Rectus Abdominis-Myofascial release Technique Versus External Oblique-Plication Technique for Safe Waist Enhancement in Abdominoplasty

Thesis

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INTRODUCTION

Abdominoplasty is an old procedure that had existed for more than 100 years. It aims to reshape the abdominal wall by combining skin and subcutaneous tissue resection with musculoaponeurotic reinforcement. Improvement of the waistline is one of the goals of abdominoplasty ***(Chaouat, M, 2000).***

Numerous designs for abdominoplasty are available. Suction-assisted liposuction (SAL)has been added to the procedure. Hassan Badran was one of the first authors to integrate SAL into the procedure.***(Badran H, 2013).***

The waist shape depends on several factors, such as fat deposit, individual abdominal contour and degree of muscular tension.***(Chaouat, M, 2000)***The most common cause of abdominal deformity is pregnancy, most often multiple pregnancies. Pregnancy stretches the skin beyond its biomechanical capability to spring back and stretches the musculoaponeurotic structures of the abdominal wall. The result is stretching and thinning of these structures and diastasis of the rectus muscle. ***(Nahas FX, 1998).***

Several techniques of muscular reinforcement to achieve a more harmonious contour of the anterior abdominal wall have been described. These

procedures are basically focused on the tension of the abdominal wall. Consequently, they may result in some improvement at the waistline ***(Nahas FX, 1998).*** There are controversies between the efficiency of techniques to produce a good abdominal contour with aesthetically satisfying waist ***(Fahmy SF et al, 2013)***

Musculoaponeurotic laxity is usually corrected by midline plication of the rectus sheath from xiphoid to the pubis especially when there is diastasis of the rectus abdominus msucle. It seems that midline plication alone is not sufficient to improve the contour deformity of the whole musculofascial layer especially in the waist area ***(Brauman D et al, 2008)***

Recently great emphasis has focused on modification of the structural support of the abdominal wall. Although many techniques have been published for the treatment of the aponeurotic musculature during abdominoplasty none have proved to be the most efftive or long lasting ***(Baroudi R, 1996, Ramirez Om, 1999, Nahas FX, 2001)***.

A smart technique for the waist enhancement is the external oblique plication technique which involves L and inverted L plication of the external oblique muscle that can correct many aspects of the abdominal wall deformity. This plication is performed after correcting rectus diastasis by midline plication ***(Nahas FX, 2001)***

Another challenging techniques for correction of the musculoaponeurotic laxity is the Rectus abdominis myofascial release technique which describes the incision of the anterior rectus sheath. The rectus myofascial release allows the

centrifugal forces of the rectus muscles to push the muscles towards the midline, fascilitating closure with decreased tension. It also allows better pull of the external oblique muscle, which in turn will be more effective in redifining and decreasing the waistline measurement***. (Ramirez OM, 2000)***

Which technique is better for enhancement of the waist during correction of the abdominal myoapponeurotic laxity and which is more safe on the intraabdominal pressure and respiration?, these questions have not been answered yet and no study has been done to compare both techniques and their role in abdominoplasty.

AIM OF THE WORK

This study aims to evaluate the results of the rectus abdominis myofascial release technique versus the external oblique plication technique in correction of the abdominal myofascial laxity and their role in the enhancement of the waist line and the effect on intraabdominal pressure.

PATIENTS AND METHODS

In this clinical, interventional, prospective, self-controlled, single-centered Study, 30 patientsseeking abdominoplasty procedure for abdominallaxityand increasedwaist /hip ratio were randomly selected at thePlastic Surgerydepartment ofAin Shams University. The Ethics Committee of the University approvedthe StudyProtocol. All patients were females. Their age ranged between25 and 55 years old and with a BMI (bodymass index) less than 34 kg/cm2.Thepatients signed a consentbefore participating in this study.

Inclusion criteria are

- Female.
- Age: 25 to 55.
- Body Mass Index (BMI): < 34.
- With abdominal myoapponeurotic laxity and ill-defined waistline.

Exclusion criteria are

- Patients with severe comorbidity (malignant hypertension, uncontrolled diabetes and any other severe condition).
- Patients with risk for deep venous thrombosis and chest complications.

- Patients with previous abdominal surgery (including previous abdominoplasty).
- Patients planning pregnancy within 1 year
- Patients with BMI > 34.
- Patients with unrealistic expectations.

Detailed history was taken including smoking history. Clinical examination of each patient has been done with assessment of the weight, height, body mass index, and presence/absence of skin redundancy, muscle tone, rectus diastasis, presence and extent of skin striae, position of umbilicus, assessment of waist circumference and waist / hip ratio. Preoperative and post-operative anterior and lateral photographs were taken.

Routine preoperative investigations were done to the patients (complete blood count, blood sugar, urine tests, liver and renal function tests, prothrombin time and activated partial thromboplastin time). Duration of procedure and duration of hospital stay was recorded.

All patients had Foley catheter insertedpreoperatively to measure the vesicalpressure which directly reflects the intraabdominalpressure. ***(Malbrain ML et al, 2012)***

After muscle relaxationand when the intravesical volume is belowthe volume required to initiate the bladdermuscle contraction (approximately 350 ml).This volume was achieved by emptying

thebladder and inserting 350 ml of normal saline.All manometric measurements were obtainedwhen the zero standard level was at the level ofthe patient's heart and recorded in centimetersof saline. Measurements was recorded preoperatively after initiation of anesthesia and postoperatively while the patient was still intubated andfully relaxed.

Pain was assessed on the 2nd, 7th, and 15th days aftersurgery.Respiratory rate (RR) and breathing pattern were documented.Compression stockings were applied preoperatively to guard against venous thrombosis. In high risk patients, 5000 U of Unfractionated Heparin were given subcutaneously 2 hours before operation and then every 8 hours after operation until they werefreely able to walk.

Standard abdominoplasty was performed in all patients. Surgery was performed under general anesthesia, skin was incised on the abdominal crease with a horizontal limb in the suprapubic area and oblique limbs bilaterally extending to the anterior superior iliac spine. Abdominal flap was dissected on the suprafascial plane just above the rectus sheath and external oblique fascia up to the xiphoid process of the sternum.

Regarding the musculoaponeurotic laxity managementpatients were divided randomly into two groups:

- Group A (15 patients): Rectus abdominismyofascial release technique was conducted.

- Group B (15 patients): External oblique plication technique was conducted.

Group (A) Rectus AbdominisMyofascial Release Technique.***(Ramirez, 2000)***

The rectus abdominismyofascial release technique is done by incising the anterior rectus sheath longitudinally at the junction between the inner and the middle thirds of the rectus muscle width. In cases of significant abdominal laxity, this incision is made at about half of the rectus width. These incisions meet at the level of the xiphoid process superiorly and the pubis inferiorly. The medial edges are sutured together using prolene 1 sutures and the lateral edges sutured together using the same kind of suture. Figure 47 shows the rectus abdominismyofascial release technique.

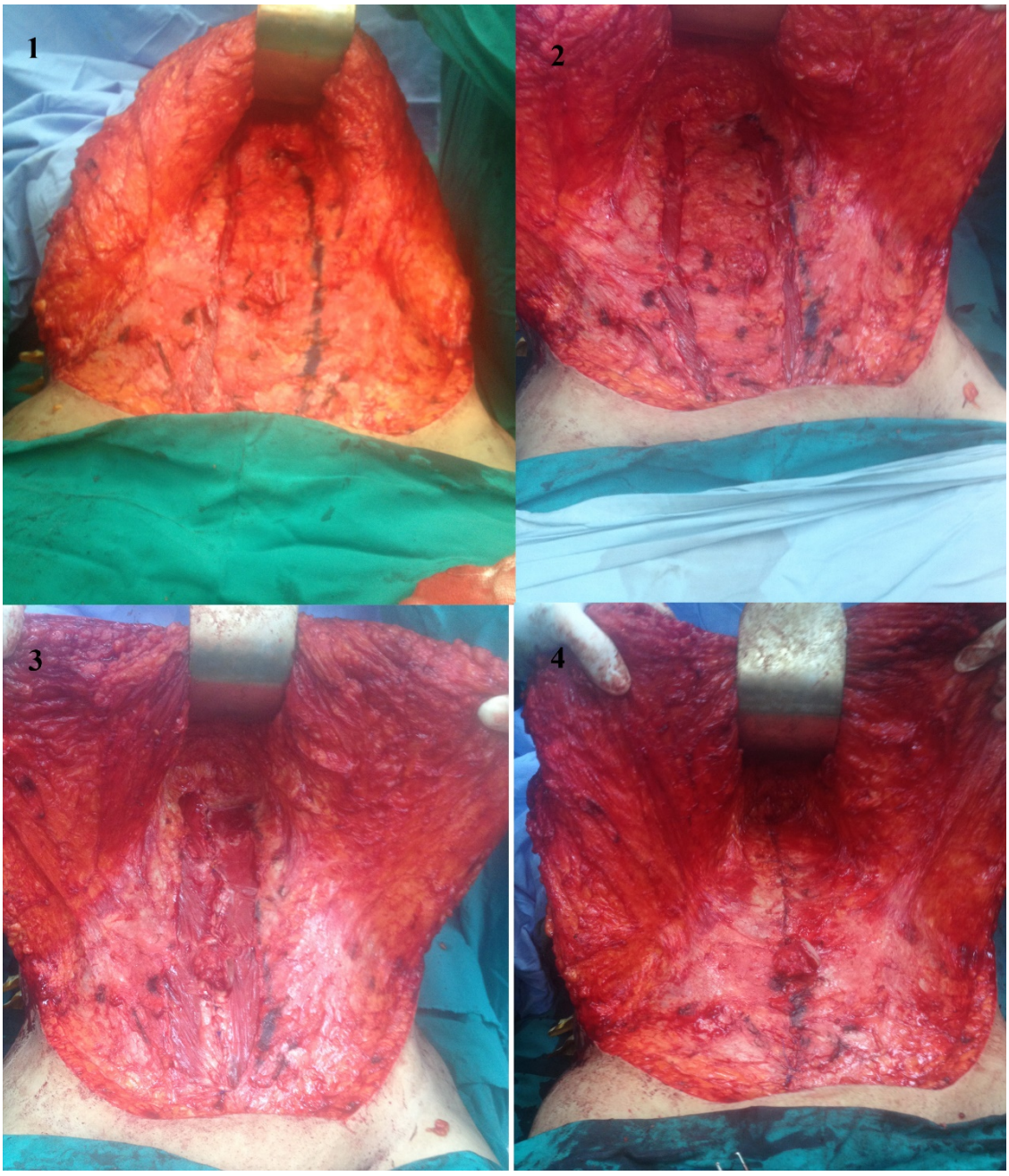

Fig. (47):(1) incision of the right anterior rectus sheath, (2) incision of the left anterior rectus sheath, (3) suturing of the medial edges, (4) suturing of the lateral edges .

Group (B): External Oblique Plication Technique.*(Nahas FX, 2001)*

Plication of the external oblique muscle is performed as 2 opposite L using the Prolene 0 continuous sutures. The vertical limb is made on a vertical line parallel to the midline, over the semilunaris line. The semilunaris line is located on the transition between the rectus muscle and the three lateral muscles of the abdomen. This vertical plication begins 3 to 4 cm above the umbilicus and go down to a point 3 cm above the level of the inguinal ligament. The horizontal limb begins at the lower end of the vertical one and extends laterally parallel to the inguinal ligament to a point medial to the anterior iliac crest. Figure 48 shows the external oblique plication technique.

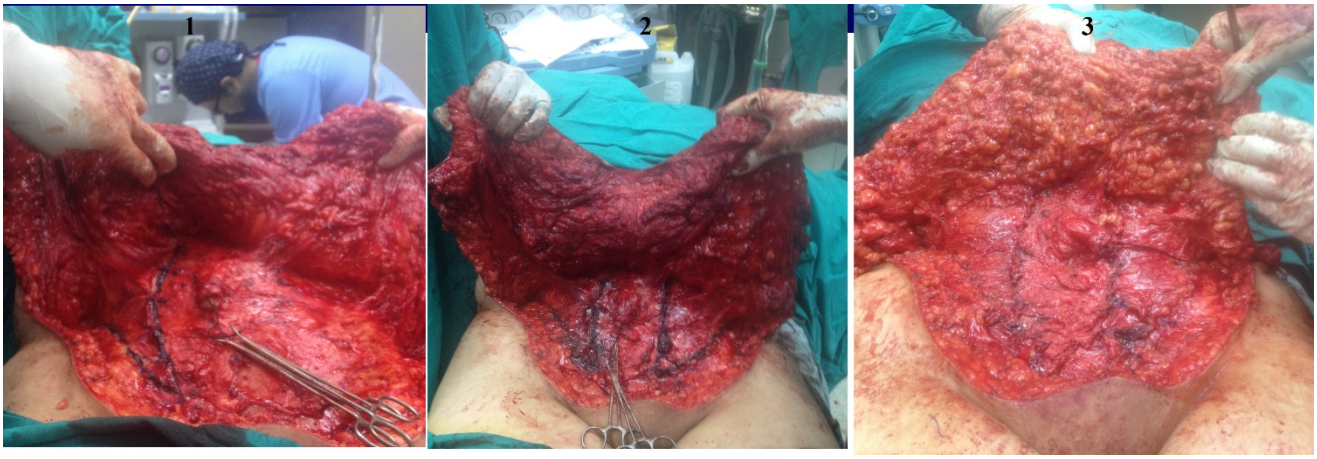

Fig. (48):(1) marking of the right external oblique plication, (2) marking of the right and left external oblique plication, (3) bilateral plication of external oblique.

Post-Operative Care:

Post operatively, patients were placed in the semi setting position, with the back elevated 45 degrees with flexed hips and knees.Intravenous fluids, antibiotics and pain medications were given for the first postoperative day and then patients were switched to oral medications.On the first day, the patientswere encouraged to mobilize.All Patients were discharged by the second or third day post operatively and they were advised to walk flexed for the first week and to wear an abdominal pressure garment for 6 weeks.

Patients were followed up post operatively and the following measurements were recorded:

- Intraabdominal pressure changes (measured on table after skin closure while the patient still intubated and fully relaxed)
- Blood gases on post-operative days 1 and 7.
- Intensity of postoperative pain on 2^{nd}, 7^{th}, and 15^{th} day after surgery (evaluated by Numeric Rating Scale: 0- no pain, 1-3 mild pain, 4-6 moderate pain, 7-10 severe pain).
- Duration of postoperative pain in days.
- Local wound condition with dressing changing on 5^{th}, 8^{th}, 11^{th} and 14^{th} day post operatively.
- Complications as seroma, hematoma, infection, wound dehiscence, deep venous thrombosis (DVT), pulmonary embolism, etc.

- Need for secondary intervention to decrease tension
- Need for mechanical ventilation or ICU stay
- Waist-hip ratio 1 month after the operation
- Weight changes after 1 month.
- Patient satisfaction after 3 months.
- Abdominal shape after 3 months.
- Pre and post-operative photos after 3 months.

All collected data wer placed in a specially designed data base. For statistical analysis were used Statistical Package for the Social Sciences (SPSS) program, version 20. Standard methods of descriptive statistics were used (mean, median, standard deviation). In a symmetric distribution of frequencies were applied parametric statistical analysis (student's t-test) and in asymmetric distribution, nonparametric statistical analysis methods ($\chi 2$ test and Mann-Whitney test). Fisher's exact test was used for comparing frequency of success in two treated groups. The value of $p \leq 0.05$ was considered as significant.

Discussion

Patients seek abdominoplasty to restore amore youthful appearance to their abdomen asa whole. The modern abdominoplasty mustaddress not only skin and subcutaneous tissuebut also the muscular abdominal wall to maximizeaesthetic outcome of the procedure.(***John et al, 2004).***

Enhancement of the waist line during the abdominoplasty is a challenging process and can be achieved by different ways. Suction lipectomy combined with abdominoplasty helps to better contour the abdomen and gives better definition to the distal ends of the line of closure ***(Heppe HP, 2001)***

Matarasso is credited for demonstrating the importance of anatomic site as a factor influencing the outcome of liposuction and describing the safe zones of liposuction in the abdomen in combination with abdominoplasty based on the blood supply to the abdominal flap that remains after elevation of the flap ***(Matarasso A, 1995)*** .Evolution of the lipoabdominoplasty has followed contributions from several surgeons, especially LeLouran et al and Saldanha et al***.(Le Louran C et al, 2000, Saldanha OR et al, 2003).***

Manipulations of the musculoaponeurotic layer of the abdomen during abdominoplasty has been described by different authors using different techniques in efforts to enhance the waistline. The musculoaponeurotic layer has gained importance in the improvement of the waist line. Several techniques have been proposed to increase the tension of the anterior abdominal wall and enhance the waist***. (Appiani E,***