safety scoring system finds lamotrigine possible to use during breastfeeding.[2] It is

important to monitor maternal serum lamotrigine concentration after delivery and adjust the dosage accordingly, because maternal serum levels can increase after delivery.

Drug Levels

In published reports of anticonvulsant use during breastfeeding, most women were taking a combination of anticonvulsants. Some other anticonvulsants (e.g., phenytoin, carbamazepine) stimulate the metabolism of other drugs including anticonvulsants, whereas others (e.g., valproic acid) inhibit the metabolism of other drugs. Therefore, the relationship of the maternal dosage to the concentration in breastmilk can be quite variable, making calculation of the weight-adjusted percentage of maternal dosage less meaningful than for other drugs in this database.

Maternal Levels. An epileptic woman took oral lamotrigine 300 mg daily throughout pregnancy and postpartum. After 6 weeks postpartum, the dosage was reduced to 200 mg daily. Breastmilk lamotrigine levels (time with respect to the doses not stated) on a dose of 300 mg daily ranged from 2.4 to 6.5 mg/L. After reducing the maternal dosage to 200 mg daily, the milk levels were 1.95 and 1.26 mg/L at days 64 and 92 postpartum, respectively.[3]

A woman with epilepsy was taking lamotrigine at a dosage of 300 mg daily in the last half of pregnancy and postpartum. At 2 weeks postpartum, breastmilk samples taken before the morning dose, before and after nursing, were 5.6 and 5.7 mg/L, respectively.[4]

Thirty-four women with 35 births had breastmilk lamotrigine levels monitored. Specific dosages and milk levels were not reported in the abstract, but the authors stated that they calculated that some of the infants received a mg/kg dosage that would be expected to produce therapeutic serum levels. However, infant serum levels were not reported.[5]

Nine mothers with epilepsy mothers with 10 pregnancies taking lamotrigine in daily dosages averaging 411 mg daily (range 100 to 800 mg daily) had their breastmilk lamotrigine levels monitored between days 13 and 18 postpartum before and after nursing. (One of the mothers had her first of 2 pregnancies reported previously in reference [2]) Three of the women were also taking other anticonvulsants that induce lamotrigine metabolism; one was taking valproic acid that inhibits lamotrigine metabolism. The average prenursing breastmilk level was 7.4 mg/L (range 1 to 8.2 mg/L), 11.8 hours after the previous dose. The average postnursing level was 5.6 mg/L (range 1 to 8.2 mg/L); one mother had taken a dose during nursing. The authors estimated that these exclusively breastfed infants would receive between 0.2 and 1 mg/kg daily or about 9% (range 2 to 20%) of the maternal weight-adjusted dosage.[6,7]

Six nursing mothers who were taking lamotrigine in an average dosage of 6.3 mg/kg daily (range 1.75 to 12.5 mg/kg daily)collected milk over 1 to 2 dosage intervals. The mean infant daily dosage of lamotrigine in breastmilk was 0.45 mg/kg daily (range 0.1 to 0.75 mg/kg daily) which was 7.6% (range 5.7 to 9.9%) of the maternal weight-adjusted dosage.[8]

A hospital laboratory evaluated all requests for lamotrigine concentration measurements. Mothers were taking between 50 to 500 mg of lamotrigine daily in the postpartum period. Milk concentrations ranged from 0.3 to 10.3 mg/L.[9]

Twenty-four nursing mothers taking lamotrigine had serum and breastmilk concentrations measured on several occasions. The average lamotrigine dosage was 387 mg daily (range 50 to 800 mg daily) or 5.93 mg/kg daily (range 0.99 to 14.34 mg/kg daily). The average breastmilk concentration of all samples was 3.4 mg/L (range 0.5 to 11.8 mg/L). The authors estimated that an exclusively breastfed infant would receive an average dosage of 0.51 mg/kg daily which was equivalent to 9.2% (range 3.1 to 21.1%) of the maternal weight-adjusted maternal dosage.

Among 16 women who donated multiple serial milk samples, the peak milk concentrations occurred about 3 hours after the dose and averaged 2.3 times the average minimum milk concentration.[10]

Four women who were taking lamotrigine during pregnancy and postpartum had their milk analyzed for lamotrigine twice between 1 to 12 weeks postpartum. Maternal dosages ranged from 250 to 900 mg daily and milk concentrations ranged from 2.8 to 8 mg/L.[11]

A mother was taking 875 mg of lamotrigine daily at term and her dosage was slowly reduced by 25 mg daily at weekly intervals beginning 2 weeks postpartum. On day 22 postpartum with a dose of 600 mg daily, her milk lamotrigine level was 7.68 mg/L 13 hours after a dose and on day 25, it was 10.06 mg/L 3.5 hours after the same dose. From days 28 to 64 postpartum on doses of 525 to 575 mg daily, milk samples contained 7.02 to 8.71 mg/L of lamotrigine 12 to 14 hours after a dose. The authors estimated that the infant's daily dosage on day 22 was 1.15 mg/kg, equating to 13% of the maternal weight-adjusted dosage.[12]

Nine women taking lamotrigine for epilepsy had colostrum or milk samples taken at random times between 30 minutes and 3 days postpartum. The average maternal dose was 311 mg daily (range 50 to 500 mg daily) and the average milk level was 3 mg/L (range 1.6 to 8.7 mg/L). Milk levels correlated with maternal serum levels, but not with maternal dosage.[13]

Thirty-nine nursing mothers who were taking lamotrigine alone or with drugs that induce (n = 3) or inhibit (n = 2) lamotrigine's metabolism had both serum and breastmilk samples taken between days 6 and 33 postpartum over the period of 2002 to 2017. Most sampling occurred before the first morning dose. The mean breastmilk lamotrigine concentration was 2.8 mg/L (range <0.66 to 9.1 mg/L) Milk concentrations were highly correlated with maternal serum concentrations.[14]

Five samples of breastmilk were obtained from women after taking a 100 mg dose of lamotrigine. Concentrations between 8 and 12 hours after a dose were in the range of 3.9 to 5.7 mcg/L.[15]

Seventeen nursing mothers who were taking lamotrigine therapeutically in doses ranging from 1.6 to 7.6 mg/kg daily donated a milk sample before the morning lamotrigine dose, and again at 1, 3, 6, 9, and 12 hours after the dose. The highest milk lamotrigine concentrations occurred at 2 to 4 hours after the dose, with considerable interindividual variability. The average milk level was 2.75 mg/L (range 0.65 to 7.8 mg/L). The estimated infant daily dose of lamotrigine was 0.40 mg/kg (range 0.21 to 0.73 mg/kg) for the 13 infants who were fully breastfed. The relative infant dosages of those 13 infants averaged 11.6% (range 5 to 31%). The authors found no significant correlation between the maternal weight-adjusted daily dosage and breastmilk trough or AUC values. However, there was high correlation between maternal trough serum concentrations and trough breastmilk concentrations and breastmilk AUC values.[16]

One hundred thirty women taking lamotrigine monotherapy during pregnancy and postpartum had measurements of lamotrigine in colostrum taken between days 2 and 5 postpartum usually before the morning dose for routine monitoring. Colostrum lamotrigine levels averaged 1.4 mg/L (range 0.3 to 10.3) mg/L, but averaged 1.6 mg/L in eight women taking a concomitant enzyme inducer and 4.9 mg/L in nine mothers taking concomitant valproic acid.[17]

Infant Levels. An infant was exclusively breastfed from day 2 of age during maternal treatment with lamotrigine 300 mg daily. Infant total serum level at 2 days of age was 2.8 mg/L (free drug 1.2 mg/L), reflecting transplacental passage. Serum levels taken periodically 2 to 3 hours after the morning dose and 1 to 2 hours after breastfeeding ranged from 1.7 to 2.7 mg/L (free drug 0.73 to 1 mg/L). After maternal dosage reduction to 200 mg daily and 50% formula supplementation, total serum levels on days 64 and 92 dropped to 1.54 and 0.75 mg/L (free drug 0.53 and 0.24 mg/L), respectively. Infant serum levels were undetectable (total <0.2 mg/L; free <0.1 mg/L) on days 144 and 145 with only one breastfeeding daily.[3]

The 2-week old breastfed infant of a mother taking lamotrigine 300 mg daily had a level of 1.4 mg/L before the mother's morning dose.[4]

The plasma levels of 10 breastfed infants of 9 mothers taking lamotrigine during pregnancy and postpartum were monitored after birth. Most were breastfed from day 1 or 2 of age. Their transplacentally acquired plasma levels, which were similar to maternal plasma levels at birth, generally dropped slightly over the first 72 hours of life. Infant plasma levels 2 to 3 weeks postpartum averaged 1.7 mg/L (range 0.5 to 3.3 mg/L) before nursing about 11.8 hours after the previous maternal dose and 1.5 mg/L (range <0.5 to 2.5 mg/L) after nursing. Infant plasma levels averaged 30% (range 23 to 50%) of their mothers' plasma levels at that time.[6,7]

One breastfed infant whose mother was taking lamotrigine had a serum concentration of 1.7 mg/L 10 days after delivery. This was 30.4% of the maternal serum concentration.[18]

Four infants of mothers taking lamotrigine monotherapy during pregnancy and lactation for partial seizures had their plasma levels monitored on day 10 of age (sampling time with respect to dose or nursing not reported). Maternal dosages were 200, 400, 750, and 800 mg and the respective infant's serum levels were <1, 1.8, 2, and 1.3 mg/L. Repeat levels in 2 infants at 2 months of age were 1.7 and 1.9 mg/L (previously 1.8 and 1.3 mg/L, respectively). Infant plasma levels ranged from 0 to 43% of maternal plasma levels at 10 days of age and 20 and 23% of maternal levels at 2 months when they were partially breastfed, each receiving formula for 2 or 3 feedings daily.[19]

Six infants with a median age of 4.1 months (range 0.1 to 5.1 months) were breastfed during maternal use of lamotrigine in an average dosage of 6.3 mg/kg daily. Five were exclusively breastfed and one was about 50% breastfed. Single serum levels taken at various times after the maternal dose averaged 0.6 (range 0.3 to 0.9 mg/L) which averaged 18% (range 3 to 33%) of maternal serum levels.[8]

A hospital laboratory evaluated all requests for lamotrigine concentration measurements. Mothers were taking between 50 to 500 mg of lamotrigine daily. Infants serum concentrations averaged 88% of their mothers' serum concentrations at delivery and averaged 45 to 55% of their mothers' serum concentrations at 3, 7, 14 and 30 days after delivery, although the percentage of infants who were breastfed was not stated. Infants who were breastfed (extent not stated) had serum concentrations ranging from <0.1 to 12.7 mg/L.[9]

Simultaneous infant and maternal serum lamotrigine concentrations were obtained from 12 mother-infant pairs during maternal use of lamotrigine. Total infant serum concentrations of lamotrigine averaged 18.3% of maternal serum concentrations, but unbound infant serum concentrations averaged 30.9% of maternal levels, probably because the drug was less bound in the infants' serum. In 4 mother-infant pairs who had simultaneous serum sampling at delivery and again during the first 4 weeks postpartum, infant/maternal serum concentration ratios averaged 12.2 (total) and 6.2 (unbound) times higher at delivery than at the second sampling. These decreases indicate that exposure to lamotrigine during breastfeeding is much less than exposure during pregnancy.[10]

The Berlin Teratogen Information Service evaluated 29 infants whose mothers were taking lamotrigine. Serum levels were measured under steady-state condition more than 10 days after birth (mean 6.4 weeks). The mean serum level was 1.8 mg/L (range <0.4 to 6.6 mg/L). Eighteen babies (62%) had lamotrigine serum levels within therapeutic range of 1 to 10 mg/L.[20]

Four breastfed infants (extent not stated), whose mothers were taking lamotrigine in dosages ranging from 250 to 900 mg daily, had serum lamotrigine concentrations measured twice after breastfeeding between 1 and 12 weeks postpartum. The median serum concentration in the infants was 2.2 mg/L (range 1.7 to 3.3 mg/L), which was 26% of the median maternal serum concentrations.[11]

An infant was fully breastfed by a mother taking lamotrigine during pregnancy and postpartum. The infant had a serum concentration of 7.7 mg/L at 12 hours of life and 5.8 mg/L on day 3 of life while his mother was taking

875 mg daily of lamotrigine. On day 16, 4 hours after the maternal dose and 3 hours after breastfeeding, the infant's serum concentration was 4.9 mg/L with a maternal dose of 850 mg daily. Breastfeeding was terminated on day 17 because of an severe apneic episode in the infant; on day 22, the infant's serum concentration was 1.3 mg/L and on day 25 it was 0.5 mg/L.[12]

A computer simulation of 300 cases in which the mother was receiving 200 mg of lamotrigine daily estimated that a fully breastfed infant would receive an average of 2 mg of lamotrigine daily and develop average serum concentration of 1 mg/L.[21]

Three breastfed preterm infants whose mothers were taking lamotrigine 200 mg daily had serum lamotrigine levels measured. One infant whose mother was taking no other drugs, had undetectable serum lamotrigine. The other two infants were twins whose mother was taking other unspecified medications for bipolar disorder. They reportedly had serum levels "within the therapeutic range". Whether the infants were exposed prenatally was not stated.[22]

Four mothers treated with lamotrigine for bipolar disorder in dosages of 100 to 300 mg daily fully breastfed their infants. Infant and maternal serum samples were obtained between 1.5 and 5 weeks postpartum. The infant serum levels averaged 32.5% (range 18 to 46%) of the maternal serum levels.[23]

A woman was taking lamotrigine 120 mg daily for epilepsy during pregnancy, which was increased to 200 mg daily during the third trimester. The dosage was reduced to 150 mg daily postpartum. Her 40-day-old infant developed anemia, possibly associated with lamotrigine and had a serum lamotrigine concentration of 1.4 mg/L.[24]

Thirty-eight infants breastfed by mothers who were taking lamotrigine alone or with drugs that induce (n = 4) or inhibit (n = 4) lamotrigine's metabolism had both serum samples taken between days 6 and 33 postpartum over the period of 2002 to 2017. Most sampling occurred before the first morning dose. The mean infant serum lamotrigine concentration was 1.6 mg/L (range <0.66 to 3.8 mg/L) Serum concentrations were highly correlated with maternal serum concentrations. The mean ratio of infant to maternal serum concentrations was 0.34. The mean ratio between infant serum concentration and maternal milk concentration was 0.94.[14]

In a multicenter study of nursing mother-infant pairs, 70 infants had blood samples taken at about the same time as maternal blood samples. Sixty-three of the infants had blood levels of lamotrigine above the lower limit of quantification (0.1 mg/L). The authors estimated the average infant lamotrigine serum concentration to be 1.6 mg/L (range 0.05 to 8.5 mg/L), assuming unquantifiable serum concentrations to be 50% of the lower limit of quantification. Median infant blood levels were 28.9% (range 0.6 to 90.3%) of their mothers' blood levels.[25]

One hundred twenty-nine infants whose mothers were taking lamotrigine monotherapy during pregnancy and postpartum had measurements of lamotrigine in serum taken between days 2 and 5 (median 3 days) postpartum, usually before the morning maternal dose, for routine monitoring. Their average serum concentration was 1.9 mg/L. Lamotrigine serum levels averaged 1 mg/L in the infants of four women taking a concomitant enzyme inducer and 5.5 mg/L in the infants of ten mothers taking concomitant valproic acid.[17]

Five prospectively followed breastfed infants whose mothers were taking lamotrigine in dosages of 50 to 400 mg daily had serum lamotrigine concentrations measured 3 to 7 times (average 5.2 times) during the first 6 months of life. Except for an infant whose mother was taking 50 mg daily, all infants had serum concentrations in the therapeutic range in adults (range 1.2 to 2.9 mg/L; mean 2.2 mg/L) after 1 month of age. Two infants had at least one plasma level in the adult therapeutic range for epilepsy, 2.8 and 2.9 mg/L. Infant serum concentrations decreased in each case after switching to mixed feeding or maternal dosage reduction.[26]

Follow-up data was compiled from 107 visits of 47 breastfed infants whose mothers were taking lamotrigine seen at a Swedish medical center over an 11-year period. Two-thirds of the infants were exclusively breastfed from birth to over 2 months of age. Mean infant lamotrigine serum concentration

was 4.98 micromoles/L (1.3 mg/L) and the mean infant to mother serum concentration ratio was 0.27. Infant lamotrigine concentrations were slightly higher in the first month of life with lower concentrations thereafter. Around a fifth of the exposed infants reached a therapeutic serum level of lamotrigine.[27]

Effects in Breastfed Infants

One infant was exclusively breastfed from day 2 of life during maternal lamotrigine 300 mg daily, which was decreased at 6 weeks postpartum to 200 mg daily and 50% formula was introduced. Examinations every 4 weeks showed normal development and no evidence of intellectual disabilities or neurologic deficits. An electroencephalogram at 4 weeks of age showed no signs of pathology.[3]

A breastfed infant whose mother was taking lamotrigine 300 mg daily during pregnancy and postpartum had no observable adverse effects up to 5 months of age.[4]

The same authors reported 9 previously unreported infants who were breastfed during maternal lamotrigine therapy (dosage range 100 to 800 mg daily) with no adverse effects.[6,7]

Thirty-five pregnancies in 34 mothers who were taking lamotrigine during pregnancy were monitored. An unstated fraction of them breastfed their infants. No adverse effects in infants were observed.[5]

An exclusively breastfed infant whose mother was taking lamotrigine 200 mg and levetiracetam 2.5 g daily during pregnancy and lactation appeared healthy to the investigators throughout the 6- to 8-week study period.[28]

The breastfed infant of a woman taking lamotrigine 300 mg daily developed normally during the first 4 months of life and no adverse effects were observed.[29]

A 6-week-old infant developed apparent withdrawal symptoms after abrupt weaning by a mother who was taking lamotrigine 200 mg daily during late pregnancy and postpartum. Symptoms included loss of appetite, neuromotor hyperexcitability and irritability. Symptoms occurred 2 weeks after weaning and were completely alleviated within 48 hours after instituting lamotrigine 1 mg/kg daily in the infant. Neuromotor development of the infant normalized 1 month after discontinuing therapy.[30] The reaction is rated as probably caused by lamotrigine in breastmilk.

The Berlin Teratogen Information Service evaluated 61 infants exposed to lamotrigine in breastmilk (46 prospectively and 15 retrospectively). The mean maternal lamotrigine dosage was 304 mg/day (range 25 to 1150 mg/day), the mean follow up time after birth was 11.5 weeks (range 1 to 44 weeks). Twelve infants had symptoms not related to prematurity, including feeding problems, persistent crying, gastrointestinal symptoms, icterus prolongatus and irritability. In the prospective group, symptoms occurred in 7 infants (15.2%). Liver enzymes were measured in 15 babies. Three infants had elevated SGOT 112–143 units/L and SGPT 112–181 units/L (age 13, 14 and 14 weeks, lamotrigine serum levels 2.3 to 6.6 mg/L). In two of the three cases liver enzymes normalized after discontinuation of breast feeding. There was no enzyme control in the third child.[20]

Six infants with a median age of 4.1 months (range 0.1 to 5.1 months) were breastfed during maternal use of lamotrigine in an average dosage of 6.3 mg/kg daily. Five were exclusively breastfed and one was about 50% breastfed. No adverse effects were noted by the mothers or the attending pediatricians. A clinical pediatric assessment in 3 of the infants also revealed no adverse effects.[8]

Thirty infants whose mothers were taking lamotrigine were followed during breastfeeding. None of the infants developed a rash. Among infants who were monitored by laboratory testing, no abnormalities in liver tests, electrolytes (n = 10) or hematocrits (n = 8) were noted. Elevated platelet counts were observed in 7 of 8 infants tested (average age 3.8 weeks, range 2 to 10 weeks), with no adverse clinical effects.[10]

A mother was taking 875 mg of lamotrigine daily at term and her dosage was slowly reduced by 25 mg daily at weekly intervals beginning 2 weeks postpartum. Her infant was fully breastfed and on day 16 postpartum while she was taking 850 mg daily, the infant experienced a severe apneic episode requiring cardiac compressions to maintain perfusion and was responsive only to painful stimuli. The infant's mother was taking a high dosage and had extensive drug excretion into breastmilk, and the infant's serum concentration was at the high end of the therapeutic range for children, but the fact that no adverse effects had occurred prior to day 16 could not be explained. Lamotrigine was assessed to be the probable causes of the apneic episode.[12]

Three women with bipolar disorder breastfed their infants during pregnancy and breastfeeding. One took 50 mg daily at term and increased her dose to 200 mg within one month. She reportedly breastfed her infant exclusively for 12 months. An unrelated infant rash occurred at 4 months of age, but the infant's growth and development were normal at 18 months of age. Another woman took lamotrigine 250 mg daily while she breastfed (extent not stated) her infant for several weeks. The infant's growth and development were normal at 18 months of age. The third mother also took 250 mg daily while breastfeeding (extent not stated) for at least 15 months. At 4 months of age, the infant developed a rash on the neck that resolved spontaneously; the infant's growth and development were normal at 15 months of age.[31]

Five breastfed preterm infants were reported whose mothers were taking lamotrigine. Transient elevation of liver enzymes occurred in twins whose mother was taking other unspecified medications for bipolar disorder. No adverse effects were seen in the other infants.[22]

A prospective cohort study in Norway followed infants of mothers who took antiepileptic drugs during pregnancy and lactation and compared to infants with mothers with untreated epilepsy and infants with fathers who took antiepileptics as control groups. Of the 223 mothers studied, 71 were taking lamotrigine monotherapy. Infants were assessed at 6, 18 and 36 months of age. Continuous breastfeeding in children of women using antiepileptic drugs was associated with no greater impaired development than those with no breastfeeding or breastfeeding for less than 6 months.[32,33]

In a long-term study on infants exposed to anticonvulsants during breastfeeding, no difference in average intelligence quotient at 3 years of age was found between infants who were breastfed (n = 30) a median of 6 months and those not breastfed (n = 36) when their mothers were taking lamotrigine.[34] Breastfeeding during phenytoin monotherapy does not appear to adversely affect infant growth or development, and breastfed infants had higher IQs and enhanced verbal abilities than nonbreastfed infants at 6 years of age in one study.[1] Combination therapy with sedating anticonvulsants or psychotropics may result in infant sedation or withdrawal reactions.

All adverse reactions in breastfed infants reported in France between January 1985 and June 2011 were compiled by a French pharmacovigilance center. Of 174 reports, lamotrigine was reported to cause adverse reactions in 6 infants and to be one of the drugs most often suspected in serious adverse reactions, such as sedation, hypotonia, weight loss and liver damage.[35]

In a case series of 6 women who took lamotrigine throughout pregnancy and postpartum in dosages between 200 and 400 mg daily, 4 of them breastfed their infants. One breastfed for only 2 days, 1 was exclusively breastfeeding at 3 weeks postpartum, and 2 were feeding both breastmilk and formula at 8 to 13 weeks postpartum. None of the infants appeared to be adversely affected.[36]

A woman with bipolar disorder took lamotrigine 100 mg and quetiapine 25 mg daily for the treatment of bipolar disorder during two pregnancies. After the first birth, she did not breastfeed, but she breastfed (extent not stated) the second infant. At the 2-month well baby checkup, the infant was meeting all developmental milestones.[37]

Two women received lamotrigine for postpartum bipolar II postpartum depression. One took 50 mg daily and the other took a combination of 300 mg lamotrigine and 300 of quetiapine daily while breastfeeding (extent not stated). The authors reported no major adverse reactions in their breastfed infants.[38]

A 12-day-old exclusively breastfed male infant presented with severe weight loss and hypernatremic dehydration because of inadequate milk intake and a 30% weight loss since birth. The infant's mother was being treated for bipolar disorder with lamotrigine 250 mg orally once daily, aripiprazole 15 mg orally once daily, and sertraline 100 mg orally once daily. She was also taking levothyroxine 50 mcg once daily, a prenatal multivitamin, and folic acid. On initial evaluation in the emergency department, he was pale, with marbled skin, dry mucous membranes, decreased skin turgor, and bluish feet with prolonged capillary refill. The right foot eventually became darker with blackened toes and he developed gangrene of the right lower limb, which did not respond to medical therapy and required amputation of all five toes and surgical debridement of the metatarsals. Necrosis was attributed to arterial microthrombi caused by disseminated intravascular coagulation after severe dehydration. The authors considered the mother's medications as a possible cause of the dehydration and related problems.[39]

A woman was taking lamotrigine during pregnancy and postpartum for epilepsy. Her 40-day-old full-term breastfed infant was admitted to the hospital for crying and refusal of food. Laboratory examination revealed anemia, thought to be caused by lamotrigine. The infant's serum lamotrigine concentration was 1.4 mg/L. Breastfeeding was reduced, but after 10 days, anemia had not improved and an asymptomatic neutropenia was found. Breastfeeding was discontinued and the blood tests normalized over the next 2 weeks. The reaction was possibly caused by lamotrigine in breastmilk.[24]

A retrospective study in Japan compared the outcome of 20 full-term, mostly exclusively infants breastfed by mothers taking lamotrigine in an average dosage of 161 mg daily (range: 50–400 mg daily) to a comparable control group of mothers. Infants were followed until 1 moth of age at which time the exclusive breastfeeding rate was 55%. Five of the women taking lamotrigine were also taking other psychotropic drugs which were phenytoin and phenobarbital in one mother, with the others unspecified. Although some adverse effect were reported, drowsiness (n = 3), skin rash (n = 11), jaundice (n = 8), heart murmur (n = 1), poor suckling (n = 1), and retractive breathing (n = 1), the frequency was no greater than in the control group at one-month of age.[40]

In a study of 17 nursing mothers who were taking lamotrigine therapeutically in doses ranging from 1.6 to 7.6 mg/kg daily, 13 infants were exclusively breastfed 4 were between 50% and 75% breastfed. The mothers reported no adverse effects in their breastfed infants during the study and none of the mothers reported developmental problems in their infants in follow-up telephone calls when the infants reached 12 to 24 months of age.[16]

A retrospective study of 102 women with epilepsy found that women taking lamotrigine were less likely to initiate and continue breastfeeding at 3 months postpartum than women taking levetiracetam.[41]

In a multicenter study of women in the United Kingdom exposed to anticonvulsants during pregnancy and breastfeeding, 84 women who were exposed to anticonvulsants breastfed their infants were compared to 81 women not exposed to antiseizure medications. Of the women taking anticonvulsants, 33% were taking lamotrigine alone. No negative effect of breastfeeding was observed in cognitive, language or motor development in the breastfed infants at 1 and 2 years, although only 29% of women breastfed longer than 3 months.[42]

One breastfed infant whose mother was taking lamotrigine reportedly developed transient neutropenia and increased transaminases, but other possible causes were not ruled out.[26]

Follow-up data was compiled from 107 visits of 47 breastfed infants whose mothers were taking lamotrigine seen at a Swedish medical center over an 11-year period. Two-thirds of the infants were exclusively breastfed from birth to over 2 months of age. One infant had somnolence and absence attacks, which ceased when breastfeeding was discontinued. Moderate and transient elevations of alanine aminotransferase were seen in 3 infants, 14% of

the exposed infants where liver enzymes were measured, with the maximal ALT values at age 2 to 5 months of age. All aspartate transaminase levels were within the normal range. Four infants (20%) had not reached their birth weight at their 2-week visit, and 3 infants had inadequate weight gain at the later follow-up visits.

Effects on Lactation and Breastmilk

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

Alternate Drugs to Consider

(Seizure Disorder) Carbamazepine, Divalproex, Gabapentin, Oxcarbazepine, Phenytoin, Valproic Acid

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Substance Identification

Substance Name

Lamotrigine

CAS Registry Number

84057-84-1

Drug Class

Breast Feeding

Lactation

Milk, Human

Anticonvulsants

Antimanic Agents

Antidepressive Agents