# Eating Disorders Common in Type 1 Diabetics

### BY BRUCE JANCIN Denver Bureau

KEYSTONE, COLO. — A high index of suspicion for eating disorders is warranted in adolescents and young adults with type 1 diabetes, Stephanie H. Gerken said at a conference on the management of diabetes in youth.

The largest studies suggest the prevalence of eating disorders (EDs) meeting Diagnostic and Statistical Manual, Fourth Edition, criteria is about 10% in adolescent girls with type 1 diabetes. Another 14% have subthreshold variants. Both rates are roughly twice those found in nondiabetic adolescent girls.

The most common unhealthy weightcontrol practice among diabetic teens is intentional omission of insulin to lose weight. Many diabetic patients with weight concerns quickly figure out that skipping insulin injections is an easier way to drop pounds than restricting food intake

or bingeing and purging, explained Ms. Gerken, who is a diabetes educator and registered dietician at the International Diabetes Center, Park Nicollet Clinics, Minneapolis.

The elevated risk of eating disorders in association with type 1 diabetes is not limited to adolescents.

'We've been surprised at how many adults we see in their 30s and 40s who've been struggling for over 10 years with this and are finally wanting and accepting

Zegerid®

### Brief Summary of Prescribing Information

INDICATIONS AND USAGE Ducidenal Ulcer ZEGERID is indicated for short-term treatment of active duodenal ulcer. Most patients heal within four weeks. Some patients may require an additional four weeks of therapy. Gastric Ulcer

Gastric Ulcer ZEGERID is indicated for short-term treatment (4-8 weeks) of active benign gastric ulcer. (See CLINCAL PHARMACOLOGY, Clinical Studies, Gastric Ulcer.) Treatment of Gastroesophageal Reflux Disease (GERD)

Symptomatic GERD ZEGERID is indicated for the treatment of heartburn and other symptoms associated with GERD.

with GERD. Ecosive Esophapitis ZEGEID is indicated for the short-term treatment (4-8 weeks) of erosive ecophapitis which has been diagnosed by endoscopy. (See CLINICAL PHARMACOLOCY Clinical Studies.) The efficacy of ZEGEID used for longer than 8 weeks in these patients has not been established. In the trate instance of a patient not responding to 8 weeks of treatment, it may be highli to give up to an additional 4 weeks of treatment. If there is recurrence of ensive esophagitis or GERD symptoms (eq. heartburn), additional 4-8 week courses of nonenzone may be considered. Maintenance of Healing of Erosive Esophagitis ZEGEND is indicated to maintain healing of erosive esophagitis. Controlled studies do not extend beyond 12 months.

not extend beyond 12 montus. Reduction of Risk of Upper Gastrointestinal Bleeding in Critically III Patients ZEGERID Powder for Oral Suspension 40 mg/1680 mg is indicated for the reduction of risk of upper GI bleeding in critically ill patients.

CONTRAINDICATIONS ZEGERID is contraindicated in patients with known hypersensitivity to any components of the formulation.

### PRECAUTIONS

FICLADIUMS General Symptomatic response to therapy with omeprazole does not preclude the presence of gastric malignancy. Atrophic gastritis has been noted occasionally in gastric corpus biopsies from patients treated long-term with omeprazole.

Packphild guarter mixed constructed construction of the second se

milk-akki syndrome. Information for Patients ZEGERID should be taken on an empty stomach at least one hour prior to a meal. ZEGERID is available either as 40 mg or 20 mg capsules with 1100 mg sodium bicarhoneta. ZECERID is also available either as 40 mg or 20 mg single-dose packets of powder for oral suspension with 1680 mg sodium bicarbonate.

poweer for or as asspension with redu mg sodulin blazatoriaae. Directions for Use: Capsules: Swallow infact capsule with water. DO NOT USE OTHER LIQUIDS. DO NOT OPEN (APSULE AND SPINNLE CONTENTS NOT FOOD. Powder for Oral Suspension: Empty packet contents into a small cup containing 1-2 tablespoons of water. DO NOT USE OTHER LIQUIDS OR FOODS. Stir well and drink immediately. Refill cup with water and drink.

Immediately. Refill cup with water and drink. **Drug Interactions** Omeprazole can prolong the elimination of diazepam, wararin and phenytoin, drugs that are metabolized by oxidation in the liver. There have been reports of increased INR and pothrombin time in patients receiving proton pump inhibitors, including omeprazole, and wararin concombinatively. Increases INR and pothrombin time may lead to abnormal bleeding and even death. Patients treated with proton pump inhibitors and warfarin may need to be monitored for increases in INR and pothrombin time may lead to abnormal bleeding and even death. Patients treated with proton pump inhibitors and warfarin may need to interaction with theoptylline or propravold was found, there have been clinical reports of interaction with theoptylline or propravold was found, there have been clinical reports of diguist the dosgae of these drugs when taken concomitantly with ZECREND. Because of these drugs when taken concomitantly with ZECREND. Because of these drugs when taken concomitantly with ZECREND. Because of these drugs when taken concombinative with the administration of omeprazole. Concomitant administration of omeprazole and atazanawir has been reported to co-administration with essential vestor additionant. Administration of omeprazole and tacciliums may increase the serum levels of tacrolimus. CuNiCAL PHARIABACOK, Pharmacobinetics). Carcinogeneesis, Mutageneesis, Impairment of Fertility

nasma levels of omeprazole, clarithromycin, and 14-hydroxy-clarithromycin (see also CLINICAL PHARMACOLOGY, Pharmacokinetics).
Carcinogenesis, Mutagenesis, Impairment of Fertility
Carcinogenesis, Mutagenesis, Impairment of Fertility
In two 24-month carcinogenity studies in ratis, oneprazole at daily doses of 1.7, 3.4, 13.8, 4.4.0
and 140.8 mgKydig (approximately 0.5 to 25.5 times the human dose of 40 mg/day, based on body surface area) produced gastric EDL cell carcinoids in a dose-related manner in both male and female rats, the incidence of this effect was markedly higher in finanger ats, which had higher biod levels of omeprazole. Castric carcinoids seldom occur in the untreated rat. In addition, EQL of mg/day are present in all treaded groups of bot seeses. In ore of these studies, female rats was present in all treaded groups of bot seeses. In ore of these studies, female rats was bread to mby surface area) for one year. Intendioved for an additional year without the drug, No carcinoids were seen in these rats. An increased incidence of these souths, female rats was the addition of the second year the difference between treated groups of both seves. In ore of themse the second year the difference between treated and control rats was maler (46% vs 26%) but still strwed mure hyperplasia in the treated group. Castric adenocarionna was seen in one rat (2%), so similar tumor was seen in mel or end (are 140% register) for this strain of rat no similar tumor has been noted historically, tu a finding involving only one tumor is difficult to 10 a 33 mms the tumate dose of 40 mg/day, based of 10 Mg mg/day (about 15 a).
10 a 33 miss the tuman dose of 40 mg/day, based on body surface area). No astrophoreas were found in a small runter has been noted historically, tu a finding involving an ear. No astrophoreas were tound in similar tumor has been noted historically, tu a finding involving area. No astrophoreas were found in a small in the rate of a 40 mg/day, based or body surface a be down that are the initial does of which graph because of holdy serials at each AT 9 wheel middle inogenicity study of omerparable (init and show increase) than of course of a politive. practice was positive for classinger infects in an *in* who house anothouse in an *in* who bone marrow chromosomal aberration assay. Omeganache was negative in the *in* with an entities that an estimation of two in who mouse micronucleus tests, and in an *in* who bone marrow chromosomal aberration assay. Omeganache was negative in the *in* with an estimation as supportance was an estimation assay and an *in* who rat liver DNA damage assay. prazole at oral doese up to 138 mg/kg/day (about 28 times the human doese of rai depoductive performance in rats. **omance** 

Pregnancy Category C There are no adequate and well-controlled studies on the use of omeprazole in pregnant women. The vast majority of reported experience with omeprazole during human pregnancy is first timester exposure and the duration of use is rarely specified, e.g., intermittent vs. chronic. An expert review of published data on experiences with omeprazole use during pregnancy by TERIS—the Teratogen Information System—concluded that therapeutic doses during pregnancy are unlikely to pose a substantial teratogenic risk (the quantity and quality of data were assessed as fain.<sup>1</sup>

TERG—The Teratogen Intormation System—concluder timat interceptour, uses using pregnary are unlikely to pose a substantial teratogenic risk (the quantity and quality of data were assessed as fair). Three epidemiological studies compared the frequency of congenital ahormatiles among infants for women exposed to LP-receptor antagonists or other controls. A population-based prospective cohort epidemiological studies, reported on SS infants (82 exposed during the first trimester) with 99 of these exposed beyond first trimester, and 131 exposed after the first trimester with 99 of these exposed beyond first trimester and 131 exposure to omeprazole during pregnancy.<sup>2</sup> In utero exposure to the omeprazole during pregnancy.<sup>2</sup> In utero exposure to the omeprazole was not associated with increased risk of any matimumation (odds ratio 0.82, 95% Cl 0.50-1.34), low birth weight or low Apgar score. The number of infants born with

ventricular septal defects and the number of stillborn infants was slightly higher in the oneprazole exposed infants than the expected number in the normal population. The author concluded that both effects may be random. A networked we colorist study reported on G8D pregnant women exposed to either H2-blockers or oneprazole in the linst timester (134 exposed to metaprazole). The overall maiformation rate was 4.4% (65% Cl 3.6-53) and the maiformation rate for first timester exposure to omeprazole was 3.6% (65% Cl 3.6-53). The relative risk of maiformations associated with first timester exposure to omeprazole compared with networked with first timester exposure to omeprazole compared with networked with first timester exposure to omeprazole was 0.9 (65% Cl 0.3-2.2). The study could effectively rule out a relative risk greater than 2.5 for all maiformations. Rates of pretent odively or growthe relatation risk greater than 2.5 for all maiformations. A controlled prospective desarvational study followed 113 women exposed to omeprazole using the several traditional of the time the regress. A controlled prospective desarvational study followed 113 women exposed to omeprazole during freezing and the maiformations. Have not controls tackground incidence of major maiformations 1-5%). Rates of spontaneous and elective abortions, preterm deliveries, gestational age at delivery and mean birth weight did in dfffer between the groups. The sample sate in this study has 80% power to detect a 5-fold increase in the rate of major maiformation. Several studies conducted in pregnart rates at doses used and in pregnant rates to dose used and intravenous omeprazole was administered to vore 200 pregnant tabits at doses up to 69 mg/kg/day (baod 2.8 to 25 mg/da) addod 2.8 to 28 times the human dose of 40 mg/day, based on body surface areal produced dose-related networks the relative rate and the relative

Pediatric Clinical stud

Indiffer in doubles, source and after local actions of the source of the

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Obseque adjustment is necessary in the enderly. (See CLINICAL PhANWACOLOGI.) ADVERSE REACTIONS Omeprazole was generally well tolerated during domestic and international clinical trials in 3006 nations

3096 patients. the U.S. clinical trial population of 465 patients, the adverse experiences summarized in the U.S. clinical trial population of 465 patients, the adverse experiences summarized in the 11 were reported to occur in 1% or more of patients on therapy with omeprazole, umbers in parentineses indicate percentages of the adverse experiences considered by vestigators appositely, probably or definitely related to the drug. Table 11: Adverse Experiences Occurring in

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Headache Diarrhea	3.0 (1.9)	3.1 (1.6)	2.1 (0.5)	
Abdominal Pain Nausea JRI	2.4 (0.4) 2.2 (0.9) 1.9	3.1 3.1 1.6	2.1 4.1 (0.5) 2.6	
Dizziness /omitina	1.5 (0.6) 1.5 (0.4)	0.0	2.6 (1.0) 1.5 (0.5)	
Rash Constipation	1.5 (1.1) 1.1 (0.9)	0.0 0.0	0.0 0.0	
Cough Asthenia	1.1 1.1 (0.2)	0.0 1.6 (1.6)	1.5 1.5 (1.0)	
Back Pain	1.1	0.0	0.5	_

able 12 summarizes the adverse reactions that occurred in 1% or more of omeprazole-reated patients from international double-blind, and open-label clinical trials in which treated |

Table 12: Incidence of Adverse Experiences ≥ 1% Causal Relationship not Assessed				
	Omeprazole (n = 2631)	Placebo (n = 120)		
Body as a Whole, site unspecified				
Ábdominal pain	5.2	3.3		
Asthenia	1.3	0.8		
Digestive System				
Constipation	1.5	0.8		
Diarrhea	3.7	2.5		
Flatulence	2.7	5.8		
Nausea	4.0	6.7		
Vomitina	3.2	10.0		
Acid regurgitation	1.9	3.3		
Nervous System/Psychiatric				
Headache	2.9	2.5		

A controlled clinical trial conducted in 359 critically ill patients, comparing ZEGFND 40 mg/1680 mg suspension nore daily to I \L clinetinien 1200 mg/d80 rup to 14 days. The incidence and total number of AEs experienced by ≥ 3% of patients in either group are presented in Table 13 by body system and preferred term. Table 13. Number (%) of Critically lll Patients with Frequently Occurring (≥ 3%) days for works for works by Rody System and Preferred Term.

Adverse Events by Body System and Preterred Term			
	ZEGERID® (N=178)	Cimetidine (N=181)	
ledDRA lody System referred Term	All AEs n (%)	All AEs n (%)	
LOOD AND LYMPHATIC SYSTEM DISORDERS			
naemia NOS naemia NOS Aggravated hrombocytopenia	14 (7.9) 4 (2.2) 18 (10.1)	14 (7.7) 7 (3.9) 11 (6.1)	
ARDIAC DISORDERS			
trial Fibrillation radycardia NOS upraventricular Tachycardia achycardia NOS entricular Tachycardia	11 (6.2) 7 (3.9) 6 (3.4) 6 (3.4) 8 (4.5)	7 (3.9) 5 (2.8) 2 (1.1) 6 (3.3) 6 (3.3)	
ASTROINTESTINAL DISORDERS*			
ionstipation iarrhoea NOS	8 (4.5) 7 (3.9)	8 (4.4) 15 (8.3)	

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Gastric Hypomotility	3 (1.7)	6 (3.3)	
GENERAL DISORDERS AND ADMINISTRATIO	N SITE CONDITIONS	;	
Hyperpyrexia Oedema NOS Pyrexia	8 (4.5) 5 (2.8) 36 (20.2)	3 (1.7) 11 (6.1) 29 (16.0)	
INFECTIONS AND INFESTATIONS			_
Candidal Infection NOS Oral Candidiasis Sepsis NOS Urinary Tract Infection NOS	3 (1.7) 7 (3.9) 9 (5.1) 4 (2.2)	7 (3.9) 1 (0.6) 9 (5.0) 6 (3.3)	
INVESTIGATIONS			_
Liver Function Tests NOS Abnormal	3 (1.7)	6 (3.3)	
METABOLISM AND NUTRITION DISORDERS			
Fluid Overhaad Hyperkaaemia NOS Hyperkaaemia NOS Hyperatraemia Hypocalcaemia Hypocalaemia Hypocalaemia Hyponagnesaemia Hyponataemia Hyponataemia	9 (5.1) 19 (10.7) 4 (2.2) 3 (1.7) 11 (6.2) 6 (3.4) 22 (12.4) 18 (10.1) 7 (3.9) 11 (6.2)	14 (7.7) 21 (11.6) 6 (3.3) 9 (5.0) 10 (5.5) 8 (4.4) 24 (13.3) 18 (9.9) 5 (2.8) 7 (3.9)	
Agitation	6 (3.4)	16 (8.8)	_
RESPIRATORY, THORACIC AND MEDIASTINA	L DISORDERS		
Acute Respiratory Distress Syndrome Nosocomial Pneumonia Pneumothorax NOS Respiratory Failure	6 (3.4) 20 (11.2) 1 (0.6) 3 (1.7)	7 (3.9) 17 (9.4) 8 (4.4) 6 (3.3)	
SKIN AND SUBCUTANEOUS TISSUE DISORD	ERS		_
Decubitus Ulcer Rash NOS	6 (3.4) 10 (5.6)	5 (2.8) 11 (6.1)	
VASCULAR DISORDERS			
Hypertension NOS Hypotension NOS *Clinically significant UGI bleeding was	14 (7.9) 17 (9.6)	6 (3.3) 12 (6.6)	_

Hyp Hyp \*Cli ded in this table Additional advects experiences occurring in < 1% of patients or subjects in domestic and/or international trials conducted with omegrazole, or occurring since the drug was marketed, are shown below within each body system. In many instances, the relationship to omegrazole was unclear.

Body As a Whole Allergic reactions, including, rarely, anaphylaxis (see also Skin below), fever, pain fatigue, malaise, abdominal swelling.

Cardiovascular Chest pain or angina, tachycardia, bradycardia, palpitation, elevated blood pressure, and peripheral edema.

Cites (pain) or anyon, conjugatore, propriation, perpension, sortices taked present and Gastrointestinal Pancreatitis (some fata), anorexia, irritable colon, flatulence, fecal discoloration, esophageal candidiasis, mucosal atrophy of the tongue, dry mouth, stomattis. During treatment with omeprazole, gastric fundic gland polyps have been noted rarely. These polyps are being and appear to be reversible when treatment is discontinued. Gastroduodenal carcinoids have been reported in patients with Zollinger-Elison syndrome on long-term treatment with omeprazole. This finding is believed to be amailestation of the underlying condition, which is known to be associated with such tumors.

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Metabolic/Nutritional Hyponatremia, hypoglycemia, and weight gain.

Muscle cramps, myalgia, muscle weakness, joint pain, and leg pain.

Nervous System/Psychiatric Psychic disturbances including depression, agitation, aggression, hallucinations confusion, insomnia, nervousness, tremors, apathy, somnolence, anxiety, dream abnormalities; vertigo; paresthesia; and hemifacial dysesthesia.

## *Respiratory* Epistaxis, pharyngeal pain.

Epistaxis, pharyngear pam. *Skin* Rash and rarely, cases of severe generalized skin reactions including toxic epidermal neorolysis (TEV): some fatal). Stevens-Johnson syndrome, and erythema multiforme (some severe); purpura and/or petechiae (some with rechallenge); skin inflammation, urticaria, angioedema, purulus, photosensitivity, alopecia, dry skin, and hyperhidrosis. *Special Senses* Tinnitus, taste perversion. *Ocular* Blurred vision, ocular irritation, dry eye syndrome, optic atrophy, anterior ischemic optic neuropathy, optic neuritis and double vision.

Deuropany, opuc neurus anu uouue voon. Urogeniai Interstitial nephritis (some with positive rechallenge), urinary tract infection, micro pyuria, urinary frequency, elevaled serum creatinine, proteinuria, hematuria, glyc testicular pain, and gynecomastia.

By Util, utilitary integrating, sociates experiments in the effective pairs in and gynecomastia. Hematologic Rare instances of pancytopenia, agranulocytosis (some fatal), thrombocytopenia, neutropenia, leukopenia, anemia, leucocytosis, and hemotylic anemia have been reported. The incidence of clinical adverse experiences in patients greater than 65 years of age was similar to that in patients 65 years of age or less. Additional adverse reactions that could be caused by sodium bicarbonate, include metabolic alkalosis, seizures, and tetany. **OVERDOSAGE** Papots have been reselved of overlosage with omeprazole in humans. Does ranged up to 2400 mg (120 times the usal eroommended dinical does). Manifestanions were varialle, but included contission, drowiness, burred vision, tachycardia, nausea, vontiling, diaphoresis, thusing, headeach, dry mudt, and other adverse readons similar to those seen in normal dinical auconem has been reported when omeparable was taken alow to be specific article for omeprazole overdisage is known. Omeprazole is redensively protein bound and is therefore, not readily dialyzable. In the verd of overdosage treatment shudu be symptomatic and supportive. As with the management of any overdosage the possibility of multiple drug ingestion should be considered. For current information on treatment of any drug overdosa, a cartified Physicians Desk Reference (PPR) or tost leiptone boux. Single oral doses of omeprazole at 1350, 1339, and 1200 mg/kg were leftal to mice, rats, and dogs, respectively. Animata given these doses showd sedation, plosis, madfilton, a valuum Dicatonate overdose may cause hypocalcernia, hypokalemia, madfilton, a valuum Dicatonaten verdose may cause hypocalcernia, hypokalemia,

addition, a sodium bicarbonate overdose may cause hypocalcemia, hypokalemia pernatremia, and seizures.



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help," Ms. Gerken observed at the conference sponsored by the University of Colorado and the Children's Diabetes Foundation, Denver.

She is part of a joint team composed of staff at the diabetes center and at the Park Nicollet Eating Disorders Institute-Minnesota's sole inpatient ED treatment facility. The unusual multidisciplinary program was created in recognition that this is a particularly challenging group of patients adept at exploiting the often conflicting management goals for the two diseases.

Patients with combined ED and type 1 diabetes experience poor metabolic control, with serious long-term consequences. British investigators who followed 87 type 1 diabetic females aged 11-25 years for 8-12 years found that 26% had a clinical ED



The most common unhealthy weightcontrol practice in diabetic teens is intentional omission of insulin.

**MS. GERKEN** 

or evidence of bingeing and purging at baseline and/or follow-up. Also, 36% admitted to misusing insulin for weight control. The group with disordered eating had a high rate of microvascular complications at follow-up in addition to two deaths because of renal disease, one from cardiovascular disease, and one suicide (Diabetes Care 2005;28:84-8).

Personality characteristics that have been associated with EDs in adolescent girls with type 1 diabetes include perfectionism, negative and avoidant coping skills such as self-blame and wishful thinking, and borderline personality characteristics.

Family factors also figure prominently in girls with type 1 diabetes and an ED. These patients tend to come from families who seldom eat together. The parents have a high level of weight-related concerns, are often dieting, and make negative comments about eating or weight.

"Every patient I work with has some kind of issues with the family," Ms. Gerken observed.

Eating disorders are notoriously tough to diagnose. Affected individuals will hide the evidence because of shame, denial, and a powerful desire to keep losing weight.

Red flags that a diabetic patient may have an ED include frequent low blood sugar levels, anxiety about getting on the scale, an increase in glycosylated hemoglobin together with weight loss, repeated hospitalizations for diabetic ketoacidosis, a drop in self-monitoring of blood glucose, and frequent "forgetting" to bring the blood glucose monitor or records to office visits.

Other warning signs include withdrawal from friends and family, irritability, bodily dissatisfaction, delayed puberty, unexplained menstrual or fertility problems, deteriorating school performance, compulsive exercise, and food stealing.