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Review of the evidence for the pharmacological management including surgery for obesity in people with type 2 diabetes

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Introduction

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health.[1] There is a recognized close association between obesity and type 2 diabetes termed as 'diabesity'. Moreover, these two co-morbidities are strongly inter-linked and reduction of bodyweight improves control of diabetes and associated mortality and morbidity. Treatment of obesity in the diabetic patients becomes complex as some of the anti- diabetics may lead to weight gain. Likewise Diabetes treatment doses not give optimum glycemic control in obese patients. Bariatric surgery is currently the most effective anti-obesity treatment and causes long-term remission of diabetes, but surgery has a high cost and associated complications.[2]

Moreover, patients with Type 2 diabetes are at risk of increasing weight, insulin resistance, with requirement of further amplification of glycemic treatment. In overweight and obese patients with type 2 diabetes, modest and sustained weight loss has been shown to improve glycemic control and to reduce the need for glucose-lowering medications.[3]

For this review, the evidence for pharmacological management and surgery to manage obesity in Type 2 Diabetes will be reviewed. This will be carried out through literature search and systematic review assessment on obesity treatment in patients with type 2 diabetes with patient relevant outcomes.

Methods

It is hypothesized that pharmacological management and surgery are useful interventions to treat obesity for better outcomes among patients with Type 2 Diabetes.

This literature based research took place in 2017 in Pakistan as fulfillment of Diploma in Diabetes through University of South Wales. To review and find evidence as per set hypothesis studies using RCT published between 1995 till to date with inclusion of patients who are obese with type 2 diabetes were explored. Finally two studies using pharmacological interventions and two studies using surgical interventions were selected and results briefly described below in Table 1.

Table 1 Review of Pharmacological management including Surgery for Obesity in Type 2 Diabetes

S #	STUDY, Authors(year), Title of study	Design/Methods/ Sample size	Intervention	Results
STUDY 1	Weight loss with sibutramine improves glycaemic control and other metabolic parameters in obese patients with type 2 diabetes mellitus[4]	Double-blind, multicentre trial, 175 obese (body mass index (BMI) ≥27 kg/m2) patients with poorly controlled type 2 diabetes mellitus	Sibutramine 15 mg daily Vs Placebo ,moderate calorie restriction	At week 24 when comparing those who completed the course, sibutramine compared with placebo patients showed significantly greater ($p < 0.001$) absolute (−4.3 vs. −0.4 kg) and percentage (−4.5% vs. −0.5%) weight loss. Weight loss ≥5% or 10% was achieved by 33% and 8% of sibutramine patients, respectively, but no placebo patients ($p < 0.03$ or better). Improvement in glycaemic control was correlated with weight loss ($p < 0.001$). Sibutramine patients also showed improvements in fasting insulin, triglycerides, HDL cholesterol, and quality-of-life assessment.

Table Continued...

S #	STUDY, Authors(year), Title of study	Design/Methods/ Sample size	Intervention	Results
STUDY 2	Role of Orlistat in the Treatment of Obese Patients With Type 2 Diabetes.[11]	A multicenter 57-week randomized double-blind placebo-controlled study. 391 obese men and women with type 2 diabetes who were aged >18 years, had a BMI of 28-40 kg/m^2	120 mg orlistat or placebo was administered orally three times a day with a mildly hypocaloric diet	After 1 year of treatment, the orlistat group lost 6.2 ± 0.45% (mean ± SEM) of initial body weight vs. 4.3 ± 0.49% in the placebo group (P < 0.001). Twice as many patients receiving orlistat (49 vs. 23%) lost ^5 % of initial body weight (P < 0.001). Orlistat treatment plus diet compared with placebo plus diet was associated with significant improvement in glycemic control, as reflected in decreases in HbAlc (P < 0.001) and fasting plasma glucose (P < 0.001) and in dosage reductions of oral sulfonylurea medication (P < 0.01). Orlistat therapy also resulted in significantly greater improvements than placebo in several lipid parameters.
Study 3	Adjustable Gastric Banding and Conventional Therapy for Type 2 Diabetes.[5]	Unblinded randomized controlled trial conducted from December 2002 through December 2006. Participants were 60 obese patients (BMI 30 and 40) with recently diagnosed (2 years) type 2 diabetes.	Conventional diabetes therapy with a focus on weight loss by lifestyle change vs laparoscopic adjustable gastric banding with conventional diabetes care	Among 55 patients (92%) who completed the 2-year follow-up. Remission of type 2 diabetes was achieved by 22 (73%) in the surgical group and 4 (13%) in the conventional-therapy group. Relative risk of remission for the surgical group was 5.5 (95% confidence interval, 2.2-14.0). Surgical and conventional-therapy groups lost a mean (SD) of 20.7% (8.6%) and 1.7% (5.2%) of weight, respectively, at 2 years (P.001). Remission of type 2 diabetes was related to weight loss (R2=0.46, P.001) and lower baseline HbA1c levels (combined R2=0.52, P.001). There were no serious complications in either group.
STUDY 4	Metabolic Effects of Bariatric Surgery in Patients With Moderate Obesity and Type 2 Diabetes.[6]	A single center, prospective, randomized, controlled trial of 60 subjects with uncontrolled type 2 diabetes (HbA_{1c} 9.7 ± 1%) and moderate obesity (BMI 36 ± 2 kg/m^2)	Randomized to IMT alone, Intensive Medical Therapy(IMT)plus Roux-en-Y gastric bypass, or IMT plus sleeve gastrectomy.	Glycemic control improved in all three groups at 24 months (N = 54), with a mean HbA_{1c} of 6.7 ± 1.2% for gastric bypass, 7.1 ± 0.8% for sleeve gastrectomy, and 8.4 ± 2.3% for IMT (P < 0.05 for each surgical group versus IMT). Reduction in body fat was similar for both surgery groups, with greater absolute reduction in truncal fat in gastric bypass versus sleeve gastrectomy (−16 vs. −10%; P = 0.04). Insulin sensitivity increased significantly from baseline in gastric bypass (2.7-fold; P = 0.004) and did not change in sleeve gastrectomy or IMT. β-Cell function (oral disposition index) increased 5.8-fold in gastric bypass from baseline, was markedly greater than IMT (P = 0.001), and was not different between sleeve gastrectomy versus IMT (P = 0.30).

Discussion

The above studies that looked separately in to pharmacological and surgical interventions in obese patients with type 2 diabetes have shown that maintained weight reduction is an independent parameter for better outcomes.

Pharmacological management with widely used medicines like sibutramine and Orlistat in obesity is associated with improvements in metabolic and glycemic control through meaningful maintenance of weight loss.[4] However, the more significant weight loss was observed with moderate calorie restriction, while these medicines are well tolerated.

Regarding Surgical Interventions, Dixon et al.,[5] and Kashyap et al.,[6] suggested that surgical therapy achieves remission of type 2 diabetes through better weight reduction and Bariatric surgery provides robust glycemic control when comparing with intensive medical therapy at 2 years. Moreover, it is also observed that regardless of similar reduction in weight as sleeve gastrectomy, gastric bypass is beneficial in restoring pancreatic β-cell function truncal fat reduction and consequently reverses the fundamental deficiencies in diabetes.

Looking at the results of above studies and other such similar researches, it is evident that obesity management not only favors to reduce diabetes progression, but also useful to manage glycemic control and substantial reduction in other co-morbidities like hypertension, cardiac disease. Moreover, improvements in glycemia due to weight loss are likely to happen early in the natural history of type 2 diabetes when obesity-associated insulin resistance has caused reversible β-cell dysfunction but insulin secretory capacity remains relatively preserved.[7]

A recent study by Davies et al.,[8] reported tremendous efficacy of Liraglutide and results showed, significant reductions in mean waist circumference and BMI with liraglutide (3.0 mg) and liraglutide (1.8 mg) compared with placebo. Moreover, Liraglutide (3.0 mg) was associated with significantly better glycemic control compared with placebo in terms of change in HbA1c level. . In addition, more participants treated with liraglutide (3.0 mg) and liraglutide (1.8 mg) than placebo reduced their net use of oral hypoglycemic agents after 56 weeks. This evidence is quite convincing, however, the choices of pharmacological agents to treat obesity are still limited.

According to Sims et al[9] that as compare to medical therapy alone, recent clinical trials have shown that RYGB or bilio-pancreatic diversion resulted in better glucose control. Likewise, RYGB achieved glycemic control in significantly more patients,[10] and sleeve gastrectomy resolved the diabetic state more effectively.[11]

Conclusion

As we know that hallmarks of Type 2 diabetes are insulin resistance and obesity are the major causes of this condition. While central or abdominal obesity a factual dilemma, it is also evident that links between Obesity and diabetes are well established and interventions like diet, physical activity, pharmacological and bariatric/metabolic surgical measures are conjunctive treatment measures to manage diabetes in obese patients.

Recommendations

a) Behavior change strategies should be used to bring constant, sustained and long term weight loss in obese diabetics and life style measures should also be prioritized as 1st line intervention as per guidelines.

b) Follow up care should be stringent with team based approach in diabetes management.

c) The recommendations from recent NICE/ADA should be adopted while managing patients.

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None.

Conflicts of interest

The author declares there are no conflicts of interest.

References

1. WHO fact sheet. Obesity and overweight. *WHO*. 2016.
2. Lanzarini E, Csendes A, Gutierrez L, et al. Type 2 diabetes mellitus in patients with mild obesity: preliminary results of surgical treatment. *Obes Surg*. 2013;23(2):234–240.
3. American Diabetes Association. Obesity Management for the Treatment of Type 2 Diabetes: Standards of Medical Care in Diabetes-2021. *Diabetes Care*. 2021;44(Suppl 1):S100–S110.
4. Fujioka K, Seaton TB, Rowe E, et al. Weight loss with sibutramine improves glycaemic control and other metabolic parameters in obese patients with type 2 diabetes mellitus. *Diabetes Obes Metab*. 2000;2(3):175–187.
5. Dixon JB, Brien PEO, Playfair J, et al. Adjustable gastric banding and conventional therapy for type 2 diabetes: a randomized controlled trial. *JAMA*. 2008;299(3):316–323.
6. Kashyap SR, Bhatt DL, Wolski K, et al. Metabolic effects of bariatric surgery in patients with moderate obesity and type 2 diabetes. *Diabetes Care*. 2013;36(8):2175–2182.
7. Rothberg AE, McEwen LN, Kraftson AT, et al. Very-low-energy diet for type 2 diabetes: An underutilized therapy? *J Diabetes Complications*. 2014;28(4):506–510.
8. Davies MJ, Bergenstal R, Bode B, et al. Efficacy of liraglutide for weight loss among patients with type 2 diabetes. the scale diabetes randomized clinical trial. *JAMA*. 2015;314(7):687–699.
9. Sims EA, Danforth E, Horton ES, et al. Endocrine and metabolic effects of experimental obesity in man. *Recent Prog Horm Res*. 1973;29:457–496.
10. Schauer PR, Kashyap SR, Wolski K, et al. Bariatric surgery versus intensive medical therapy in obese patients with diabetes. *N Engl J Med*. 2012;366(17):1567–1576.
11. Hollander PA, Elbein SC, Hirsh IB, et al. Role of orlistat in the treatment of obese patients with type 2 diabetes. A 1-year randomized double-blind study. *Diabetes Care*. 1998;21(8):1288–1294.