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A REVIEW ON ANTI-OBESITY MEDICATIONS AND FIBER SUPPLEMENTATION

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ABSTRACT

Obesity is a chronic complex disorder characterized by excess weight or body fat that might affect their health resulting in unfavorable metabolic, biomechanical, and psychosocial health cost caused by the interaction of numerous genetic, dietary, lifestyle, and environmental factors. The pharmacologic management of adult obesity was summarized by food and drug administration (FDA)-approved medications. The mainstream of these medications are taken orally, and only one is administered subcutaneously. Psyllium Husk is an enormous source of nutritional fiber. It helps in the provision of satiety and good control over appetite. It helps to decrease your hunger without affecting the energy levels. This aids weight loss with minimal side effects compares to others drugs. FDA approved weight loss drugs have minimal to modest effects on the cardiometabolic risk profile of obese and overweight adults. So in order to control the epidemic a new challenge to public health professionals is the main risk factors. Prevention of obesity should receive high priority.

Keywords: Orlistat, Lorcaserin, Phentermine, and Topiramate, Naltrexone and Bupropion, Liraglutide, Psyllium Husk

INTRODUCTION

Obesity is a chronic complex disorder characterized by excess weight or body fat that might affect their health resulting in unfavorable metabolic, biomechanical, and psychosocial health cost caused by the interaction of numerous genetic, dietary, lifestyle, and environmental factors [1, 2]. Being overweight or obese has been associated with increased risk of several conditions, including hypertension, dyslipidemia, diabetes mellitus, heart disease, stroke, sleep apnea, degenerative joint disease, infertility, and certain cancers [3].

In India, the prevalence of obesity is more commonly seen in women when compared to men and also increased in children and adolescents. According to the recent data shows that as 13% to 50% of the urban population and 8%–38.2% of the rural population. Obesity has grown to be an international public health issue in the past 50 years by affecting the quality of life, increased risk of illness with rise in health-care costs in all parts of the world [4].

In the present era, many expected drugs are being used for obesity. The availability and harmful side effects of these drugs limit their utilization. As a result, there is an utmost need to develop safe, effective, and economical entities with easy availability.

Plant-derived medicines are considered to be the first line of defense in maintaining health [5]. Moreover; these plants are having many health benefits besides its anti-obesity action. The use of some plants and their products could be an effective strategy for the management of obesity.

Obesity is the second cause for depression, which proportionally increase the BMI progressively by raising the medical costs and expected to continue the expense in the next 15 years [6].

Weight loss and additional outcomes

In obese women, weight loss has an impact on fertility improvement by re-establishing menstrual regularity and ovulation. An additional report demonstrates a significant reduction in knee-joint load in overweight and obese older adult's patients who go through lifestyle intervention. The reduced weights also have a positive impact on mental health, because weight loss is associated with decreased symptoms of depression which is experienced by obese individuals [7]. Lifestyle (e.g. diet and exercise) and behavioral modifications are the cornerstones in the management of obesity, but they are difficult to achieve and sustain [8]. If there is a failure in

modification, pharmacotherapy is added to the obese individuals, when BMI \geq 27.

(FDA)-approved medications for obesity

The pharmacologic management of adult obesity was summarized by food and drug administration (FDA)-approved medications. Before taking the medication for obesity, patients should discuss with the physician or

health care professionals for drug usage, because few drugs may increase the weight if taken for the long term and some drugs may reduce the weight with co-morbid conditions.

Weight Changes with Common Medications used in India [9]

Table 1 shows Weight Changes with Common Medications used in India.

Table 1: Weight Changes with Common Medications used in India

S. No		Weight gain	Weight neutral	Weight loss
1	Anti _hyperglycemic agents	Pioglitazone, Sulphonylureas		Metformin, GLP-1 agonists, SGLT2 inhibitors
2	Hormones	Glucocorticoids	Testosteroneb, Leuprolideb, Medroxyprogesteroneb	
3	Atypical antipsychotics	Olanzapine, Quetiapine, Risperidone, Aripiprazole	Ziprasidoneb	
4	Anticonvulsants & mood stabilizers	Gabapentin, Carbamazepineb, Divalproexb	Lithiumb, Lamotrigineb	Zonisamide, topiramate
5	Antidepressants	Amitriptyline, Mirtazapine		bupropion, fluoxetine, sertralineb, venlafaxineb, duloxetineb

Orlistat

Orlistat was approved by FDA in 1999 and before 2012, the only anti-obesity medicine approved for long-term use. Orlistat is indicated intended for obesity management including weight loss and weight maintenance when used in combination with a reduced-calorie diet. It is also indicated to reduce the risk of weight regain after prior weight loss [10].

Mechanism of action

Orlistat inhibits gastrointestinal and pancreatic lipases, thus hydrolysis of triglycerides is blocked, and fatty acid absorption by intestinal endothelium is reduced. 30 these results in approximately

one-third of fatty acids consumed with food not being absorbed [11].

Dose

The recommended dosage of orlistat is one 120-mg capsule or one 60-mg capsule 3 times per day can be taken during mealtime or up to 1 hour after food [12].

Side Effects

Some side effects are stomach pain or discomfort, fecal urgency, oily stool, with fecal incontinence, nausea; vomiting. This can decrease the absorption of medications, such as cyclosporine, levothyroxine, warfarin, amiodarone, antiepileptic agents, and antiretroviral drugs [13].

Lorcaserin

Lorcaserin was approved by the FDA in 2012 as a long-term treatment of obesity. Lorcaserin is indicated as adjunctive therapy to a reduced-calorie diet and exercise in the long-term weight management of adults who are either obese or overweight. Lorcaserin must be discontinued if 5% or less weight loss is achieved after 12 weeks. Lorcaserin is a schedule IV controlled substance [14].

Mechanism of Action

Lorcaserin is a selective serotonin 5-hydroxytryptamine 2C (5HT-2C) receptor agonist in the central nervous system (CNS) agonist that decreases caloric intake [15]. The medication stimulates 5-HT_{2C} receptors on the pro-opiomelanocortin (POMC) neurons in the arcuate nucleus; this causes the release of alpha-melanocortin-stimulating hormone (alpha-MSH), which acts on melanocortin-4 receptors in the paraventricular nucleus to suppress appetite.

Dose

Lorcaserin can be taken 10mg BID or 20mg (extended-release) QD. If bodyweight is reduced by 5% at 12 weeks, the drug should be stopped [16].

Side Effects

The common side effects are headache, dizziness, fatigue, nausea, dry mouth, and constipation.

Phentermine and Topiramate

The FDA has approved in 2012 phentermine/topiramate ER for chronic weight management as an adjunct to a reduced-calorie diet and increased physical activity. This medication for that appetite regulation involves multiple pathways and can have an additive effect on body weight. Phentermine/topiramate helps adults who are obese or overweight and include weight-related medical problems to lose weight and to keep from starting gaining back that weight. Topiramate was approved for epilepsy in 1996 and migraine prophylaxis in 2004 [17].

Mechanism of action

Phentermine, a centrally acting sympathomimetic, enhances the release of serotonin, norepinephrine, and dopamine. Topiramate is a gamma-aminobutyric acid (GABA) agonist, glutamate antagonist, and carbonic anhydrase inhibitor, whose primary approval was as antiepileptic [18].

Dose

Phentermine/topiramate ER is available in 4 doses (3.75/23 mg, 7.5/46 mg, 11.25/69 mg, and 15.0/92 mg), which are lower than the maximum doses of the individual agents. The medication should be taken once daily in the morning with or without food.

Side effects

Paresthesia, dry mouth, constipation, dysgeusia, insomnia, depression, and anxiety are the most common adverse events, which are dose-dependent [19].

Naltrexone and Bupropion

Naltrexone/bupropion was approved by the FDA in 2014. Naltrexone is an opioid receptor antagonist used for alcohol and narcotic addiction. Bupropion is an antidepressant that is also beneficial to promoting tobacco cessation and weight loss [20]. Bupropion is a selective reuptake inhibitor of dopamine and noradrenaline; it reduces cravings for nicotine and food, most likely due to increasing the extracellular dopamine level. The effect of this combination is to reduce hunger; it has no effect on energy metabolism.

Mechanism of Action

Research on CNS pathways that control food intake and body weight has identified the hypothalamic melanocortin system and the mesolimbic reward system [21]. Pro-opiomelanocortin (POMC)-produce neurons inside the hypothalamus release α -melanocyte-stimulating hormone (MSH) and β -endorphin. α -MSH mediates the anorectic effect of POMC, whereas β -endorphin is responsible for autoinhibitory feedback, which inactivates the anorectic effect.

Bupropion can be used to stimulate the POMC neurons, whereas naltrexone can be used to block the autoinhibitory response in weight reduction [22].

Dose

Naltrexone/bupropion is available in sustained-release tablets of 8 mg/90 mg. The dose should be escalated: one tablet every morning for one week, then one tablet twice daily for another week, followed by two tablets every morning and one every evening for the third week and finally two tablets twice daily from the 4th week.

Side effects

Nausea, headache, constipation, dizziness, vomiting, and dry mouth

Liraglutide

Liraglutide was approved by Europe in 2009 and in the United States in 2010. Liraglutide, sell under the brand name Victoza. This is a medication used to treat diabetes mellitus type 2 is a glucagon-like peptide-1 receptor agonist and obesity. Liraglutide is indicated as an add-on to a low-calorie diet and better physical activity for chronic weight management in adults with obesity [21].

Mechanism of Action

GLP-1, an incretin hormone, is secreted by the L-cells of the distal ileum, proximal colon and the vagal nucleus of the solitary tract after meals and has multiple effects: 1)

enhances insulin secretion by the pancreatic beta-cells and inhibits glucagon secretion in a glucose-dependent manner, thus it regulates blood glucose; 2) slows gastric emptying and increases postprandial satiety and fullness; and 3) decreases appetite and food consumption by acting in the hypothalamus, limbic/reward system and cortex [23].

DOSE

Initiate at 0.6 mg SC for 1 week; increase by 0.6 mg/day in weekly intervals until a dose of 3 mg/day Discontinue if a patient cannot tolerate the 3 mg dose, as efficacy have not been established at lesser doses 0.6, 1.2, 1.8, 2.4 mg

Side Effects

The common side effects are: nausea, vomiting, diarrhea, constipation, and dyspepsia.

Psyllium Husk

Psyllium Husk is an enormous source of dietary fiber. Mainly found to be growing in India, Psyllium husk (isabgol or ispaghula) is the outer covering of the seeds of the plant *Plantago ovata*. It is used as a bulk-forming, gentle laxative and passes through the digestive system without being completely absorbed or broken down. It can also be a boon for those trying hard to lose weight. The extra pounds have one factor in

common: high levels of fat in their body or obesity.

Psyllium Husk helps control appetite

The most difficult task while following a weight loss program is preventing binge-eating. Psyllium husk helps in over appetite. It helps to decrease your appetite without affecting the energy levels. This aids weight loss [24].

Mechanism of Action

The soluble fiber in psyllium is the polysaccharide heteroxylan, hemicelluloses [25]. The dry, fibrous content of psyllium husk draws water into the gut by pulling water from high- to low-moisture environments. The soluble portion easily absorbs water, causing it to expand in the gut. It has a double effect like softening the stool and physically stimulating gut transport. This may explain its paradoxical ability to treat constipation and diarrhea [26].

Dose

Psyllium supplementation, especially 10.2 g/day of psyllium fiber administered 20–30 min before meals. It can drink by mix psyllium powder in a glass of warm water or with a tablespoon of lime juice and drink it.

Side effects

The common side effects are Breathing difficulty, stomach pain, itching, skin rash, nausea, vomiting.

CONCLUSION

Obesity is associated with food intake and energy balance. It is not only a lifestyle disorder however a disease. FDA approved weight loss drugs have minimal to modest effects on the cardiometabolic risk profile of obese and overweight adults. So in order to control the epidemic a new challenge to public health professionals is the main risk factors. Prevention of obesity should receive high priority. Psyllium husk supplementation has greater weight loss effects with regular usage and it's easy to consume. Compare to other drugs psyllium husk has better result.

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