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Laser Liposuction- A Safety Profile

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Abstract

Safety profile always remains the highest concern for everyone undergoing an invasive medical procedure. The severity, duration and extent of side effects matter to both the team and the patient. The assurance that stems from the doctor's experience and confidence plays a major role in the patient's acceptance to undergo the procedure. The paper discusses the side effects that were commonly seen with other methods of liposuction and Laser assisted Liposuction is compared along with. The subjects were 'primed' before laser Assisted Liposuction and 'priming' is defined here. Priming methodology used here is Monopolar and Bipolar Radio frequency and the systems used are BTL Exilis and Med 360, a system combining Vacuum rollers, Bipolar radio frequency and Infra-Red light. The priming is used as an adjuvant to the process of liposuction to facilitate the procedure. The study covers a wide range of subjects in the age group 30-74 years with BMI above 30 and wt between 70-140 Kg. The subjects included those with many other chronic debilitating illnesses like Diabetes, Hypertension, Non-alcoholic Fatty Liver degeneration, infertility etc. The study gives a wide profile of the post-operative period to find that LAL under TA is quite safe and is well withstood by people of all ages with many coexistent chronic disorders. The findings concur with existing reports on the safety profile of Laser assisted Liposuction which is discussed here. The study concludes that Laser assisted liposuction is a safe procedure free from many common side effects even in the presence of other illnesses.

Keywords: *LAL, Laser assisted Liposuction, Tumescent Anaesthesia.*

Introduction

There are no second opinions about the safety profile of liposuction in general. A large number of studies conclude the safety of liposuction on the subjects who were below BMI of 30 and not grossly obese. There are barely any references to the safety in co morbid conditions like Diabetes Mellitus, Hypertension, CVD which always come along with obesity. The present study is to fill up this lacuna of BMI and co morbid conditions restrictions. All the subjects were in high BMI range above 30 to 44 with co exiting disorders. The study is an assessment of the safety profile of laser liposuction in extreme conditions

Literature

Liposuction of unwanted subcutaneous fat depots is being used extensively for cosmetic reasons. Liposuction is a form of cosmetic surgery used to remove unwanted body fat. Liposuction is the most commonly performed operative aesthetic procedure in the world accounting for 5% of all elective surgeries[1].

Ultra sound assisted Liposuction using high frequency vibrations in the range of 20-69kHz started in the 90's. The ultra sound energy emulsified the fat and ultra sound was applied during the liposuction procedure. The technique was associated with burns, punctures, internal damage and large incisions leading to unsightly scars, sensory alterations and pigmentations. Internal ultra sound was abandoned due to its side effects and followed up with External Ultrasound. External Ultrasound is used immediately before liposuction on tumesced areas to produce a more favourable result without the side effects and complications associated with internal ultrasound.

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EUA is defined as the introduction of formatted ultrasonic energy into a wetted field before surgery. Less resistance to the cannula, less discomfort to the patient, smoother results, and more rapid recovery were reported with EUA. Drawbacks following traditional liposuction included ecchymoses, long recovery times, skin laxity as well as pulmonary emboli, seromas, and visceral perforations. Rohrich[2] et al noted that ultrasound-assisted liposuction (UAL) is a safe and effective method for the treatment of gynaecomastia. The technique is particularly efficient in removing dense, fibrous breast tissue in men and produces minimal external scarring. Zocchi[3] et al in one study report that during liposuction following external ultra sound, the cannulas proved to be easier to move and the time needed for the surgery was slightly less on the treated side. There was less bruising and swelling on the ultra sound treated side and majority of patients reported less discomfort on the treated side.

Liposuction evolved further with the use of the third generation ultrasound technology VASER and VAL (Vaser Assisted Lipoplasty) with several advantages of minimal trauma, maximum safety and better outcome. Vaser technology delivers absolute minimum amount of vibratory energy to the tissues to achieve desired emulsification using small, grooved probes and pulsed delivery. With VAL, the total amount of fat that can be aspirated in a single stage is 21 litres *Zocchi* [3].

Power assisted liposuction that followed had several advantages over traditional liposuction methods like less trauma, no burn risks, easy passage thro' difficult fibrous areas of the tissues. Shorter surgery duration in large volume liposuction and faster recovery were major advantages of the Power assisted liposuction. Power assisted liposuction is a painless procedure that is less traumatic than traditional liposuction *Araco A*[4].

The study used Laser Assisted Liposuction to assess the safety profile. First trial of Laser assisted liposuction using Nd: YAG 600 micron fibre. The procedure consists in using the light emitted by laser to selectively produce lysis of the fat cell. Laser is Light Amplification by Stimulated Emission of Radiation. The penetration into the soft tissue is approximately 1.4 mm. Because of its low penetration, it does not produce distant trauma and acts locally facilitating the progression of a very thin probe. The efficacy of laser on fatty tissue and skin tightening were proved by *Goldman*[5] et al in 2003 with a pulsed 1064 nm Nd: YAG system. *Sasaki* [6] states that "Internal application of laser energy may be the most effective method of reducing fatty tissue and enhancing skin tightening.

Badin[7] *and Goldman* [8] demonstrated the histological changes that correlated clinically with decrease in adiposity, ecchymoses and improved skin tightening and explained the laser's advantages over traditional liposuction by patient's post-operative comfort and fat reduction. Later *Badin* [7] proved that Laser Assisted Liposuction (LAL) causes less trauma and good skin retraction. Decreased adiposity, shorter recovery time and improved skin tightening were recorded with LAL in many trials. *Dibernado* [9] concluded that laser-assisted liposuction has a statistically significant effect on skin shrinkage and tightening of the skin in the abdominal area when compared to liposuction alone.

Yi sun et al demonstrated that laser Lipolysis liquefies localised adipose tissues and breaks down the compact fibrous tissues loosening them. Coagulation of capillaries and the thermal effect caused less bleeding, less oedema and other post-operative complications producing rapid recovery [10].

The mechanism of action of laser energy is said to be at three varying levels such as

i) Thermal effect: Thermal effect lends 'thermal damage'
ii) Photo Mechanical effect and
iii) Photo thermal effect

Literature speaks of several advantages of laser lipolysis over other techniques. All patients are treated on an ambulatory basis. One commonly promoted advantage of laser lipolysis is fast patient recovery. "In our experience with more than 2,000 cases, most patients are able to return to normal daily activities within 1.5 days. Laser lipolysis may diminish postoperative

pain, ecchymoses, and oedema *Goldman A [12], Palm MD[11]*. Consequently, patients experience a rapid return to daily activities. There were no systemic adverse events."

Melvin states that laser Lipolysis is safe, simple and advantageous for both the surgeon and the patient. For the surgeon, it is less fatigue, less force is necessary. Correction of secondary flaws is simplified. For the patient, the fatty tissue selectivity and nerve preservation implies less postoperative pain. Because it is ambulatory, quicker recovery, lower hospitalisation cost and no working day loss are other advantages *Melvin a Shiffman[13]*.

Materials and methods

The study was conducted in Silkee Cosmetology Laser Research Institute, Chennai. The subjects included all those who underwent LAL spanning a period of 42 months. A detailed medical history was recorded. The subjects age ranged from 30 to 74 years with weight range 70- 140 Kg. They were medically evaluated by physician. Apart from routine investigations Renal Function tests, C Reactive Proteins and ECG were carried out. They underwent Laser Assisted Lipolysis in 1 or more sessions as required as per standard protocol.

The patients were instructed to message their status to the consultant before going to sleep and next day morning with special attention to pain, discomfort, oozing or drainage from the surgery site, soaking or the need to change the dressing and any other symptoms. They were reviewed next day wherein wound dressing changed and strapping with elastoplastic, compression bandage applied as required. Attention was paid to swelling, oedema, bruising, skin colour changes, fever and any systemic symptoms during the following three days.

Procedure and observation

Laser Assisted Liposuction was done under Tumescent Anaesthesia. LAL was preceded by PRIMING. *"Priming in aesthetic surgery is defined as the sensitisation of the adipose tissue by electromagnetic or mechanical forces applied over the skin to enhance the cellular response prior to liposuction or any minimally invasive surgery."* Sensitisation is enhancing the response of the target tissue prior to invasive procedure so as to get a better result for a lower energy requirement wherein the energy may be light or sound or Radio Frequency or power that influences the procedure. In this study, sensitisation of the adipose tissue is done by electromagnetic or mechanical forces applied over the skin. The systems used in the study were: Monopolar and Bipolar radio frequency, high frequency ultra sound, manual and vacuum massager and infra-red light.

The Standard protocol as evolved locally was followed for the Tumescent anaesthesia and the operative technique. The patients were not sedated and had regular meals before and after the surgery. The procedure covered tummy reduction (n=226), breast reduction (n=9), gynaecomastia (n=59), arm sculpting(n=16), butts(n=8) and thigh reduction(n=28) and saddlebags (n=19). Age group below 35 (n=184), age 35-55 (n=150) and above 55 (n=31). All the patients were with high BMI of above 30 that included diabetics (n=5), hypertensives (n=7) and pre-diabetics (n=5). The patients were given parenteral Cefotaxime during surgery followed orally for 5 days.

During surgery, none of the patients had signs of restlessness, nausea, vomiting or hypotension. The procedure was day care and no anaesthetics were involved.

During the first 24 hours post operatively, there was no complaint of pain. Absence of pain was conspicuous and many of the patients skipped their pain killer medicines and were comfortable. Elements of pain and discomfort were virtually absent. Oozing and soiled dressings were reported sparingly by those who underwent large aspirates. Immediate post-operative period was a smooth sailing affair and comfortable.

During the following three days, none reported of fever or any signs of wound infection. A total of 7 patients had Seroma (n=3), skin colour changes due to ecchymosis (n=4). Edema of the lower region reported in some. (n=6). 3 penile swelling and 3 lower abdomens. The patients were assured and were advised proper posture to aid drainage. Edema of the lower abdomen was managed by avoiding undue compression. Seroma was drained by needle

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aspiration. Ecchymosis noted in tummy(n=3) and breast (n=1). Assurance and conservative management with NSAID were administered. Nerve praxia in one arm was noted in a patient who underwent arm sculpting caused by too tight strapping of the arm to avoid dependency (gravitational) swelling. The condition improved with parenteral high dose methyl cobalamin.

Discussion

The commonest problem in any invasive medical procedure, the infection, is significant by its absence in LAL and is noteworthy. It may be deduced that it is not by chance but by choice that lays in the heat, 40^0 C generated by the laser rays. It is burnt to death by the laser rays and rarely have access to body interior. This explains the absence of fever, pain or other systemic signs or wound infection in general.

Ecchymosis, seroma had no relationship to age, weight or BMI scores but were reported by those who had chronically inflamed adipose tissues and chronic inflammatory markers. In other words, ecchymosis and seroma may be anticipated in those with chronic inflammatory markers. Gravitational oedema may be avoided by right strapping and aiding postural drainage.

Conclusion

Laser Assisted Lipolysis under Tumescent Anaesthesia is a safe procedure, free of common complications and can be safely performed in all age groups with other metabolic disorders. In the event if any such minor side effect is reported, it is self-limiting and do not require any intervention other than assurance and posture that aids natural phenomena.

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