Plenity (Oral Superabsorbent Hydrogel)

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Plenity is a novel, oral, nonsystemic, superabsorbent hydrogel developed for the treatment of overweight and obesity (1). This new product, approved by the U.S. Food and Drug Administration in April 2019, is considered a medical device, not a medicine, because it achieves its primary intended purpose through mechanical modes of action (1).

Indications

This oral superabsorbent hydrogel has a labeled indication for weight management in overweight and obese adults with a BMI of 25–40 kg/m^2 when used in conjunction with diet and exercise (2).

Mechanism of Action

There are two naturally derived building blocks in this product; modified cellulose is cross-linked with citric acid, which creates a three-dimensional matrix. Each capsule contains thousands of superabsorbent hydrogel particles. When taken orally with a meal, the capsules disintegrate in the stomach, resulting in the release of these particles (2). The individual nonclustering hydrogel particles occupy about one-fourth of a person's stomach volume when that person is fully hydrated (2). The gel particles mix with ingested foods, creating a larger volume, with higher elasticity and viscosity, in the stomach and small intestine, thus promoting satiety and fullness (2). The gel particles maintain their three-dimensional structure and mechanical properties during transit through the small intestine. Upon arrival in the large intestine, the hydrogel is partially broken down by enzymes and loses its three-dimensional structure along with most of its absorption capacity. The released water is then reabsorbed, and the remaining cellulosic material is expelled in the feces.

Potential Advantages

Oral superabsorbent hydrogel capsules provide a nonsystemic, effective alternative as an aid to weight management therapy. This product is indicated for patients with a BMI as low as 25 kg/m^2 without comorbidities, unlike currently approved pharmacologic options, and does not have a restriction on duration of therapy.

Potential Disadvantages

The oral superabsorbent hydrogel should be used with caution in patients with a history of gastroesophageal reflux disease, ulcers, or heartburn (2). It should be avoided in patients with a history of any esophageal abnormality, suspected strictures (Crohn's disease), or any previous gastrointestinal (GI) surgery that may have altered motility through the GI tract (2). This product is contraindicated in patients who are pregnant or allergic to any of its components, including cellulose, citric acid, sodium stearyl fumarate, gelatin, and titanium oxide.

Cost

The oral superabsorbent hydrogel comes in prepackaged pods containing three capsules each, to be administered with water before lunch and dinner (2). Plenity was not yet available at the time of writing, but was expected to be on the U.S. market later in 2020. No cost information was available for this review.

Comments

The Gelesis Loss of Weight (GLOW) study (1) provided an assessment of the safety and efficacy of this device, which was referred to as Gelesis100 in the study, in patients who were overweight or obese, with or without type 2 diabetes.

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https://doi.org/10.2337/cd20-0032

This was a 24-week, multicenter, randomized, double-blind, placebo-controlled study. It included patients 22–65 years of age (mean age 48 years), with a mean BMI of 34 kg/m^2 and fasting blood glucose levels of 90–145 mg/dL. Enrolled patients with a BMI <30 kg/m^2 were required to have at least one of the following comorbidities: dyslipidemia, hypertension, or drug-naive or metformin-treated type 2 diabetes.

Patients in the trial were randomized to receive either the treatment (n = 223) or placebo (n = 213). For the trial's 24-week duration, patients self-administered three capsules containing either Gelesis100 2.25 g or a placebo with 500 mL of water 20–30 minutes before lunch and dinner in conjunction with a reduced-calorie diet of 300 kcal/day below their calculated energy requirement. These patients were instructed to perform daily moderate-intensity exercise and maintain their smoking habits during the study. The coprimary efficacy end points were the percentage of change in body weight from baseline to day 171 and the percentage of patients who lost ≥5% of their body weight from baseline to day 171.

Mean weight loss was 6.4% in the treatment group compared with 4.4% in the placebo group (P = 0.0007) (1). Significantly more patients in the treatment group achieved ≥5% weight loss compared with those in the placebo group (59 vs. 42%), and 27% of patients in the treatment group lost ≥10% of their body weight compared with 15% in the placebo group (1). The overall incidence of adverse events in the treatment group was no different than in the placebo group, with adverse events in both groups being mild or moderate. The most common adverse events were GI in nature, and these were more frequent in the treatment group (P = 0.02) (1).

The Gelesis Loss of Weight 24-Week Extension (GLOW-EX) study (1) evaluated the effectiveness of the treatment over a 48-week exposure, while also assessing the weight loss benefit of adding the treatment after patients had successful weight loss with lifestyle modifications (placebo group) over the initial 24 weeks. At the time of the extension study, there were 52 eligible patients left in the original study who had lost ≥3% of their body weight from baseline. Of these, 39 were enrolled in the GLOW-EX study (21 from the original treatment group and 18 from the original placebo group). Those continuing the treatment had a mean weight loss of 7.6% after 48 weeks, up from 7.1% in the initial 24-week trial (1). Those initially treated with placebo who were then switched to Gelesis100 had a mean weight loss of 9.4% after 48 weeks, up from 7.1% in the initial 24-week trial (1).

Patients who had prediabetes or drug-naive type 2 diabetes and an A1C <8.5% were included among the participants in the GLOW study. In the initial 24-week trial, 32 patients in the treatment group and 36 patients in the placebo group met one of these criteria. The mean percentages of change in body weight from baseline to 24 weeks were –8.1 and –5.6% for the treatment and placebo groups, respectively (1). More patients with prediabetes or drug-naive type 2 diabetes (53%) achieved a weight loss of ≥7.5%, and close to half (44%) achieved a weight loss ≥10% compared with 25 and 14% of the patients in the placebo group, respectively.

Bottom Line

Obesity is a common disorder in the United States, with a prevalence of 42.4% in the 2017–2018 time period (3). Obesity is associated with many health risks, including hypertension, hyperlipidemia, type 2 diabetes, and coronary artery disease, among others. The estimated annual medical cost of obesity in the United States was $147 billion in 2008 (3).

Lifestyle modification is the recommended initial and backbone therapy for obesity, with weight loss medications often initiated as adjunct therapy. All of the therapies currently available are taken systemically and can have potential adverse reactions. The Plenity oral superabsorbent hydrogel offers a novel, nonsystemic option that appears to be safe and effective and associated with minimal adverse reactions (1).

REFERENCES

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