Case Report

Adipose Hypertrophy Following Cryolipolysis

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Abstract

Cryolipolysis has become a popular non-invasive treatment for unwanted fatty collections. The benefits are minimal down time, short recovery time, and decreased pain, although pain is the most frequent complaint. The author recently treated a patient who presented with an enlarging adipose collection on his lower abdomen following cryolipolysis with CoolSculpting® (ZELTIQ Aesthetics, Inc., Pleasanton, CA).

Level of Evidence: 5

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The number of non-surgical fat reduction procedures performed in the United States increased by 23.9% from 2012 to 2013, and, in 2013, liposuction became the most popular cosmetic surgical procedure in the country.1 Cryolipolysis has become a popular non-invasive treatment for unwanted fatty collections. The benefits are minimal down time, short recovery, and decreased pain. Recently, evidence of paradoxical hyperplasia of adipose tissue was observed following cryolipolysis with CoolSculpting® (ZELTIQ Aesthetics, Inc., Pleasanton, CA).

CASE REPORT

A 29-year-old man presented with an enlarging adipose collection on his lower abdomen following cryolipolysis with CoolSculpting®. He had undergone three treatments in total over a 2-year period. The first treatment did not produce satisfactory results; therefore, the procedure was repeated twice more. Each cryolipolysis session was performed by an otolaryngologist/facial plastic surgeon, according to the manufacturer’s guidelines, with 60-minute cooling cycles, a vacuum setting of 60, and a size 8.0 applicator. The second and the third sessions were repeated 3 months in succession. Three months after the last treatment, the patient started to develop non-painful fullness in the treated area (the lower abdomen). No medical history of note was appreciated.

The physical examination revealed a well-developed male, 5’10” and 164 lbs, which remained stable, before and after all procedures. A large soft tissue mass was noted on the patient’s lower abdomen. The examination revealed a rubbery, non-tender, mobile mass localized anteriorly. No hernia or other abnormal findings were noted. A MRI was performed, which revealed normal fatty infiltration.

Treatment

The patient had previously undergone tumescent liposuction of the lower abdomen. Infiltration of 800 mL of tumescent fluid was performed, and 1100 mL of liposuaspirate was removed (Figure 1). A drain was left, and a compression garment was placed. No problems occurred in the postoperative period (Figure 2). During the procedure, fatty tissue was excised prior to the liposuctioning and sent for pathological examination. A histologic evaluation revealed normal adipose and fibrous tissue. There was no change in the fibrous or adipose cellularity and structure, only hypertrophy. Vascularity was not commented on or addressed and was assumed to be normal.

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DISCUSSION

The “fat freezing” technique became available in June 2009 and was approved by the FDA for lower abdominal treatment in 2012. Since then, over 1,000,000 cryolipolysis treatments have been performed on various areas of the body (Mr. Brad Hauser, Vice President, Product and Clinical Strategy at ZELTIQ, personal communication, 2013). Reported side effects of the technique include pain, erythema, edema, bruising, and transient neuralgia. Most of the reported problems resolved spontaneously in 2 weeks.1

“Paradoxical hyperplasia”2 has been defined as the infrequent, unexpected growth of subcutaneous fat tissue. The CoolSculpting® manufacturer reports an occurrence rate of paradoxical hyperplasia of 1 in 10,000 patients who receive cryolipolysis with this procedure (Mr. Brad Hauser, Vice President, Product and Clinical Strategy at ZELTIQ, personal communication, 2013). Males and females have been equally affected and any treatment area in the trunk can be involved; however, the lower abdomen in males has a slightly increased incidence rate. No single risk factor for developing postoperative paradoxical hyperplasia has been identified. Most affected patients had previously undergone a single cryolipolysis treatment, with a 60-minute cooling cycle, a vacuum setting of 50 or 60, and either applicators 8.0 or 6.3. CoolSculpting® also reports that employing the “coolmax” applicator, which is the larger vacuum applicator, during the procedure and the occurrence of paradoxical hyperplasia in the lower abdomen are possibly interrelated. Onset is usually complete by 6 months and repeated cryolipolysis treatments, as our patient underwent, provided no improvement. In fact, repeated cryolipolysis treatments may actually make paradoxical hyperplasia worse. The majority of affected patients undergo surgical correction in the area involved, and this is the treatment of choice.

Figure 1. 1100 mL of lipoaspirate removed after infiltration of 800 mL of tumescent fluid was performed.

Figure 2. (A, C, E, G, I) Preoperative evaluation of this 29-year-old man’s abdomen with localized hyperplasia. (B, D, F, H, J) Postoperative photographs obtained at 3 months.
Non-invasive techniques for aesthetic body improvement have always been popular. Fat reduction procedures are numerous, and multiple specialties utilize them. In our demographic area, emergency room physicians, ophthalmologists, general surgeons, otolaryngologists, obstetrician/gynecologists, dermatologists, dentists, neurologists, and med-spas with medical extenders all offer and perform such treatments. Many of the latter – med-spas – employ a medical director who is neither onsite nor trained to deal with the complications of fat reduction procedures. This was true of the case described herein – the patient was treated three times by a facial otolaryngologist who primarily performs nonsurgical facial rejuvenation. Who, in this situation, is culpable for the adverse effect the patient experienced? Is it the patient, who went to an underqualified “doctor” to receive a safe, non-invasive fat reduction procedure? Or is it the performing physician or extender, who offers these services, yet is not qualified to treat any untoward results of them?

The nonsurgical approach to addressing adverse effects following fat reduction procedures would be to re-treat areas that do not respond well to a second cycle of cryolipolysis. Multiple areas can be treated, and these areas may overlap, resulting in re-treatment of certain areas. Second treatments have shown improvement with low risk.4-6 However, repeated cryolipolysis demonstrating no improvement should be halted after a second treatment. A board-certified plastic surgeon would have treated this problem with liposuction as an adjunct procedure.

The etiology of paradoxical hyperplasia is still in question, and multiple hypotheses regarding its cause have been proposed. Stimulation of the adipocyte is the commonality among these hypotheses. Does cooling of the adipocyte cause it to paradoxically increase in size if the cell wall is not damaged? The thought is that cooling without cell rupture causing hypoxia may stimulate a reparative rebound hypertrophy in adipocytes, fibrous cells, and vascularity. There may be some associated stimulation and differentiation of stem cells into fat.

I also believe that the negative pressure suction process has an associated stimulatory effect on the adipocytes, similar to the effect the BRAVA system (Brava, LLC, Miami, FL) has on the breast. These two processes cause cell anoxia and injury, which subsequently foster increased blood flow and proliferation of adipocytes. The final result is a paradoxical increase in fat, rather than fat reduction.

CONCLUSION
Cryolipolysis is a clinically proven treatment for the reduction of adipose deposits. If results are not ideal following an initial session, a second session has also been effective. Paradoxical hyperplasia of fat following cryolipolysis occurs infrequently, usually only after multiple cycles of cryolipolysis. The condition should be identified early and treated with liposuction, not another round of cryolipolysis.

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REFERENCES