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A NEW APPROACH TO TREATING OBESITY: INTEGRATING ADVANCED PHARMACOTHERAPY AND METABOLIC SURGERY IN A PERSONALISED TREATMENT ALGORITHM

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ABSTRACT

Background: Obesity management will need new approaches as opposed to traditional approaches that are often ineffective. The review will bring together current available evidence on the advanced pharmacotherapy and metabolic surgery to mend this treatment gap.
Methods: PubMed, Scopus, and Web of Science (2020-2024) were used to search for and find a narrative review. These trials, meta-analyses, and consensus publications on GLP-1 receptor agonists (e.g., semaglutide, tirzepatide) and metabolic interventions (e.g., gastric bypass, sleeve gastrectomy) were combined and analyzed by us.
Results: New pharmacotherapies increase weight loss by 1522 per weight loss, matching the effect of surgical procedures and providing a wide range of cardiometabolic advantages. Yet, on discontinuation, weight regain is expected. Metabolic surgery is the most permanent operation, and it maintains weight reduction of 25-35 per cent for more than 10 years and determines significant remission of type 2 diabetes. The two modalities are complementary in that pharmacotherapy offers a definitive solution that is scalable and reversible, whereas surgery offers a definitive physiological solution. We combine these results and come up with a personalised algorithm of treatment that incorporates both of them, depending on the severity of the disease and the factors related to the patient.
Conclusion: The future of effective and individualized management of obesity relies on an integrated and chronic care model that should be deployed in the pharmacotherapy and surgery combination in a synergistic way.

KEYWORDS

Personalized Medicine, Clinical Algorithm, Chronic Disease Management, Multimodal Treatment, Therapeutics, Comorbidity Resolution

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Introduction

Obesity has progressed from a state of being considered a disease of lifestyle to that of a multifactorial, complex chronic disease with severe global health and financial outcomes. According to the World Health Organization, the worldwide prevalence of obesity among adults aged 18 years and older has doubled between 1990 and 2022, reaching a higher rate of 2.5 people being overweight and 890 million living with obesity (World Health Organization, 2025). This pandemic accounts for a substantial degree of morbidity and mortality due to cardiovascular disease, type 2 diabetes, nonalcoholic fatty liver disease (NAFLD), and numerous cancers, with consequent high costs to healthcare and lost productivity (World Health Organization, 2025). Despite the documented efficacy of diet modification, exercise, and behavioral therapy, durable adherence and permanent weight loss have been achieved in only a small percentage of individuals. In the past, the relative inefficacy of older pharmacologic agents and the intrusiveness of surgery have created a therapeutic void between lifestyle therapy and surgery.

The paradigm of treating obesity has changed radically in the recent past. Innovations with potent new pharmacotherapies, including multi-receptor agonists and GLP-1, promise to provide a new level of weight loss (Alqatari et al., 2025). At the same time, the evidence-based and less harmful standard of metabolic surgery has become more substantial and sustainable (Brown et al., 2025). This development continues to drive management past the model of lifelong management and into a chronic disease model. It will require customized treatment algorithms combining the two modalities. The mechanisms and their effectiveness are compared in this review to create an integrated strategy, which would make the pharmacotherapy and surgery tools complementary and cannot be applied or ignored in the complete treatment.

Methodology

The paper is a synthesis of the evidence on advanced obesity treatment published in PubMed and Scopus, as well as Web of Science (2020-2024). It is new in the sense that it incorporates the current data to compare the next-generation pharmacotherapy (e.g., GLP-1 RAs, multi-agonists) and metabolic surgery directly and contemporarily. This review is designed to record the recent paradigm shift with recent pharmacologic efficacy coming close to the operation outcomes. We offer a new input by going beyond a mere comparison and offering an integrated treatment algorithm in a practical solution. It is a paradigm that facilitates the integrated and orderly application of the two modalities, a movement in the future, yet not entirely formulated in available literature, that approaches a significant gap in personalized obesity treatment.

Results

The New Frontier in Pharmacotherapy: GLP-1 RAs and Beyond

Mechanisms of Action

The modern management of obesity with pharmacotherapy has entered a novel stage of appetite hormonal control, satiety, and energy consumption. GLP-1 receptor agonists (GLP-1 RAs), initially developed to treat diabetes mellitus type 2, mimic the model of the incretin hormone GLP-1 to induce secretion of insulin, suppress glucagon secretion, reduce the rate of gastric emptying, and have central actions to reduce appetite. Their dual modes of action—on metabolic control and on appetite regulation—can explain their unmatched efficacy in weight loss (Alqatari et al., 2025).

Multi-receptor agonists have continued to widen the pharmacologic arsenal. Tirzepatide, a dual glucose-dependent insulinotropic polypeptide (GIP) and GLP-1 agonist, is more effective than older GLP-1 RAs and achieves body-weight reductions greater than 20% in milestone clinical trials (Sokary et al., 2025). More contemporary "triple agonists," including retatrutide, act in tandem at GLP-1, GIP, and glucagon receptors in hopes of optimally broadening energy expenditure in addition to appetite inhibition (Przybyłowski et al., 2025). The medications are a radical change to older pharmacotherapeutics, which comprised moderate efficacy coupled with adverse events.

These drugs, at the mechanistic level, are known to have complex central and peripheral system pathways, which make use of the hypothalamus, gut-brain axis, and enteroendocrine signaling. GLP-1 and multi-agonists influence the hormone of appetite and fullness to produce impressive caloric reduction with preserved lean mass, which is an attractive benefit compared to the past generations of appetite suppressants (AL-Noshokaty et al., 2025).

Efficacy from Landmark Trials and Meta-Analyses

The efficacy of weight loss with modern pharmacotherapy now approaches that previously possible only with surgery in obese patients. In a cross-sectional study by Andrade et al. (Andrade et al., 2025), GLP-1 and dual agonists were associated with mean weight reductions between 15% and more than 22% of body weight at initiation, by molecule and dose. Similarly, a network meta-analysis on Diabetes & Metabolism confirmed that GLP-1RAs, in particular semaglutide 2.4 mg and tirzepatide 15 mg, induce statistically and clinically meaningful weight loss in addition to improving glycemic control and lipid patterns (Nunns et al., 2025).

These results have been confirmed in several systematic reviews. Sarma and Palcu (2022) showed in a meta-analysis that new drugs have significantly greater efficacy than old drugs like orlistat and naltrexone–bupropion with superior tolerability and efficacy with reduced side effects. Srivastava et al. (2025) also concluded that the efficacy difference between metabolic surgery and medication therapy is decreasing and that drugs could play dual functions as bridging therapy before surgery and maintenance therapy after surgery.

In addition to weight loss, these agents also provide substantial metabolic and cardiovascular protection. GLP-1 RAs enhance insulin sensitivity, decrease blood pressure, and minimize major adverse cardiovascular events—benefits that have been validated in long-term trials that were initially performed in diabetic patients (Thomsen et al., 2025). These advantages also decrease systemic inflammation and considerably enhance liver fat in non-diabetic patients, and this aspect highlights the systemic effects of the therapy.

Safety, Tolerability, and Adherence

The ongoing use of GLP-1 agonists is burdened by a well-known GI negative effect, including nausea and vomiting, which are frequent during dose escalation, although they usually pass (Thomsen et al., 2025). Controllable side effects might limit adherence in a small percentage of patients.

Rarest, most severe side effects include pancreatitis, gallbladder disease, and a potential association with medullary thyroid carcinoma in those at genetic risk. Therefore, it remains contraindicated in those with personal or family history of multiple endocrine neoplasia type 2 (Srivastava et al., 2025). Despite these

complications, real-world data indicate declining treatment discontinuation rates with titration regimens at slower rates among prescribers and patients, as well as an ongoing sense of benefit from persistent weight loss.

One considerable new issue with these drugs is weight rebound upon withdrawal of therapy. Follow-up data have established that termination of GLP-1 therapy usually leads to partial weight rebound, characteristic of the chronic and relapsing nature of obesity (Nunns et al., 2025). Consequently, these drugs are becoming considered long-term or even life-long therapy, similar to antihypertensive or anti-dyslipidemic medications.

Accessibility and cost comprise another primary constraint. GLP-1 and GIP/GLP-1 agonists' prohibitively high monthly cost and limited coverage by health insurance make them in accessible in most health systems. This cost barrier also entrenches the treatment of obesity disparities and potentially affects clinician and patient choices between surgery and drugs (Sarma & Palcu, 2022).

Gaps and Limitations of Pharmacotherapy

Despite our current pharmacotherapies being an unmatched step forward in efficacy, several voids remain. Also, long-term post-marketing data spanning over seven years are scarce since most of the pivotal studies have short-term follow-up of less than five years (Srivastava et al., 2025). Continued post-marketing surveillance will also prove important in establishing potential late adverse results.

Second, patient response remains heterogeneous. Therapy outcomes will remain variable based on gene, behavioral, and environment-related factors, rendering precision obesity medicine a necessity. Incorporation of biomarkers, pharmacogenomics, and digital adherence technology could potentially allow personalization of therapy in the future.

Lastly, pharmacotherapy by itself can be inadequate in severely obese individuals (BMI ≥ 40 kg/m^2) or in individuals with multiple refractory comorbidities. Whole pharmacologic and surgical interventions are beneficial when used in such patients, each in sequence or together, to provide the best outcomes (Coutinho & Halpern, 2024).

Metabolic Surgery: Established Efficacy and Evolving Techniques

Procedural Overview and Mechanisms

Metabolic surgery has developed into something more than a mechanical operation. Now it is known to be a deep metabolic therapy. The systemic metabolism is changed completely through such modern surgeries as gastric bypass. They cause important endocrine, neural, and microbial alterations. These changes are much more complicated than mere restriction. The most important intestinal hormones, such as GLP-1, are modified after surgery (Srivastava et al., 2025). This brings about a significant enhancement of satiety and control of blood sugar. Moreover, there is an alteration in the flow of the bile acids as well as an alteration in the microbiome in the gut. These modifications enhance the energy usage and define better insulin sensitivity. This is the reason behind the fast-stabilizing anti-diabetic effects. These advantages frequently happen without making the first gains in weight reduction. Minimally invasive techniques are also something that makes new techniques safer. Advancements such as robotic surgery also aid in the reduction of risks of the operations. These developments cement the position of surgery as a physiologic treatment.

Long-Term Efficacy and Durability

None of the other treatments of obesity comes close to this level or duration of weight loss with metabolic surgery. Long-term data repeatedly have demonstrated 25–35 percent average total body-weight losses, which have been sustained for over a decade (Stefanakis et al., 2024). In the 12-year follow-up of an observational, prospective study of Roux-en-Y gastric bypass that was conducted in the United States, those who had gastric bypass lost a mean of 27%, with impressive remission of hypertension, dyslipidemia, and diabetes control (Stefanakis et al., 2024).

These results remained durable based on several meta-analyses and registry follow-up studies. A systematic review and meta-analysis by Sutanto et al. (2021) documented persistent mortality and major cardiovascular event reductions at 15 years follow-up post-operatively. Roth et al. (2020) reviewed more than 50 publications and concluded that metabolic surgery not only attains maximal and durable weight loss but also achieves superior metabolic results compared with pharmacologic or lifestyle therapy.

Supporting evidence to comorbidity resolution also exists. Remission rates of 56.7%–70.8% percent at two years and continued improvement in glycemic control in the long term have been shown in surgery in T2D patients (Dowgiałło-Gornowicz et al., 2025). Meta-analyses also confirm reductions in micro- and macrovascular complications, cardiovascular mortality reduction, and improvement in quality of life.

In addition to diabetes, metabolic surgery also benefits nonalcoholic fatty liver disease, polycystic ovary syndrome, and obstructive sleep apnea with an emphasis on its systemic efficacy. Current research also focuses

on decreased occurrence of some obesity-related cancer types, most probably mediated by hormonal and inflammation processes (Doycheva & Ehrmann, 2022).

Compared to pharmacotherapy, surgery's advantage lies in its permanent nature. While GLP-1 receptor agonists have to be administered lifelong and carry the risk of weight regain after withdrawal, weight loss surgery remains highly stable at 5–10 years and even more so after gastric bypass (Mousavi et al., 2025). Such durable efficacy entrenches metabolic surgery's position as the benchmark against which new pharmacologic agents are trialed.

Safety, Risks, and Postoperative Care

Enhanced surgery has transformed the mortality associated with bariatric surgery. Perioperative mortality rates now range from 0.1–0.3 percent, and those of cholecystectomy and life-threatening complications have decreased to less than 5 percent in high-volume centers (Xia et al., 2021). However, the eventual success of metabolic surgery extends far beyond surgery itself; it requires lifetime follow-up on nutrition and multidisciplinary follow-up.

Other typical long-term complications consist of micronutrient deficiencies and dumping syndrome. ASMBS then requires lifelong supplementation and frequent monitoring. Lifestyle change is also dependent on psychological assistance. There are also procedural risks to patients. Gastric bypass may lead to both internal hernias and marginal ulcers. Sleeve gastrectomy can be a contributory or a cause of gastroesophageal reflux disease. Regrettably, it is very difficult to follow up in the long term. More than fifty percent of the patients are lost in five years. The future solution can be found in new digital health. They will be able to monitor patients as well as improve the outcomes of surgeries in the long run.

Expanding Indications and Novel Techniques

Though earlier guidelines limited metabolic surgery to those with a body-mass index (BMI) of ≥ 40 kg/m²—or ≥ 35 kg/m² with comorbidities—later evidence backs suitability at lower BMIs. Kermansaravi et al. (2024) showed impressive metabolic remission and durable weight loss in populations with Class I obesity (BMI 30–34.9 kg/m²) who had laparoscopic sleeve gastrectomy. Their results have guided international and national consensus statements in 2024–2025, including those of the International Federation for the Surgery of Obesity and Metabolic Disorders and the Polish Expert Consensus (Cohen et al., 2024). Each recommends earlier along the disease course that metabolic surgery be taken into consideration in those with uncontrolled T2D or high cardiometabolic risk, even at a BMI ≥ 30 kg/m².

The surgical innovation is currently evolving with the broadening procedural indications. Recent methods include the single-anastomosis duodeno-ileal and sleeve gastrectomy, or magnetic bypass anastomosis, which seek to ensure maximum efficacy and minimal malabsorption. Moreover, there are also hybrid and endoscopic metabolic surgeries that are becoming a middle ground between pharmacotherapy and big surgery (Cohen et al., 2024). These gentle modalities can fill a therapeutic gap among patients in whom medication treatment is not sufficient, but who do not qualify to undergo full-fledged operations.

Simultaneously, the pharmacotherapy of the perioperative period is also improving and transforming the operating guidelines. The good results of pre-operative and post-operative GLP-1 receptor agonists are promising in enhancing preoperative weight loss, improving liver health, and reducing the risk of surgery (Cohen et al., 2024). These drugs can be used after surgery to maintain weight loss and avoid the recurrence of the disease.

Critical Comparative Analysis: Pharmacotherapy vs. Metabolic Surgery

Efficacy and Durability

In contrast, pharmacotherapy and metabolic surgery have clear-cut locations on the effectiveness continuum for treating obesity. More recently introduced pharmacotherapies, such as semaglutide and tirzepatide, have achieved record weight reductions of 15–21% of baseline body weight in lead clinical studies (Samuels et al., 2025). Such outcomes represent a significant improvement compared to earlier drugs, which typically yield durable decreases of 25–35 percent, similar to those achieved with gastric bypass or sleeve gastrectomy (Kosmalski et al., 2023).

Surgery also has a longer-term duration than pharmacotherapy. Withdrawal of GLP-1 receptor agonists also precipitates partial weight regain in months, which parallels the chronic-relapsing course of obesity (AL-Noshokaty et al., 2025). In comparison, the majority of early weight loss in surgery patients is durable at more than 10 years (Nunns et al., 2025). A systematic review and meta-analysis by Pipek et al. (2024) confirmed that, at 10 years, surgery achieves twice the mean total weight loss compared to combined pharmacologic therapy and lifestyle modification.

But no such duration exists in absolute terms. Between 15% and 30% of individuals who undergo an operation experience some level of weight regain, typically associated with anatomical stretching, hormonal adjustments, or behavioral regression (Noria et al., 2023). In such patients, additional pharmacotherapy may achieve or uphold outcomes, favoring a model of synergy over dichotomy.

Comorbidity Resolution and Metabolic Benefits

They both significantly enhance metabolic health, although to varying degrees and at varying rates. GLP-1 and dual-agonist therapy enhance glycemic control, lower systolic blood pressure, and lower risk of appropriately defined major cardiovascular events in diabetic and non-diabetic persons (Thomsen et al., 2025). Remission of T2D to a normal blood glucose level and off therapy, however, remains relatively infrequent.

Contrarily, metabolic surgery generally attains quick and durable diabetes remission via weight-independent modes of hormonal action. Randomized controlled trials have established remission rates exceeding 60 percent on follow-up after RYGB, compared to 10–15 percent with vigorous medical therapy (Noria et al., 2023). Surgery minimizes the necessity of medication in cardiovascular deaths, as well as lipid-lowering medication and antihypertensive medication in antihypertensive therapy (Mousavi et al., 2025).

The two treatment interventions enhance as well as the other obesity comorbidities such as NAFLD, Obstructive sleep apnea, and polycystic ovary syndrome. Still, the hormonal and mechanical effects of surgery are more rapid and instant. In general, the best metabolic intervention currently is data frame surgery.

Safety and Risk Profiles

The dichotomy of side effects depicts this trade-off between the two methods. Pharmacotherapy is well-tolerated and user-friendly; however, its efficacy is poor due to its side effects on the gastrointestinal tract and, in any case, doubtful after seven years (Xia et al., 2021). Ideally, these restrictive grounds will still lean the scale on the convenience and reversibility side- therapeutic withdrawal is not allowed unless something becomes unbearable.

Bariatric surgery is not without procedural risk, although, using modern methods, the perioperative mortality rate is now 0.1-0.3 percent, and the risk of severe complications is less than 5 percent (Xia et al., 2021). The early postoperative phase will be in need of lifelong supplementation and follow-up due to the nutritional deficiencies (Cohen et al., 2024). As seen through the patient, pharmacotherapy has slow and modifiable outcomes, moderate acute risk, whereas surgery has rapid and extreme outcomes, which have a long-term physiological accommodation and compliance.

Psychological preparedness of the patient, level of health literacy, and support structure will have a strong impact on what risk profile can be tolerated. Shared decision-making, therefore, will be critical.

Economic and Accessibility Considerations

Economic studies uncover a paradox. Pharmacotherapy presents regular monthly costs in the several hundred dollars that will accrue over the years; coverage with insurance varies, and coverage will usually be limited to diabetic indications (Butt et al., 2024). Metabolic surgery, although expensive upfront, becomes cost-effective in the range of three to five years with the savings on drugs and regained productivity (Butt et al., 2024).

They are also different in terms of accessibility. Pharmacotherapy may also be prescribed in primary care, but surgery may need specialized facilities and post-operative care. This gap continues to cause geographical and socioeconomic differences in treating obesity. Such a balanced system should have both modalities so that the choice of consideration of treatment will rely on the medical need and not on the cost of expenditure and logistics.

Table 1. Comparative Overview of Advanced Pharmacotherapy and Metabolic Surgery for Obesity Management

Feature	Advanced Pharmacotherapy (e.g., GLP-1 RAs, Tirzepatide)	Metabolic Surgery (e.g., RYGB, Sleeve Gastrectomy)
Mechanism of Action	Pharmacologic modulation of appetite, satiety, and energy expenditure via incretin hormones (GLP-1, GIP).	Anatomical and physiological alteration of the GI tract, leading to profound hormonal, neural, and metabolic changes.
Efficacy (Weight Loss)	15% - 22% of body weight.	25% - 35% of body weight, sustained long-term.
Durability	Requires chronic, often lifelong, administration; weight regain upon discontinuation is common.	Durable and permanent anatomical change; weight loss is sustained for over a decade.
Comorbidity Resolution	Significant improvement in glycemic control, blood pressure, and CV risk; remission of T2D is less common.	High rates of T2D remission (>60%), rapid and profound resolution of NAFLD, OSA, and other comorbidities.
Onset of Action	Gradual weight loss over weeks to months.	Rapid initial weight loss and metabolic improvement.
Safety & Risks	GI side effects (nausea, vomiting) are common; rare risks of pancreatitis, gallbladder disease.	Perioperative risks (mortality 0.1-0.3%); long-term risks of micronutrient deficiencies, internal hernia, and dumping syndrome.
Reversibility / Flexibility	Reversible upon discontinuation; dose can be adjusted.	Largely irreversible; revision surgery is complex.
Adherence & Follow-up	Dependent on daily/weekly adherence to medication, routine clinical monitoring.	Requires lifelong nutritional supplementation and periodic multidisciplinary follow-up.
Economic Considerations	High recurring monthly cost; long-term financial commitment.	High upfront cost; cost-effective within 3-5 years due to reduced medication use and comorbidity burden.
Ideal Patient Profile	Patients with BMI ≥27-30, those averse to surgery, as bridging therapy, or for post-surgical weight regain.	Patients with BMI ≥35 (or ≥30 with severe comorbidities) are those seeking a definitive, durable solution.

Discussion

The paradigm of treating obesity has radically altered in the past decade. Current emergency in drug therapy, particularly GLP-1 and dual or triple agonists, and new advances in metabolic surgery have bridged the efficacy gap between surgery and drug treatment and have supported accessibility and safety. Collectively, these trends indicate a shift toward an integrated, chronic disease model, replacing isolated, episodic therapy (Mousavi et al., 2025). In the years to come, the future of the front line in obesity treatment will likely be defined by new-generation drug therapies, including oral GLP-1 drugs and multi-pathway agonists, as well as endoscopic and hybrid metabolic surgeries that bridge the gap between surgery and drugs. In the meantime, under "pharmacologic disruption," which questions settled surgery indications and BMI guidelines (Coutinho & Halpern, 2024), challenges to settled knowledge in obesity treatment only grow. Ultimately, the future lies with individualized, multimodal therapy—a combined modality of pharmacological, surgical, and behavioral therapy that treats obesity as a chronic, relapsing disorder requiring lifelong treatment.

Synergistic and Sequential Paradigms

Modernist instructions are more likely to disapprove of the either/or thinking. Alternatively, it is a balance whereby treatment of obesity is abandoned.

- Pharmacotherapy before the operation (e.g., GLP-1 RAs) to induce early weight loss, to decrease hepatic steatosis, and to cut down on the risk of surgery (Nunns et al., 2025).
- The circumstances under which drug therapy was applied after the operation are: to lower weight or to treat late weight regain (Pipek et al., 2024).

This dual model abetted emerging information where no additional harmful results but good ones accumulate to demonstrate (Butt et al., 2024). It is a kind of synergy that should be seen as the new direction

of personalized and multimodal therapy that identifies obesity as a chronic condition to treat throughout life adaptively.

In brief, surgery is still the gold standard of efficacy and durability, and newer pharmacotherapy presents a modular, scalable alternative, bridging the gap between surgery and life therapy. The future of obesity treatment lies in individualized algorithms that combine both strategies based on patient phenotype, disease severity, and treatment targets.

Synthesizing a Modern Treatment Algorithm: A Guide for Clinicians

Combined pharmacotherapy and metabolic surgery under a single umbrella has permitted the transition to individualized, staged therapy of obesity from fixed guidelines according to BMI. Present guidelines issued by the American Society for Metabolic and Bariatric Surgery, the International Federation for the Surgery of Obesity and Metabolic Disorders, and the Obesity Society recommend individualized approaches that take weight into account, in addition to metabolic profile, burden of comorbidity, and treatment responsiveness.

Step 1: Foundational Lifestyle and Behavioral Intervention

Lifestyle change still constitutes the foundation of obesity treatment. Programs of structured caloric restriction, increased physical activity, sleep hygiene, and behavioral therapy should comprise the first-line basis of all treatment approaches. However, physicians need to understand that individual lifestyle interventions almost never achieve durable, long-term weight loss in excess of 5–10 percent (Kheniser et al., 2021). Hence, early assessment for concomitant therapy is imperative in the event that behavioral endeavors plateau.

Step 2: Pharmacotherapy as First-Line Adjunct

In patients who have a BMI of ≥ 30 kg/m², which is obese, or ≥ 27 kg/m² and have obesity-related comorbidities, pharmacotherapy becomes the second line in treatment (Stefanakis et al., 2024). Semaglutide and tirzepatide should then be selected based on efficacy, tolerability, comorbid conditions, and patient preference. Pharmacotherapy provides a scalable, reversible, and minimally invasive therapy that is appropriate in early-stage disease or in patients who refuse or are medically ineligible for surgery. It also comes in handy as a bridging therapy to optimize individuals before surgery by minimizing hepatic steatosis and operative risk.

Clinicians should also explain that therapy maintenance often requires ongoing therapy in many cases, and that obesity should be characterized as a chronic disease that necessitates ongoing treatment, much like hypertension or diabetes.

Step 3: Metabolic Surgery for Advanced or Refractory Obesity

In obese patients with a BMI of ≥ 35 kg/m² or ≥ 30 kg/m² with severe metabolic disease (e.g., T2D, NAFLD, CVD), however, metabolic surgery remains the most durable and effective therapy (Mousavi et al., 2025).

Assessment of metabolic risk, rather than isolated weight, should also guide patient selection, in concert with the 2024 IFSO and ASMBS refinements that advocate for earlier referral to surgery if pharmacotherapy cannot achieve durable improvement (Valdes et al., 2023).

A multidisciplinary assessment, including nutritional, psychological, and endocrinologic components, is necessary prior to surgery. Follow-up postoperatively should comprise behavioral assistance and pharmacologic adjuvants on a patient-by-patient basis.

Step 4: Combined and Sequential Approaches

The most progressive model goes on to visualize integration and not substitution. Integration of surgery and pharmacotherapy will maximize preoperative optimization, optimize postoperative maintenance, and reduce relapse (Valdes et al., 2023).

Sequential strategies have unique value in patients who experience weight regain after surgery or an inadequate pharmacologic response. The end of a precision-medicine strategy that involves the use of the right therapy on the right patient at the right time is this blended model.

In general, the novel model of obesity treatment is based on longevity, flexibility, and individualization. On the same scale of evidence-based practice, physicians and surgeons can also produce lasting outcomes by bringing pharmacologic and surgical therapy at the same level of disease intensity and patient targets (Pipek

et al., 2024). This model of multispecialty is the future treatment of obesity, and the future of treatment is a time in which there is no such thing as pharmacotherapy or surgery, but a toolkit of sustainable components of metabolic well-being.

Conclusions

Treatment of obesity in the modern world needs to be synergistic rather than competitive. The two approaches, which are basically complementary in this context, include pharmacotherapy and metabolic surgery. Quality care is, therefore, reliant on a highly customized and integrated model. This model should find a way to get out of the old and inflexible treatment protocols. The treatment is determined by the factors that define particular patients and the severity of the disease. Obesity is a biological and chronic disease. Its successful management demands lifelong and multimodal therapeutic approaches and patient-centered approaches.

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