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BRIEF COMMUNICATION

An Application May Help Improve Protein Consumption after Bariatric Surgery

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Abstract
This brief communication suggests that in patients who had bariatric surgery and in whom protein intake is lower than 60 g/d, the use of an application is likely to improve protein intake.

Keywords Bariatric surgery · Protein intake

Introduction

Protein intake (PI) is dramatically reduced after bariatric surgery. Although there is no validated recommendation for daily PI in these patients, the consensus is that it should be higher than 60 g/d [1]. Estimated PI in observational studies suggests that less than 40 to 45% at 4 months and 35 to 50% patients at 1 year achieve 60 g/d [1, 2]. Patients eat approximatively 40–45 g of protein per day 3 months after bariatric surgery [3, 4].

Randomized studies suggest that an increase in PI reduces fat-free mass loss, improves energy metabolism, and restores weight loss after weight regain [5–7].

We hypothesized that an application designed to monitor PI and correct meals can increase PI with a positive patient experience.

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Material and Methods

Patients operated upon our reference center, consuming less than 60 g of protein per day 1 month after surgery were consecutively invited to participate.

Study

This was a pilot proof of concept, open, one-arm, monocentric study.

Application

The PIM (protein intake monitor) application stood on a web platform. Patients reported 3-day food intake (every 2 weeks, including one weekend day) and for 2 months (between 1st and 3rd months after surgery) or more frequently if they wanted to, through a tablet (iPad). It allowed patients to enter their meals (in the form of text or photos with various portions of foods). This application has been validated in many clinical trials and is user-friendly enough so that most patients are rapidly autonomous [8]. The application calculated daily PI and proposed solutions to increase PI after the patient had attempted her/his own change proposals. A diet record is considered complete when the patient reported all the meals he/she ate during three consecutive days (including one weekend day).

Table 1 differences between the patients who reached (group 1) and those who did not achieve the objective of 60 g/d protein intake (group 2) 3 months after bariatric surgery

	Group 1 ($n = 19$)	Group 2** ($n = 13$)	P
Protein intake at inclusion (in g/d), median [IQR]	43.0 [40–49]	33.1 [18–46.3]	0.0573
Protein intake at 3 months of bariatric surgery (in g/d)), median [IQR]	65.3 [63.3–77.7]	52.7 [33.3–54.0]	< 0.0001
Complete diet record (%) at 3 months of bariatric surgery	84.2%	46.2%	< 0.05

In practice, the patient noted the number of meals consumed per day (including snacks). Then, he/she noted the food eaten at each meal, using photos or food items from a list. He/she could adapt the quantity in "portions" by scrolling along a line. Daily PI was summarized as a gauge. If PI remained lower than 60 g/d, the application proposed the patient to correct the meals him/herself by suggesting different qualities or quantities of food items. If the patient provided the correct answer, there was a positive feedback. After five attempts with incorrect proposals, the application proposed solutions. Patients were free to use or not this self-correction procedure. Satisfaction in the use of the application was evaluated.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

Results

The study included 37 patients, 87% women, mean age 43 (SD 13). Sleeve gastrectomy was performed in 54% patients, 41% had a gastric bypass, and 5% had a gastric banding. PI increased from a median 42.3 g/d (IQR 34.7–46.7) at inclusion to 62.5 g/d (IQR 53.0–67.3) at the end of the study. The 60 g/d target was reached by 59% of patients at 3 months of bariatric surgery.

Few of the patients that did not reach the 60 g/d objective used the self-correction procedure (18 to 29% during the first 6 weeks, and 23% of those with still a low PI at the study end). Ninety-four percent of the patients were satisfied with the application and found it useful. Thirty-one percent had difficulties in using the self-correction procedure.

Patients reaching the 60 g/d objective more often completed the diet record (84% complete record versus 46% in those not reaching 60 g/d, $P = 0.037$; Table 1). They also had less difficulties using the self-correction procedure (27.8 versus 46.2%, $P = 0.025$). The two groups considered the application satisfactory to the same extent.

In conclusion, this study suggests that the use of an application to monitor food intake may improve PI, which turns out to be above 60 g/d in 59% of the patients 3 months after bariatric surgery. The patients that used the application most seem to have the largest increase in PI. Further randomized clinical studies are necessary to validate the impact of this application.

Compliance with Ethical Standards

Conflict of Interest Authors declare no conflict of interest.

References

1. Sherf Dagan S, Keidar A, Raziel A, et al. Do bariatric patients follow dietary and lifestyle recommendations during the first postoperative year? Obes Surg. 2017;27(9):2258–71.
2. Ito MK, Gonçalves VSS, Faria SLCM, et al. Effect of protein intake on the protein status and lean mass of post-bariatric surgery patients: a systematic review. Obes Surg. 2017;27(2):502–12.
3. Moize V, Geliebter A, Gluck ME, et al. Obese patients have inadequate protein intake related to protein intolerance up to 1 year following Roux-en-Y gastric bypass. Obes Surg. 2003;13(1):23–8.
4. Verger EO, Aron-Wisnewsky J, Dao MC, et al. Micronutrient and protein deficiencies after gastric bypass and sleeve gastrectomy: a 1-year follow-up. Obes Surg. 2016;26(4):785–96.
5. Sherf Dagan S, Tovim TB, Keidar A, et al. Inadequate protein intake after laparoscopic sleeve gastrectomy surgery is associated with a greater fat free mass loss. Surg Obes Relat Dis. 2017;13(1):101–9.
6. Lopes Gomes D, Moehlecke M, Lopes da Silva FB, et al. Whey protein supplementation enhances body fat and weight loss in women long after bariatric surgery: a randomized controlled trial. Obes Surg. 2017;27(2):424–31.
7. Schiavo L, Scalera G, Pilone V, et al. A comparative study examining the impact of a protein-enriched vs normal protein postoperative diet on body composition and resting metabolic rate in obese patients after sleeve gastrectomy. Obes Surg. 2017;27(4):881–8.
8. Turnin MC, Schirr-Bonnans S, Martini J, et al. Educ@dom:comparative study of the telemonitoring of patients with type 2 diabetes versus standard monitoring-study protocol for a randomized controlled study. Diabetol Metab Syndr. 2017;9:52–62.