

Comparison of the Treatment Outcome of the Traditional Liposuction [TL] Technique Versus the Combination of Vaser and Microaire [V&M] Technique for the Treatment of Lipedema of the Arms. A Single Center Experience

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Vaser & MicroAire technique [V&M]

1. Abstract

1.1. Introduction: Lipedema is a very common occurrence in women worldwide, occurring in around 11% of females. It is also a common problem for females from Egypt and the Middle East [E& ME]. Unfortunately, there are neither official reports on the incidence of this condition in the region, nor information on the outcome of its treatment. In our center, a high percentage of patients from different regions of E&ME attend seeking body shaping procedures, including the removal of Fat from different parts of the body. The standard technique [traditional liposuction-TL] to remove the lipedema of the arm has been the treatment of choice globally, and in our center before 2019.

1.2. Methodology: In our center, the TL technique using a 4 mm Mercedes cannula was performed. Unfortunately, the results were not satisfactory for the patients or for us. Here we report our center's experience for the treatment of arm lipedema for females from E&ME treated between January 2019 and December 2023 using a new technique, the combination of Vaser and MicroAire technique [V&M], compared to patients who underwent TL.

1.3. Results: During the above-mentioned period, 500 female patients attended our center for different body shaping surgeries, mainly due to abnormal deposits of fat. Among the 500 female patients, 400 female patients presented with lipedema of the upper and lower limbs, representing 80% of the total cases seeking a

body shaping surgery in our center. Among the 400 female patients, 250/400 patients [62.5%] had only lipedema of the upper arm [UA]. Among the 250 female patients, 100 patients were treated using TL and 115 were treated using the new technique of V&M. The VM resulted in better, more cosmetically appealing results, setting it as the new standard for our center.

1.4. Conclusion: Due to the superior results seen from the V&M technique, it was established as our center's new standard for the management of lipedema with the potential of becoming a new standard in other centers as well.

2. Introduction

Lipedema is the abnormal deposition of painful fat in different parts of the body, mainly the lower half [the buttocks, the thighs, the calves] and the arms [1]. Lipedema affects mainly females and rarely affects males with a global incidence of 11% of females [2]. The exact cause of lipedema is unknown, but it is believed to be caused by the effect of female hormones [hence the incidence mainly in females] causing uneven distribution of fat in different parts of the body [3,4]. Patients who report lipedema suffer from abnormal collection of fat resulting in swelling, deformity of the affected region with considerable stretch of the skin over areas of lipedema. Sometimes patients report pain and heaviness of the affected area/limb with some reporting general symptoms of fatigue and limitation of movement daily [5]. There is no specific

test for the diagnosis of lipedema. It is mainly diagnosed by the observation of the abnormal collection of fat in the affected part in association with some or all the symptoms mentioned above, and by the exclusion of other causes with similar clinical presentation [6] e.g. normal obesity where it presents as painless collection of fat, filariasis where the worm infection needs to be confirmed, or generalized edema which is the abnormal collection of fluid in the body [7]. Currently there is no medical treatment of lipedema [8], treatment includes dietary restriction and regular exercises. However, in most cases this is not sufficient, which makes surgical intervention the only viable treatment option [9]. Unfortunately, lipedema has neither a standard grading system to categorize it to different grades, nor a standard assessment of the results [10]. The lack of a standard grading system makes it difficult to classify the patients into clear stages or groups. Likewise, the lack of standard assessment of the results makes it difficult to compare results between different patients, different groups, and different techniques [7]. In general, the success of the procedure depends on identifying a cosmetically acceptable outcome for each patient individually, the ability to achieve this outcome, and the time it takes to achieve it [11]. Standard surgical assessments for any case of liposuction also take into consideration such factors as the amount of fat that could be removed during the operation, tightening of the skin post operatively, and the time it takes to reach the desired outcome. Lastly, they take into account the occurrence of seroma and other post surgical complications and their impact on achieving the desired results [12, 13].

Our center specializes in same day and intermediate care body contouring/sculpting surgeries. On average, 50 new cases attend our center monthly for a variety of body sculpting surgeries. We observed a high percentage of patients from different regions of E&ME seeking removal of lipedema from different parts of the body including lipedema of the arm. Traditionally, the standard technique [traditional liposuction-TL] to remove the lipedema of the arm has been the treatment of choice globally [7]. This was the standard operation in our center. However, the post-surgical cosmetic results, including skin tightening and seroma formation, were suboptimal. Neither we nor the patients found them satisfactory, with a high percentage [40-50%] of patients who underwent TL reporting inadequate skin tightening postoperatively. This resulted in saggy-looking arms, falling short of their cosmetic expectations. Consequently, many patients experienced severe negative psychological impacts, feeling uncomfortable wearing their favorite clothes, and perceiving the operation as a failure despite the visible improvement in the arm appearance compared to baseline. From our experience with TL, only 75% of the desired outcome could be achieved during the operation, with some improvements potentially continuing up to 60 days post procedure. Some patients also did not fully achieve the desired outcome as mentioned above. In order to improve the results, we looked for an alternative tech-

nique. We opted to remove the lipedema in general and that of the arm using a combination of Vaser and MicroAire [V&M] liposuction. The V&M liposuction was adopted as we were able to induce good lipolysis of the resistant fat using Vaser liposuction, followed by power assisted liposuction developed by MicroAire, followed by skin tightening using Vaser.

3. Objectives

To measure the impact of the combined use of power assisted liposuction V&M technique versus traditional liposuction [TL] on the final outcome of skin tightening in the arms of the patients with lipedema, and the achievement of a good cosmetic appearance of the arm compared to baseline. Likewise, we defined the achievement of good cosmetic results as having the difference in the circumference between the affected and the normal arm no greater than 10% provided the operation was performed unilaterally. If the operation was done on both arms i.e. bilaterally, then the difference in the circumference of each arm post operatively and the desired circumference not greater than 10%.

4. Study Design

We conducted our prospective cohort study between January 2019 and December 2023. Patients were divided into 2 groups/cohorts based on the technique used for the removal of lipedema TL vs V&M techniques. Group A included patients who had TL for their lipedema, and Group B included patients operated upon using V&M technique.

5. Study Setting

The study was conducted in our center, a plastic surgery center located within the multidisciplinary hospital [ElKenana hospital], Tanta City, Egypt. Our center is a specialized center running day surgeries and treating those requiring intermediate care. Patients who were recruited in the study were among the patients attending ElKenana hospital plastic surgery and obesity clinics. All patients provided consent for all assessments and treatment procedures. Before including any patient in the study, a clinical assessment was performed to confirm the presence of lipedema of the upper arm.

6. Population

In our study, all included patients were adult females aged between 16 and 60 years old. Each patient underwent baseline laboratory tests, including complete blood count, liver, and kidney function tests. None of the patients had a history of prior body sculpting or contouring surgery on their arms. We excluded male patients, and those who are unfit for surgery or anaesthesia [should the patient be operated upon using general anaesthesia].

All the necessary ethical approvals were obtained.

7. Statistical Analysis

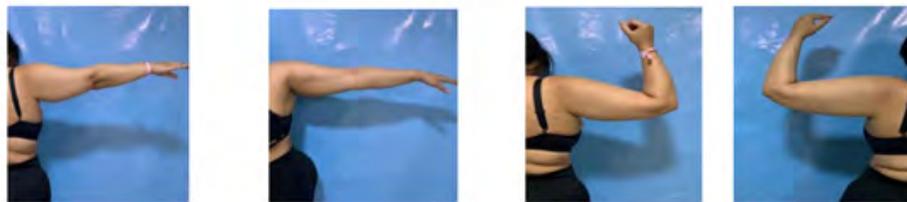
There was no formal statistical analysis. The study results were presented descriptively. The results were assessed based on post

operative assessment and follow up of the patients for a period of 60 days. The patients were assessed postoperatively regarding skin tightening, seroma formation, and any complications arising from the procedure. Measurements using a tape measure to assess the difference in arm circumference between the affected and the normal arm were obtained, this is in case of single arm operation, while in case of bilateral operation, the difference in the arm circumference pre and post operatively using a tape measure was taken. Likewise, Patient Reported Outcome [PRO], which consists of answers to a standard set of questions obtained from the patients during the regular visits up to 60 days following the operation, were used to assess patient satisfaction. Results were also compared to preoperative lipedema using pre and post operative photo imaging.

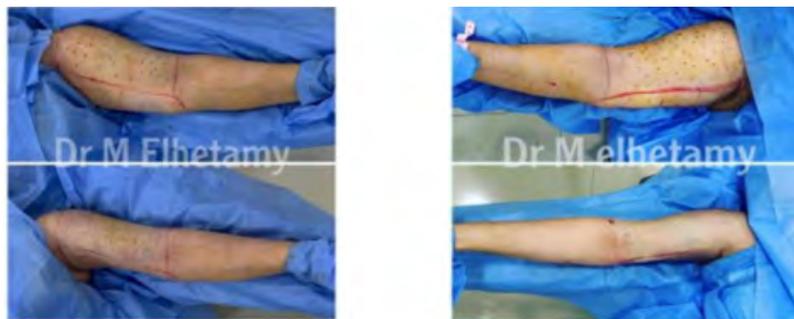
8. Results

Between Jan 2019 until December 2023, a total of 250 patients fulfilled the eligibility criteria. There were 40 patients [16%] who were excluded from our study due to 15 /40 [38%] refusing to participate in the study and 25/40 [62%] not attending the follow up period as planned. The post operative follow up of the patients included the assessment of skin tightening, and the formation of seroma or any other post operative complications up to 60 days post surgery. The post operative assessments were performed for

the patients on an outpatient basis at our center, or through video conferencing with the patients to ensure that there are no complications or seroma formation. The patients were instructed to immediately report to our center should they observe any complications or seroma formation. Among the 100 patients who were in Group A [TL], 60 patients [60%] had satisfactory outcomes regarding skin tightening and the occurrence of seroma. These observed results were based on the measurement of the circumference of the arm as previously stated, based on our examination of the changes in the shape of the arm, and the PRO survey in the post operative period. Among the 110 patients enrolled in Group B [V&M], 88 patients [80%] had satisfactory results regarding skin adherence/tightening to the arm and reduced seroma occurrence. Similarly, the amount of fat removed using V&M was of higher volume [90% of the amount needed to be removed to achieve the final appearance/ outcome], compared to the removal of around 75% of the desired amount of fat using TL. There were no other post operative complications in any patient in either group. The post operative course was generally uneventful for patients in both groups. The pictures below are representatives of the patients in each group, patient 1 underwent V&M liposuction and patient 2 underwent TL. Pictures depict each patient before operation, immediately following liposuction with either technique, and the final results 60 days post



A: Pre-operative

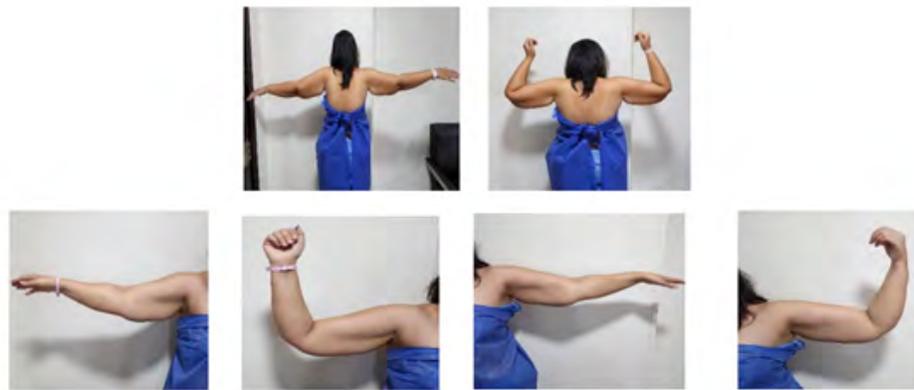


B. Immediate post operative



C. Final results at 60 days post operative period

Patient 1: Liposuction of lipedema using V&M liposuction.



A: Pre-operative:



B. Immediate post operative:



C. Final results at 60 days post operative period:

Patient 2: Liposuction of lipedema using TL.

procedure (Figure 1 and 2).

9. Discussion, Strengths, and Limitations of our Study

Liposuction surgery [TL] is widely recognized as a clinically effective surgical procedure to reduce the size of arm lipedema [14]. Its long-term effectiveness has been reported without the necessity for repeat surgery [15, 16,17]. We had been using TL for several years until 2019 when we began to look for alternatives, as around 40-50% of the cases did not achieve optimal skin tightening with more frequent seroma formation. In our attempt to overcome the shortfalls of TL we decided to proceed with Vaser liposuction and power assisted liposuction surgery [V&M]. The main point for assessment of the outcome was the assessment of the amount of fat removed which was achieved by the measurement of the circumference of the arm and compare it to the normal arm. For bilateral cases, we measured the circumference of each arm separately pre and post operatively. Other assessments were PRO as reported by the patients during the FU visits. Another tool we used to assess the results of V&M liposuction compared to TL is the volume of fat we could remove during the operation. With TL, a maximum of 75% of fat needed to achieve the outcome could be removed. Whereas with V&M liposuction, almost 90% of the volume could

be removed. Accordingly, we defined the success of the procedure as having the difference between the circumference of the affected arm and the normal arm not exceeding 10% of the measurement. Our study has several key strengths, including being a prospective cohort comparison study of V&M versus TL techniques. The number of cases, the age range of the patients, and the duration of post operative follow up in both arms were similar. One limitation of our study is the exclusion of patients greater than 60 years of age. This decision was made because our center is mainly equipped for day surgery and those needing intermediate care. For patients over 60, they usually suffer from other medical conditions and health issues e.g. hypertension, heart disease, diabetes, etc. These patients need to have the operation in a center that has an ICU. Procedures which can put patients over 60 years of age at increased risk of post operative complications such as hypertension, heart disease and diabetes. However, we routinely perform the V&E technique for many patients over 60 years of age provided that they have a good general condition, or we perform the surgery for this age group in centers that are equipped with Intensive Care Unit [ICU] and blood banks. Another limitation in our study is the lack of formal health economic [HE] analysis that compares the cost effectiveness of the V&M technique compared to TL. This is to be considered as the cost associated with this new technique due to the cannulas and

machines used is higher than that needed for the TL. However, the feedback of the patients who achieved good outcomes was that the difference in cost between the 2 techniques was acceptable. Overall, our main goal for the new V&M technique was to assess the effectiveness of power assisted liposuction [V&M] in lipedema of the arm compared to the TL. Although TL performed for lipedema of the arms can achieve good results, however in our experience and the feedback obtained from the patients, around 40-50% of the patients who had TL are not satisfied with the outcome compared to around 12% of the patients who were operated upon using the V&M technique. Currently, the new V&M technique [power assisted liposuction] is the routine procedure we perform for our patients to correct arm lipedema.

10. Conclusion

Arm lipedema is a common condition among females globally and in our region. The only satisfactory management of this condition is liposuction which has long been the standard procedure. However, due the high number of patients who report their dissatisfaction with the outcome of the TL, we decided to modify the TL and perform it by combining Vaser liposuction with power assisted liposuction [V&M]. The results with V&M were superior to those obtained with TL. With the majority of patients who had V&M reporting increased satisfaction with the results, we have decided to establish the V&M technique as the standard procedure for the management of arm lipedema in our center.

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