Clinical Study

Effect of Abdominoplasty in the Lipid Profile of Patients with Dyslipidemia

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1. Introduction

Dyslipidemia is a silent pandemic affecting millions of people around the world. There is more than one factor predisposing this serious problem, where not only diet, exercise, and medications could solve it [1].

The truth is that a lot of people can be sick without knowing it. There is controversy of the possible benefit of liposuction or abdominoplasty in the metabolism of glucose or cholesterol. There are no reports about the effect of abdominoplasty in the metabolism of patients with dyslipidemia.

2. Objectives

Observe any possible change in the lipid profile, weight, cardiovascular risk markers (HOMA), glucose, or insulin of patients with dyslipidemia after an abdominoplasty.

3. Methods

A descriptive observational study was designed to follow up the lipid profile of patients with dyslipidemia candidates to a body contouring surgery as abdominoplasty. The research project was evaluated and approved by the ethics and research committee of the Antiguo Hospital Civil de Guadalajara (file number in the institution 112-11). The ethics and research committee evaluated all the research projects in the decentralized, academic, and public Antiguo Hospital Civil de Guadalajara. It follows the guidelines according to the Health Mexican Norm and the Helsinki ethical principles.

Abdominoplasty or lipoabdominoplasty is offered to women to improve the body images in case of severe skin laxity, excess fat, and flaccidity of the abdominal muscle [2, 3]. We did not operate patients with morbid obesity, where gastric bypass and other bariatric surgeries are suggested.
The following criteria for recruitment were applied patients with recent diagnoses of dyslipidemia with severe laxity of the skin, fat and musculofascial system in the lower and upper abdomen. We excluded patients with negative to participate, alterations in the morphology of abdominal wall (multiple surgical scars and defects on the abdominal wall), pregnancy, systemic illnesses that can put in risk the life of the patient (hepatic, renal or hearth problems), anoma-lies in the coagulation profile as antiphospholipid syndrome, procoagulants, prothrombotic disorders, primary dyslipi-demia, age less than 20 years or more than 60 years and patients that had a previous body contouring surgery as liposuction, fat injection or abdominoplasty.

Demographic variables as age and gender were report-ed, as well as the fat tissue weight removed after the abdomi-noplasty. We calculated the sample size taking in account the number of patients operated for an abdominoplasty in one year in the institution (academic, tertiary hospital) with the help of the program in the web page http://www.macorr.com/sample-size-calculator.htm. The sample size was calculated in 17 patients. We collected patients during one year period from October 2010 to September 2011.

We observed before and three months after the surgery any possible change on weight, body mass index, laboratories values as total cholesterol, HDL, LDL, VLDL, triglycerides, hemoglobin, hematocrit, leukocytes, platelet, glucose, urea, creatinine, insulin, albumin, TGO, TGP, and HOMA index (insulin × glucose)/22.5. HOMA index is a cardiovascular risk marker. We used the Student's t test to evaluate any possible change before and three months after the surgery. We considered a P value less or equal to 0.05 as statistical significant.

The patients were followed before and during the postoperative period in junction with the Department of Endocrinology of the same hospital. It was suggested not make any change on diet, exercise, or medications to lower cholesterol or any element in the lipid profile. A questionnaire was applied before and at the third month to evaluate the calorie intake. In the questionnaire, the last three days of food intake were evaluated. The patients were asked about their daily activities in order to identify any possible change in exercise that can increase the calories used. Three months after the surgery, patients continued followup of the dyslipidemia in the Endocrinology Department. They were advised to continue regular consults about cholesterol disorder. Medications and changes in life style as diet and exercise were started.

4. Results

We operated 26 female patients between 26 and 56 years old. The mean age was 39 years old. The mean length was 1.6 meters (1.46–1.75 meters SD 0.32), weight of 69.1 kgs (54–83 kgs, SD 8.09), and body mass index of 27.4 kgs (22–30.8 kgs, SD 1.1).

Before the surgery, the mean glucose value was of 91.45 mg/dL (72–114 mg/dL, SD 9.99), insulin value of 17.11 UI/mL (2–96 UI/mL, SD 23.38), and the HOMA index was 3.96 (0.41–24.33, SD 5.43).

The mean hemoglobin value was 13.99 g/L (11.82–16.3 g/L SD 1.22), hematocrit 42.13 (37.2–47 SD 2.86), leukocytes count 7.33 (4.33–10.7, SD 1.87), and platelets 316 (220–440 SD 56.7).

The mean creatinine value was 0.67 mg/dL (3.9–94 mg/dL, SD 0.54), urea 20.34 mg/dL (10.7–33.2 mg/dL SD 2.2), album- in 4.11 mg/dL (3.9–6.9 mg/dL SD 0.62), DHL 175 (109–283 SD 43.72), TGO 27 mg/dL (16–45 mg/dL SD 6.6), and TGP 28 mg/dL (11–43 mg/dL SD 7.65).

Of the 26 patients, we found 16 of the patients with more than one anomaly in the lipid profile. Sixteen of them had hypercholesterolemia, twelve had hypertriglyceridemia, nine hypopalphalipoproteinemia, and four had hiperprebeta. The results are shown in Figure 1.

The medical treatment, diet and exercise were started by the endocrinologist at the third month of the surgery. Questionnaires were applied in order to evaluate any possible change on diet during the three-month period of time. The patients reported no change on diet. Results are shown in Table 1.

The fat tissue removed weight between 500 and 400 gr (mean 1700 gr).

The results before and after the surgery in weight, body mass index, total cholesterol, HDL, LDL, VLDL, triglycerides, hemoglobin, hematocrit, leukocytes, platelet, glucose, urea, creatinine, insulin, albumin, TGO, TGP, and HOMA index are shown in Table 2.

5. Discussion

The resection of fat tissue has consequences in the metabolism of patients. It is proved that abdominoplasty improves the metabolism of glucose, lipids, and fatty acid. Andreas and cols showed in this report that body mass index, waist/hip ratio, fat mass, fat free mass, fasting plasma glucose, 2-h plasma glucose, triglycerides, total cholesterol, free fatty acids, and systolic and diastolic blood pressure decreased after abdominoplasty [4]. Something important to mention is that the reduction in the values is noticeable and the period of evaluation was longer than one month (40 days). Most of the patients were healthy with no previous impairment in weight, glucose, or any other chronic degenerative diseases. The variables before and after the surgery reached statistical significance and were between normal ranges. The same group evaluated the effect of liposuction in the metabolism of the patients [5]. It is a longer lasting report (followup at the 21 day and 90 day) that showed change in body mass index, waist hip ratio, body fat, plasma insulin, triglycerides, total cholesterol, free fatty acid, systolic and diastolic pressure, inflammatory markers, leptin, TNF alpha, adiponectines, resistin, IL6 and IL10 levels. The explanation by the authors is the reduction of fat and consequently the reservoir of cytokines that improved the metabolism of the adiponectines, by decreasing the number of receptors in the fat [5, 6]. When the same group was evaluated in a randomized study, the effect of liposuction and no liposuction positive effect in insulin resistance and circulating markers of vascular inflammation were observed.
Lipid profile anomalies

Figure 1

Table 1: Caloric intake estimated.

|                  | Kcal before the surgery | Kcal three months after the surgery | P < 0.05 |
|------------------|-------------------------|------------------------------------|----------|
| Carbohydrates    | 893                     | 921                                | 0.67     |
| Lipids           | 713                     | 732                                | 0.42     |
| Proteins         | 649                     | 658                                | 0.78     |
| Total            | 2234                    | 2311                               | 0.85     |

Table 2: It shows media, range, and standard deviation before and three months after the surgery.

| Variable          | Before the surgery media, range and SD | Three months after the surgery media, range and SD | P value, standard deviation |
|-------------------|----------------------------------------|----------------------------------------------------|-----------------------------|
| Weight            | 69.1 kgs (54–83 kgs, 8.09)             | 68.62 kgs (54–83 kgs, 8.07)                        | 0.79 (8.01)                 |
| Body mass index   | 27.4 (22–30.8, 1.1)                    | 27.1 (24.4–28.7, 1.32)                            | 0.81 (1.3)                  |
| Glucose           | 91.45 mg/dL (72–114 mg/dL, 9.99)       | 90.71 mg/dL (76–106 mg/dL, 8.77)                   | 0.27 (9.32)                 |
| Insulin           | 17.11 UI/mL (2–96 UI/mL, 23.38)        | 11.79 UI/mL (3–57.4 UI/mL, 11.15)                  | 0.28 (18.3)                 |
| HOMA              | 3.96 (0.41–24.33, 5.43)                | 2.58 (0.7–10.67, 2.3)                             | 0.22 (4.1)                  |
| Hemoglobin        | 13.99 mg/dL (11.82–16.3 mg/dL, 1.22)   | 12.79 mg/dL (11–15.3 mg/dL, 1.06)                  | 0.1 (1.2)                   |
| Hematocrit        | 42.1 (37.2–47, 2.86)                  | 42.13 (37–43, 2.8)                               | 0.3 (2.8)                   |
| DHL               | 175 (109–283, 43.72)                  | 178 (110–296, 52.15)                             | 0.83 (47)                   |
| TGO               | 27 mg/dL (16–45 mg/dL, 6.6)            | 28.32 mg/dL (12–43 mg/dL, 8.05)                    | 0.74 (7.5)                  |
| TGP               | 28 mg/dL (11–43 mg/dL, 7.65)           | 31.79 mg/dL (14–49 mg/dL, 7.89)                    | 0.33 (8)                    |
| Albumin           | 4.11 mg/dL (3.9–6.9 mg/dL, 0.62)       | 3.8 mg/dL (2.8–5.3 mg/dL, 0.64)                    | 0.094 (0.64)                |
| Cholesterol       | 224 mg/dL (134–488 mg/dL, 69.55)       | 220 mg/dL (128–446 mg/dL, 62.56)                   | 0.84 (65)                   |
| Triglycerides     | 193 mg/dL (61–369 mg/dL, 51.2)         | 133 mg/dL (26–286 mg/dL, 80.75)                    | 0.03 (73.2)                 |
| HDL               | 44 mg/dL (6–69 mg/dL, 10.99)           | 49 mg/dL (32–38.6 mg/dL, 29.6)                     | 0.18 (23.2)                 |
| VLDL              | 43 mg/dL (12–133 mg/dL, 26.1)          | 39.1 mg/dL (11.8–122 mg/dL, 22.04)                 | 0.55 (23.85)                |
| LDL               | 137 mg/dL (130–390 mg/dL, 68.43)       | 97.61 mg/dL (26–295 mg/dL, 71.86)                  | 0.04 (72.33)                |
The metabolism of glucose and cholesterol has been reported. Follow-up with the primary care physician, but that benefit in surgery is not going to change a healthy lifestyle and regular follow-up with the primary care physician, but that benefit in the metabolism of glucose and cholesterol has been reported. In our city, previous reports were done in the case of abdominoplasty, liposuction, or combination of both methods [13, 14]. Significant improvement is noticed. Cholesterol and triglycerides are related with epiandroteniona, and the reduction of the peripheral fat decreased the levels of leptine and as consequence the levels of glucose, insulin, and cholesterol improved. Our observation is unique in evaluating Mexican patients with a documented anomaly in the lipid profile. The follow-up was longer almost 90 days and the results showed clinical changes with only statistical change on LDL and triglycerides. But not all the reports showed a possible benefit.

Something important to remember is that the most dangerous fat tissue is located inside the body where body contouring surgery does not have any effect [8, 15]. This surgery is not a good choice in morbid obesity patients. But in the case of massive weight lost after a bariatric procedure, the resection of the redundant tissue, besides the functional benefit, can have an extra benefit in reducing inflammatory markers [16]. At the end, we would like to comment on the report of Swanson, one of the biggest reports about this matter. He found a positive effect in liposuction and abdominoplasty in the lipid profile of his patients. He included 322 patients. He found a difference in triglycerides values and leucocytes count. He did not find any benefits in cholesterol, VLDL, LDL, and HDL. The group of patient was a combination of different procedures (no homogeneous about the type of surgery) but the size of the group is one of the biggest reports in the literature [17].

6. Conclusion

We found a reduction in triglycerides and LDL. We did not find any positive benefit in cholesterol, HDL, and VLDL, as well as hemoglobin, hematocrit, leucocytes, glucose, insulin, HOMA index, TGO, TGP, albumin, body mass index, or weight.

Most of the patients in this group have more than one anomaly in the lipid profile. Hypercholesterolemia, hypertriglyceridemia, and hypoalphalipoproteinemia are the most common anomalies, different from reports in Mexican population. Chronic degenerative diseases are pandemic problem, where genetics is not only involved.

Beside the possible motivation after body contouring surgery, the fat tissue that the plastic surgeons remove can have an impact on the cholesterol metabolism (especially in triglycerides and LDL). But we should be careful with this finding. If diet, life style, and exercise are not modified, the remaining fat tissue could increase in size and any positive effect can be finished.

Conflict of Interests

The author reported no conflict of interests in this report.

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