

CPAP May Improve Cognition in Alzheimer's

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DENVER — Continuous positive airway pressure improved both excessive daytime sleepiness and—in a particularly encouraging finding—cognitive function in a randomized trial involving Alzheimer's disease patients with obstructive sleep apnea, investigators reported at the annual meeting of the Associated Professional Sleep Societies.

"This is preliminary, but it seems to be quite promising. If in fact we can do anything to at least slow down deterioration of cognition—if not actually improve it—then that might postpone institutionalization, which will save billions of dollars as well as improving quality of life for these patients," observed Sonia Ancoli-Israel, Ph.D., who is professor of psychiatry at the University of California in San Diego.

Sleep-disordered breathing is exceed-

ingly common in Alzheimer's disease patients, she noted.

Various studies have put the prevalence of obstructive sleep apnea (OSA) in patients with dementia at 50%-90%, depending on the criteria used.

Moreover, demented patients with severe OSA have significantly worse dementia than those with mild to moderate OSA and individuals with severe dementia have significantly more sleep-disordered breathing than those with milder dementia.

"Clearly there is some association between how much one can breathe at night and how much dementia one might have. Do I think that sleep apnea causes dementia? No, I don't—but I do think that if someone is already demented and you add hypoxia and disturbed sleep on top of that, it's likely to make the dementia worse," Dr. Ancoli-Israel said.

She reported on 40 noninstitutionalized patients with mild to moderate Alzheimer's disease and OSA who were randomized in double-blind fashion to true continuous positive airway pressure (CPAP) or to a control group given a counterfeit respiratory assistance protocol—"affectionately known as CRAP," she said. After 3 weeks of CRAP, patients in the control group were switched to 3 weeks of CPAP.

Those who were already on CPAP continued on the therapy for an additional 3



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DR. ANCOLI-ISRAEL

weeks. A comprehensive neuropsychological test battery was administered at baseline, at 3 weeks, and after 6 weeks.

The first noteworthy finding, Dr. Ancoli-Israel said, was that these Alzheimer's disease patients—whose mean age was 78 years—tolerated CPAP "reasonably well," using the equipment for an average of 5 hours per night. "That's really not that different from what we see in our clinic patients." The patients' mean respiratory disturbance index, a measure of OSA severity, decreased in the CPAP group from a baseline of 30.4 events per hour to 7.2 after 3 weeks and 4.9 per hour after 6 weeks, she reported.

No significant change was seen in the group using CRAP until 3 weeks after those patients had been switched to the real CPAP. Composite neuropsychological test scores improved significantly after 3 weeks of CPAP; no further improvement was seen during the second 3 weeks on the therapy. There was no improvement in neuropsychological test scores after sham therapy, but a significant gain was documented following the switch to CPAP. "The kinds of changes that we're seeing are actually not that different from the changes one sees when patients are put on cognition-enhancing drugs. So this might be an additional way to treat the patient," she said.

In a separate presentation, Dr. Ancoli-Israel's coinvestigator, Mei Chong, M.D., reported that subjective daytime sleepiness in the study cohort also improved significantly with CPAP therapy.

Mean Epworth Sleepiness Scale scores dropped from a baseline of 9.06 to 6.59 after 3 weeks of CPAP and to 5.61 after 6 weeks.

In contrast, 3 weeks of CRAP produced no significant improvement. ■

LAMICTAL* (lamotrigine) Tablets LAMICTAL* (lamotrigine) Chewable Dispersible Tablets

longer latent period for open field exploration and a lower frequency of rearing. In a swimming maze test performed on days 39 to 44 postpartum, time to completion was increased in offspring of dams receiving 25 mg/kg per day. These doses represent 0.1 and 0.5 times the clinical dose on a mg/m² basis, respectively. Lamotrigine did not affect fertility, teratogenesis, or postnatal development when rats were dosed prior to and during mating, and throughout gestation and lactation at doses equivalent to 0.4 times the highest usual human maintenance dose on a mg/m² basis. When pregnant rats were orally dosed at 0.1, 0.14, or 0.3 times the highest human maintenance dose (on a mg/m² basis) during the latter part of gestation (days 15 to 20), maternal toxicity and fetal death were seen. In dams, food consumption and weight gain were reduced, and the gestation period was slightly prolonged (22.6 vs. 22.0 days in the control group). Stillborn pups were found in all 3 drug-treated groups with the highest number in the high-dose group. Postnatal death was also seen, but only in the 2 highest doses, and occurred between day 1 and 20. Some of these deaths appear to be drug-related and not secondary to the maternal toxicity. A no-observed-effect level (NOEL) could not be determined for this study. Although LAMICTAL was not found to be teratogenic in the above studies, lamotrigine decreases fetal folate concentrations in rats, an effect known to be associated with teratogenesis in animals and humans. There are no adequate and well-controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human response, this drug should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. **Non-Teratogenic Effects:** As with other antiepileptic drugs, physiological changes during pregnancy may affect lamotrigine concentrations and/or therapeutic effect. There have been reports of decreased lamotrigine concentrations during pregnancy and restoration of pre-partum concentrations after delivery. Dosage adjustments may be necessary.

Pregnancy Exposure Registry: To facilitate monitoring fetal outcomes of pregnant women exposed to lamotrigine, physicians are encouraged to register patients, before fetal outcome (e.g., ultrasound, results of amniocentesis, birth, etc.) is known, and can obtain information by calling the Lamotrigine Pregnancy Registry at (800) 336-2176 (toll-free). Patients can enroll themselves in the North American Antiepileptic Drug Pregnancy Registry by calling (888) 233-2334 (toll-free).

Labor and Delivery: The effect of LAMICTAL on labor and delivery in humans is unknown.

Use in Nursing Mothers: Preliminary data indicate that lamotrigine passes into human milk. Because the effects on the infant exposed to LAMICTAL by this route are unknown, breast-feeding while taking LAMICTAL is not recommended.

Pediatric Use: LAMICTAL is indicated as adjunctive therapy for partial seizures in patients above 2 years of age and for the generalized seizures of Lennox-Gastaut syndrome. Safety and effectiveness for other uses in patients with epilepsy below the age of 16 years have not been established (see BOX WARNING). Safety and effectiveness in patients below the age of 18 years with Bipolar Disorder has not been established.

Geriatric Use: Clinical studies of LAMICTAL for epilepsy and in Bipolar Disorder did not include sufficient numbers of subjects aged 65 and over to determine whether they respond differently from younger subjects. In general, dose selection for an elderly patient should be cautious, usually starting at the low end of the dosing range, reflecting the greater frequency of decreased hepatic, renal, or cardiac function, and of concomitant disease or other drug therapy.

ADVERSE REACTIONS: (see BOX WARNING regarding the incidence of serious rash).

Epilepsy: Most Common Adverse Events in All Clinical Studies: Adjunctive Therapy in Adults With Epilepsy: The most commonly observed (≥5%) adverse experiences seen in association with LAMICTAL during adjunctive therapy in adults and not seen at an equivalent frequency among placebo-treated patients were: dizziness, ataxia, somnolence, headache, diplopia, blurred vision, nausea, vomiting, and rash. Dizziness, diplopia, ataxia, blurred vision, nausea, and vomiting were dose related. Dizziness, diplopia, ataxia, and blurred vision occurred more commonly in patients receiving CBZ with LAMICTAL than in patients receiving other AEDs with LAMICTAL. Clinical data suggest a higher incidence of rash, including serious rash, in patients receiving concomitant valproate than in patients not receiving valproate (see WARNINGS). Approximately 11% of the 3,378 adult patients who received LAMICTAL as adjunctive therapy in premarketing clinical trials discontinued treatment because of an adverse experience. The adverse events most commonly associated with discontinuation were rash (3.0%), dizziness (2.8%), and headache (2.5%). In a dose response study in adults, the rate of discontinuation of LAMICTAL for dizziness, ataxia, diplopia, blurred vision, nausea, and vomiting was dose related.

Monotherapy in Adults With Epilepsy: The most commonly observed (≥5%) adverse experiences seen in association with the use of LAMICTAL during the monotherapy phase of the controlled trial in adults not seen at an equivalent rate in the control group were vomiting, coordination abnormality, dyspepsia, nausea, dizziness, rhinitis, anxiety, insomnia, infection, pain, weight decrease, chest pain, and dysmenorrhea. The most commonly observed (≥5%) adverse experiences associated with the use of LAMICTAL during the conversion to monotherapy (add-on) period, not seen at an equivalent frequency among low-dose valproate-treated patients, were dizziness, headache, nausea, asthenia, coordination abnormality, vomiting, rash, somnolence, diplopia, ataxia, accidental injury, tremor, blurred vision, insomnia, nystagmus, diarrhea, lymphadenopathy, pruritus, and sinusitis. Approximately 10% of the 420 adult patients who received LAMICTAL as monotherapy in premarketing clinical trials discontinued treatment because of an adverse experience. The adverse events most commonly associated with discontinuation were rash (4.3%), headache (3.1%), and asthenia (2.4%).

Adjunctive Therapy in Pediatric Patients With Epilepsy: The most commonly observed (≥5%) adverse experiences seen in association with the use of LAMICTAL as adjunctive therapy in pediatric patients and not seen at an equivalent rate in the control group were infection, vomiting, rash, fever, somnolence, accidental injury, dizziness, diarrhea, abdominal pain, nausea, ataxia, tremor, asthenia, bronchitis, flu syndrome, and diplopia. In 339 patients age 2 to 16 years, 4.2% of patients on LAMICTAL and 2.9% of patients on placebo discontinued due to adverse experiences. The most commonly reported adverse experiences that led to discontinuation were rash for patients treated with LAMICTAL and deterioration of seizure control for patients treated with placebo. Approximately 11.5% of the 1,081 pediatric patients who received LAMICTAL as adjunctive therapy in premarketing clinical trials discontinued treatment because of an adverse experience. The adverse events most commonly associated with discontinuation were rash (4.4%), infection aggravated (1.7%), and ataxia (0.6%).

Incidence in Controlled Adjunctive Clinical Studies in Adults With Epilepsy: Listed below are treatment-emergent signs and symptoms that occurred in ≥2% of adult patients with epilepsy treated with LAMICTAL in placebo-controlled trials and were numerically more common in the patients treated with LAMICTAL. In these studies, either LAMICTAL or placebo was added to the patient's current AED therapy. Adverse events were usually mild to moderate in intensity.

LAMICTAL was administered as adjunctive therapy to 711 patients; 419 patients received adjunctive placebo. Patients in these adjunctive studies were receiving 1 to 3 of the following concomitant AEDs (carbamazepine, phenytoin, phenobarbital, or primidone) in addition to LAMICTAL or placebo. Patients may have reported multiple adverse experiences during the study or at discontinuation; thus, patients may be included in more than one category. **Treatment-Emergent Adverse Event Incidence in Placebo-Controlled Adjunctive Trials in Adult Patients With Epilepsy (Events in at least 2% of patients treated with LAMICTAL and numerically more frequent than in the placebo group are listed by body system with the incidence for LAMICTAL followed by placebo):** Body as a whole: Headache (29.19), flu syndrome (7.6), fever (6.4), abdominal pain (5.4), neck pain (2.1), infection aggravated (seizure exacerbation) (2.1); **Digestive:** Nausea (19.10), vomiting (9.4), diarrhea (6.4), dyspepsia (5.2), constipation (4.3), tooth disorder (3.2), anorexia (2.1); **Musculoskeletal:** Arthralgia (2.0); **Nervous System:** Dizziness (38.13), ataxia (22.6), somnolence (14.7), incoordination (6.2), insomnia (6.2), tremor (4.1), depression (4.3), anxiety (4.3), convulsion (3.1), irritability (3.2), speech disorder (3.0), concentration disturbance (2.1); **Respiratory:** Rhinitis (14.9), pharyngitis (10.9), cough increased (8.6); **Skin and appendages:** Rash (10.5), pruritus (3.2); **Special Senses:** Diplopia (28.7), blurred vision (16.5), vision abnormality (3.1); **Urogenital (female patients only):** Dysmenorrhea (7.6), vaginitis (4.1), amenorrhea (2.1).

Dose-Related Adverse Events From a Randomized, Placebo-Controlled Trial in Adults With Epilepsy: In a randomized, parallel study comparing placebo and 300 and 500 mg/day of LAMICTAL, some of the following drug-related adverse events were dose related. The adverse events are listed by adverse experience followed by incidence in placebo first, LAMICTAL 300 mg dose second, and LAMICTAL 500 mg dose third: ataxia (10.10, 28), blurred vision (10.11, 25), diplopia (8.24, 49), dizziness (27.31, 54), nausea (11.18, 25), vomiting (4.11, 18). Other events that occurred in more than 1% of patients but equally or more frequently in the placebo group included: asthenia, back pain, chest pain, flatulence, menstrual disorder, myalgia, paresthesia, respiratory disorder, and urinary tract infection. The overall adverse experience profile for LAMICTAL was similar between females and males, and was independent of age. There are insufficient data to support a statement regarding the distribution of adverse experience reports by race. Generally, females receiving either adjunctive LAMICTAL or placebo were more likely to report adverse experiences than males. The only adverse experience for which the reports on LAMICTAL were greater than 10% more frequent in females than males (without a corresponding difference by gender on placebo) was dizziness (difference=16.5%). There was little difference between females and males in the rates of discontinuation of LAMICTAL for individual adverse experiences.

Incidence in a Controlled Monotherapy Trial in Adults With Partial Seizures: Listed below are treatment-emergent signs and symptoms that occurred in at least 5% of patients with epilepsy treated with monotherapy with LAMICTAL in a double-blind trial following discontinuation of either concomitant carbamazepine or phenytoin not seen at an equivalent frequency in the control group. 43 patients received monotherapy with LAMICTAL up to 500 mg/day; 44 received low-dose VPA monotherapy at 1,000 mg/day. Patients in these studies were converted to LAMICTAL or VPA monotherapy from adjunctive therapy with CBZ or PHT. Patients may have reported multiple adverse experiences during the study; thus, patients may be included in more than one category. **Treatment-Emergent Adverse Event Incidence in Adults With Partial Seizures in a Controlled Monotherapy Trial (Events in at least 5% of patients treated with LAMICTAL and numerically more frequent than in the valproate group are listed by body system with the incidence for LAMICTAL followed by valproate):** Body as a whole: Pain (5.0), infection (5.2), chest pain (5.2); **Digestive:** Vomiting (9.0), dyspepsia (7.2), nausea (7.2); **Metabolic and nutritional:** Weight decrease (5.2); **Nervous System:** Coordination abnormality (7.0), dizziness (7.0), anxiety (5.0), insomnia (5.2); **Respiratory:** Rhinitis (7.2); **Urogenital (female patients only):** Dysmenorrhea (5.0).

Adverse events that occurred with a frequency of less than 5% and greater than 2% of patients receiving LAMICTAL and numerically more frequent than placebo were: **Body as a whole:** Asthenia, fever. **Digestive:** Anorexia, dry mouth, rectal hemorrhage, peptic ulcer. **Metabolic and Nutritional:** Peripheral edema. **Nervous System:** Amnesia, ataxia, depression, hyposthesia, libido increase, decreased reflexes, increased reflexes, nystagmus, irritability, suicidal ideation. **Respiratory:** Epistaxis, bronchitis, dyspnea. **Skin and Appendages:** Contact dermatitis, dry skin, sweating. **Special Senses:** Vision abnormality.

Incidence in Controlled Adjunctive Trials in Pediatric Patients With Epilepsy: Listed below are adverse events that occurred in at least 2% of 339 pediatric patients who received LAMICTAL up to 15 mg/kg per day or a maximum of 750 mg per day. LAMICTAL was administered as adjunctive therapy to 163 patients; 171 patients received adjunctive placebo. **Treatment-Emergent Adverse Event Incidence in Placebo-Controlled Adjunctive Trials in Pediatric Patients With Epilepsy (Events in at least 2% of patients treated with LAMICTAL and numerically more frequent than in the placebo group are listed by body system with the incidence for LAMICTAL followed by placebo):** Body as a whole: Infection (20.17), fever (15.14), accidental injury (14.12),

abdominal pain (10.5), asthenia (8.4), flu syndrome (7.6), pain (5.4), facial edema (2.1), photosensitivity (2.0); **Cardiovascular:** Hemorrhage (2.1); **Digestive:** Vomiting (20.16), diarrhea (11.9), nausea (10.2), constipation (4.2), dyspepsia (2.1), tooth disorder (2.1); **Hemic and lymphatic:** Lymphadenopathy (2.1); **Metabolic and nutritional:** Edema (2.0); **Nervous system:** Somnolence (17.15), dizziness (14.4), ataxia (11.3), tremor (10.1), emotional lability (4.2), gait abnormality (4.2), thinking abnormality (3.2), convulsions (2.1), nervousness (2.1), vertigo (2.1); **Respiratory:** Pharyngitis (14.11), bronchitis (7.5), increased cough (7.6), sinusitis (2.1), bronchospasm (2.1); **Skin:** Rash (14.12), eczema (2.1), pruritus (2.1); **Special Senses:** Diplopia (5.1), blurred vision (4.1), ear disorder (2.1), visual abnormality (2.0); **Urogenital:** Urinary tract infection (male and female patients) (3.0), penis disorder (2.0).

Bipolar Disorder:

During the monotherapy phase of the double-blind, placebo-controlled trials of 18 months' duration, 13% of 227 patients who received LAMICTAL (100 to 400 mg/day), 16% of 190 patients who received placebo, and 23% of 166 patients who received lithium discontinued therapy because of an adverse experience. The adverse events which most commonly led to discontinuation of LAMICTAL were rash (3%) and mania/hypomania/mixed mood adverse events (2%). Approximately 16% of 2,401 patients who received LAMICTAL (50 to 500 mg/day) for Bipolar Disorder in premarketing trials discontinued therapy because of an adverse experience; most commonly due to rash (5%) and mania/hypomania/mixed mood adverse events (2%).

Incidence in Controlled Clinical Studies of LAMICTAL for the Maintenance Treatment of Bipolar I Disorder: Listed below are treatment-emergent signs and symptoms that occurred in at least 5% of patients with Bipolar Disorder treated with LAMICTAL monotherapy (100 to 400 mg/day), following the discontinuation of other psychotropic drugs, in 2 double-blind, placebo-controlled trials of 18 months' duration and were numerically more frequent than in the placebo group. LAMICTAL was administered as monotherapy to 227 patients; 190 patients received placebo. Patients in these studies were converted to LAMICTAL (100 to 400 mg/day) or placebo monotherapy from add-on therapy with other psychotropic medications. Patients may have reported multiple adverse experiences during the study; thus, patients may be included in more than one category. **Treatment-Emergent Adverse Event Incidence in 2 Placebo-Controlled Trials in Adults With Bipolar I Disorder (Events in at least 5% of patients treated with LAMICTAL monotherapy and numerically more frequent than in the placebo group are listed by body system with the incidence for LAMICTAL followed by placebo):** General: Back pain (8.6), fatigue (8.5), abdominal pain (6.3); **Digestive:** Nausea (14.11), constipation (5.2), vomiting (5.2); **Nervous System:** Insomnia (10.6), somnolence (9.7), xerostomia (dry mouth) (6.4); **Respiratory:** Rhinitis (7.4), exacerbation of cough (5.3), pharyngitis (5.4); **Skin:** Rash (non serious) (7.5).

Adverse events that occurred in at least 5% of patients and were numerically more common during the dose escalation phase of LAMICTAL in these trials (when patients may have been receiving concomitant psychotropic medications) compared to the monotherapy phase were: headache (25%), rash (11%), dizziness (10%), diarrhea (8%), dream abnormality (6%), and pruritus (6%).

Other events that occurred in 5% or more patients but equally or more frequently in the placebo group included: dizziness, mania, headache, infection, influenza, pain, accidental injury, diarrhea, and dyspepsia. Adverse events that occurred with a frequency of less than 5% and greater than 1% of patients receiving LAMICTAL and numerically more frequent than placebo were: **General:** Fever, neck pain. **Cardiovascular:** Migraine. **Digestive:** Flatulence. **Metabolic and Nutritional:** Weight gain, edema. **Musculoskeletal:** Arthralgia, myalgia. **Nervous System:** Amnesia, depression, agitation, emotional lability, dyspraxia, abnormal thoughts, dream abnormality, hypoesthesia. **Respiratory:** Sinusitis. **Urogenital:** Urinary frequency.

Adverse Events Following Abrupt Discontinuation: In the 2 maintenance trials, there was no increase in the incidence, severity or type of adverse events in Bipolar Disorder patients after abruptly terminating LAMICTAL therapy. In clinical trials in patients with Bipolar Disorder, 2 patients experienced seizures shortly after abrupt withdrawal of LAMICTAL. However, there were confounding factors that may have contributed to the occurrence of seizures in these bipolar patients (see DOSAGE AND ADMINISTRATION section of full prescribing information).

Mania/Hypomania/Mixed Episodes: During the double-blind, placebo-controlled clinical trials in Bipolar I Disorder in which patients were converted to LAMICTAL monotherapy (100 to 400 mg/day) from other psychotropic medications and followed for durations up to 18 months, the rate of manic or hypomanic or mixed mood episodes reported as adverse experiences was 5% for patients treated with LAMICTAL (n=227), 4% for patients treated with lithium (n=166), and 7% for patients treated with placebo (n=190). In all bipolar controlled trials combined, adverse events of mania (including hypomania and mixed mood episodes) were reported in 5% of patients treated with LAMICTAL (n=956), 3% of patients treated with lithium (n=280), and 4% of patients treated with placebo (n=803).

The overall adverse event profile for LAMICTAL was similar between females and males, between elderly and nonelderly patients, and among racial groups.

Other Adverse Events Observed During All Clinical Trials For Pediatric and Adult Patients With Epilepsy or Bipolar Disorder and Other Mood Disorders: LAMICTAL has been administered to 6,694 individuals for whom complete adverse event data were captured during all clinical trials, only some of which were placebo controlled. All reported events are included except those already listed above, those too general to be informative, and those not reasonably associated with the use of the drug. **Frequent events** occurred in ≥1/100 patients; **infrequent events** occurred in 1/100 to 1/1,000 patients; **rare events** occurred in ≤1/1,000 patients.

Body as a Whole: Infrequent: Allergic reaction, chills, halitosis, and malaise. **Rare:** Abdomen enlarged, abscess, and suicide/suicide attempt. **Cardiovascular System:** Infrequent: Flushing, hot flashes, hypertension, palpitations, postural hypotension, syncope, tachycardia, and vasodilation. **Rare:** Angina pectoris, atrial fibrillation, deep thrombophlebitis, ECG abnormality, and myocardial infarction.

Dermatological: Infrequent: Acne, alopecia, hirsutism, maculopapular rash, skin discoloration, and urticaria. **Rare:** Angioedema, erythema, exfoliative dermatitis, fungal dermatitis, herpes zoster, leukoderma, multiforme erythema, petechial rash, pustular rash, seborrhea, Stevens-Johnson Syndrome, and vesiculobullous rash. **Digestive System:** Infrequent: Dysphagia, eructation, gastritis, gingivitis increased appetite, increased salivation, liver function tests abnormal, and mouth ulceration. **Rare:** Gastrointestinal hemorrhage, glossitis, gum hemorrhage, gum hyperplasia, hematemesis, hemorrhagic colitis, hepatitis, melena, stomach ulcer, stomatitis, thirst, and tongue edema. **Endocrine System:** Rare: Goiter and hypothyroidism. **Hematologic and Lymphatic System:** Infrequent: Echinocystis and leukopenia. **Rare:** Anemia, eosinophilia, fibrin decrease, fibronogen decrease, iron deficiency anemia, leukocytosis, lymphocytosis, macrocytic anemia, pellicula, and thrombocytopenia. **Metabolic and Nutritional Disorders:** Infrequent: Aspartate transaminase increased. **Rare:** Alcohol intolerance, alkaline phosphatase increase, alanine transaminase increase, bilirubinemia, general edema, gamma glutamyl transpeptidase increase, and hyperglycemia. **Musculoskeletal System:** Infrequent: Arthritis, leg cramps, myasthenia, and twitching. **Rare:** Bursitis, joint disorder, muscle atrophy, pathological fracture, and tendinous contracture. **Nervous System:** Frequent: Confusion and paresthesia. **Infrequent:** Akathisia, apathy, aphasia, CNS depression, depersonalization, dysarthria, dyskinesia, euphoria, hallucinations, hostility, hyperkinesia, hypertonia, libido decreased, memory decrease, mind racing, movement disorder, myoclonus, panic attack, paranoid reaction, personality disorder, psychosis, sleep disorder, stupor, and suicidal ideation. **Rare:** Cerebellar syndrome, cerebrovascular accident, cerebral sinus thrombosis, choreoathetosis, CNS stimulation, delirium, delusions, dysphoria, dystonia, extrapyramidal syndrome, faintness, grand mal convulsions, hemiplegia, hyperalgesia, hyperesthesia, hypokinesia, hypotonia, manic depression reaction, muscle spasm, neuralgia, neuritis, paralysis, and peripheral neuritis. **Respiratory System:** Infrequent: Yawn. **Rare:** Hiccups and hyperventilation. **Special Senses:** Frequent: Amblyopia. **Infrequent:** Abnormality of accommodation, conjunctivitis, dry eyes, ear pain, photophobia, taste perversion, and tinnitus. **Rare:** Deafness, lacrimation disorder, oscillopsia, parosmia, ptosis, strabismus, taste loss, uveitis, and visual field defect. **Urogenital System:** Infrequent: Abnormal ejaculation, breast pain, hematuria, impotence, menorrhagia, polyuria, urinary incontinence, and urine abnormality. **Rare:** Acute kidney failure, anorgasmia, breast abscess, breast neoplasm, creatinine increase, cystitis, dysuria, epididymitis, female lactation, kidney failure, kidney pain, nocturia, urinary retention, urinary urgency, and vaginal moniliasis.

Postmarketing and Other Experience: In addition to the adverse experiences reported during clinical testing of LAMICTAL, the following adverse experiences have been reported in patients receiving marketed LAMICTAL and from worldwide noncontrolled investigational use. These adverse experiences have not been listed above, and data are insufficient to support an estimate of their incidence or to establish causation. **Blood and Lymphatic:** Agranulocytosis, aplastic anemia, disseminated intravascular coagulation, hemolytic anemia, neutropenia, pancytopenia, red cell aplasia. **Gastrointestinal:** Esophagitis. **Hepatobiliary Tract and Pancreas:** Pancreatitis. **Immunologic:** Lupus-like reaction, vasculitis. **Lower Respiratory:** Apnea. **Musculoskeletal:** Rhabdomyolysis has been observed in patients experiencing hypersensitivity reactions. **Neurology:** Exacerbation of parkinsonian symptoms in patients with pre-existing Parkinson's disease, tics. **Non-site Specific:** Hypersensitivity reaction, multiorgan failure, progressive immunosuppression. **DRUG ABUSE AND DEPENDENCE:** The abuse and dependence potential of LAMICTAL have not been evaluated in human studies. **OVERDOSAGE: Human Overdose Experience:** Overdoses involving quantities up to 15 g have been reported for LAMICTAL, some of which have been fatal. Overdose has resulted in ataxia, nystagmus, increased seizures, decreased level of consciousness, coma, and intraventricular conduction delay.

Management of Overdose: There are no specific antidotes for LAMICTAL. Following a suspected overdose, hospitalization of the patient is advised. General supportive care is indicated, including frequent monitoring of vital signs and close observation of the patient. If indicated, emesis should be induced or gastric lavage should be performed; usual precautions should be taken to protect the airway. It should be kept in mind that lamotrigine is rapidly absorbed (see CLINICAL PHARMACOLOGY section of full prescribing information). It is uncertain whether hemodialysis is an effective means of removing lamotrigine from the blood. In 6 renal failure patients, about 20% of the amount of lamotrigine in the body was removed by hemodialysis during a 4-hour session. A Poison Control Center should be contacted for information on the management of overdose of LAMICTAL.

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