

The Effect of Sleeve Gastrectomy on Diabetic and Hypertensive Patient

Introduction

Obesity prevalence is increasing around the world, and now over a billion adults are obese [1]. Obesity is associated with health problems like type 2 diabetes mellitus (T2DM) and hypertension, although the precise link between these disorders is not understood [2]. Around a third of pre-op sleeve gastrectomy patients have hypertension, according to Bobowicz et al. [2]. One way to alleviate obesity and its associated comorbidities is with bariatric surgery, such as sleeve gastrectomy. Sleeve gastrectomy is a restrictive procedure where the surgeon removes up to 80% of the patient's stomach. Surgeons sometimes use the sleeve gastrectomy as the first stage in a two-stage procedure, but evidence suggests that it is an effective weight loss method in its own right [3]. According to Buchwald H, Oien DM [4] sleeve gastrectomies comprised 28% of all bariatric surgeries worldwide in 20. This literature review examines the effect of sleeve gastrectomies on hypertensive and type 2 diabetic patients. Section 1 discusses the effect of sleeve gastrectomy on type 2 diabetic patients. Section 2 examines how sleeve gastrectomy compares with other bariatric surgeries. Finally, Section 3 discusses the effect of sleeve gastrectomy on hypertensive patients.

The Effect of Sleeve Gastrectomy on Diabetic Patients

Sleeve gastrectomy has a beneficial effect on T2DM, as demonstrated by Bayham BE, Greenway FL, Bellanger DE, O Neil CE [5]. These researchers retrospectively reviewed the health charts of 71 patients diagnosed with T2DM. All patients had undergone a vertical sleeve gastrectomy in the preceding eight years. The results showed that eight weeks after the bariatric surgery, 83% of the patients remained off their diabetes medication. The authors concluded that sleeve gastrectomy is a viable way to resolve T2DM in obese patients. Another recent study examined the long-term effect of sleeve gastrectomy on T2DM [6]. The method consisted of an assessment of 23 patients with T2DM who underwent sleeve gastrectomy. The researchers found that the T2DM in 96% of patients improved in the short-term (whereas the other 4% saw no improvement in the short-term). This improvement continued for the long-term (>5 years) in 83% of patients. However, only 9% of patients had complete and long-term remission of their T2DM. Still, this study shows that sleeve gastrectomy improves T2DM in the large majority of patients. The ability of sleeve gastrectomy to alleviate T2DM is not surprising. After all, all weight loss surgeries, including biliopancreatic diversion, gastric bypass and RYGB, alleviate T2DM. Indeed, when obese patients lose weight by any method, they often see a reduction in their T2DM, and sometimes even a resolution. The link between weight loss and diabetes reduction has been demonstrated in studies such as Hartz AJ, Rupley DC, Kalkhoff RD, Rimm AA and Mokdad AH, Ford ES, Bowman BA [7,8] contacted 195,005 adults by telephone in the United States. The researchers asked for the respondents' height,

weight and diabetes status. A statistical analysis of the results showed that obesity was significantly associated with diabetes: adults with a BMI above 40 had an odds ratio of 7.37 for diabetes compared to adults with a healthy weight. This shows that obesity causes diabetes, which in turn implies that sleeve gastrectomy can alleviate diabetes via its ability to induce weight loss.

How Does Sleeve Gastrectomy Compare with other Bariatric Surgeries?

Although sleeve gastrectomy can alleviate T2DM, roux-en-Y gastric bypass (RYGB) is even better, according to Brethauer et al [6]. This study compared the outcomes of sleeve gastrectomy, RYGB and gastric banding patients. The study found that RYGB alleviates diabetes better than sleeve gastrectomy and gastric banding. Specifically, the long-term remission rate for T2DM in RYGB patients was 61%, compared to only 31% for sleeve gastrectomy patients and just 9% for gastric banding patients. This means RYGB alleviates T2DM greater than sleeve gastrectomy and gastric banding. However, a weakness of the study was that the sleeve gastrectomy patients and the gastric banding patients were older than the RYGB patients. This may have been the reason for the inferior glycaemic outcomes of the sleeve gastrectomy patients and the gastric banding patients. The superiority of RYGB was confirmed by Li JF, Lai DD, NiB, Sun KX [9]. These researchers performed a meta-analysis of five randomised controlled trials that compared RYGB with sleeve gastrectomy. This meta-analysis revealed that RYGB has higher rates of T2DM remission than sleeve gastrectomy. Specifically, RYGB has remission rates of around 80%, whereas sleeve gastrectomy has remission rates of only 50%. This implies that RYGB is better at alleviating T2DM than sleeve gastrectomy. However, the researchers also found that RYGB has a higher rate of complications than sleeve gastrectomy, which implies that sleeve gastrectomy is the safer procedure. The findings of a study by Bayham BE [5] conflict with Brethauer's study and Li's study. Bayham et al. found that 79% of RYGB patients remain off their diabetes medication after surgery, compared to 83% of the sleeve gastrectomy patients. This implies

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that both operations have roughly the same effectiveness at resolving T2DM: neither type of bariatric surgery is better than the other. However, there was a major difference between the two groups: sleeve gastrectomy patients had a higher incidence of complications than the RYGB patients. Therefore, it seems sleeve gastrectomy is more dangerous than RYGB surgery, at least for patients with T2DM. The conflicting findings between Bayham's study and Li's study warrant more evidence in the form of further randomised controlled trials.

The Effect of Sleeve Gastrectomy on Hypertensive Patients

Studies show that sleeve gastrectomy has a beneficial effect on hypertensive patients. A meta-analysis by Sarkhosh et al. [1]. The researchers included 33 studies about sleeve gastrectomy and hypertension, totalling 3,997 patients. All studies met stringent inclusion criteria; for example, all studies were from 2000 to 2011. The researchers found that sleeve gastrectomy resolved hypertension in 58% of patients. Another 17% of patients experienced improvement of their hypertension, though not enough for complete resolution. This shows that sleeve gastrectomy significantly improves hypertension in most hypertensive patients. Therefore, sleeve gastrectomy is a viable option for obese patients with hypertension [2] performed a study that confirmed sleeve gastrectomy's beneficial effect on hypertensive patients. The researchers followed 84 patients for four years after sleeve gastrectomies. The patients lost an average of 44% of their excess weight thanks to surgery. Furthermore, the surgery resolved the hypertension of 33% of patients and improved hypertension in another 28% of patients. Hypertension persisted in the remaining 39% of patients. This study shows that sleeve gastrectomy resolves or improves hypertension in most hypertensive patients. Alqahtani, Antonisamy, Alamri, Elahmedi, and Zimmerman [10] also performed a study that demonstrated the benefits of the sleeve gastrectomy on hypertension. The study retrospectively reviewed 108 sleeve gastrectomy patients at King Saud University Hospitals, Saudi Arabia. All patients were children and young adults aged 5 to 21. The patients had lost 62% of their excess weight by two years after surgery. 75% of the hypertensive saw a resolution of their hypertension two years after surgery. Furthermore, prehypertension resolved in 85% of the prehypertension patients. Also, there were no serious postoperative complications or adverse sequelae. This study implies that sleeve gastrectomy is effective at resolving hypertension and prehypertension, especially in young patients. One weakness of this study is that it only followed the patients for two years. Therefore the long-term efficacy of sleeve gastrectomies is uncertain.

Conclusion

This literature review examined the effect of sleeve gastrectomy on diabetic and hypertensive patients. According to studies, T2DM resolves in the majority of sleeve gastrectomy patients in the short term, but only 9% of patients in the long-term. RYGM is better at alleviating T2DM than sleeve gastrectomy. However, the safety of RYGM relative to sleeve gastrectomy is uncertain. Sleeve gastrectomy's effect on hypertension is also beneficial. Sleeve gastrectomy resolves hypertension in 30-75% of patients and improves hypertension in another 20-30%. We can conclude that sleeve gastrectomy is a suitable intervention for patients with T2DM and hypertension.

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