Introduction: Excess abdominal fat has been linked to cardiovascular disease, diabetes and high blood pressure, and studies show that losing abdominal fat through diet and exercise improves these and other symptoms of metabolic syndrome. If lose of abdominal fat through diet and exercise reduces or reverses the ill effects of obesity, does that imply that removal of abdominal fat via liposuction could offer similar results? Starting in this issue, Cosmetic Surgery Times offers a look at this hypothesis and related studies in a three-part series that examines the ramifications for cosmetic surgeons, patients and society.

Liposuction is among the most commonly requested procedures in today’s typical cosmetic surgery practice, and abdominal liposuction, which has been universally popular among a subset of patients who could not reduce their waistline through diet and exercise alone, garnered even more interest after reports emerged in the mid ‘90s linking abdominal obesity with coronary artery disease.

Since then, it has become common knowledge arena that abdominal obesity is generally associated with glucose intolerance, hyperinsulinemia, hypertriglyceridemia, and other disorders associated with metabolic syndrome, such as high blood pressure, decreased levels of high density lipoproteins (HDL) and increased levels of very low density lipoproteins (VLDL). This coupled with the fact that more than half of all US adults are considered overweight or obese, emphasizes the need for concerted efforts to prevent and treat obesity rather than just its associated co-morbidities.

Obesity related disorders represent a significant and rising percentage of US health care costs. After years of resisting, many private insurers are picking up the tab for bariatric surgery for morbidly obese patients. If a positive
connection between abdominal liposuction and metabolic syndrome can be confirmed, a similar paradigm shift regarding insurance coverage of liposuction could emerge.

Manhattan plastic and reconstructive surgeon, Douglas S. Steinbrech, MD, is currently at work on a literature review study of abdominal liposuction and metabolic syndrome. He says that if abdominal liposuction can ameliorate metabolic syndrome associated co-morbidities, the impact on cosmetic surgeons could be huge. Speaking purely hypothetically, he says, “if it turns out that it’s true and it’s proven it would open up our practices to a patient population for purely health purposes, which just in terms of insurance reimbursement could substantially change our practices.” More importantly, adds Dr. Steinbrech, “It would enable plastic surgeons to improve lives by providing these services to people who are at increased risk for heart disease and obesity. It would be a way for plastic surgeons to extend their liposuction practice to really help people to not just look better but to live longer and diminish their chances of heart disease and heart attack and to live longer with healthier lifestyles.”

Dr. Steinbrech initiated his study because of the “large amount of controversy” surrounding the purported connection between abdominal liposuction and metabolic syndrome. “There have been a number of studies that have been pro and a number of studies that have been con that have negated that hypothesis. We wanted to do a thorough investigation of the literature to find out which hypothesis would be more likely to be correct, and which studies are well controlled and accurate representations of the true physiology,” he said.

Subhead: Early studies

One of the early studies that addressed the relationship between subcutaneous fat and metabolic health risks observed the effect of lipectomy of subcutaneous adipose tissue in hamsters. Glucose tolerance, serum triglycerides, leptin and fat, among other things, were monitored. Lead
investigator, Renata V. Weber, MD, and colleagues concluded that lipectomy of subcutaneous adipose tissue led to compensatory fat accumulation. The study found that, in conjunction with a high fat diet, these lipectomized hamsters developed a metabolic syndrome with significant hypertriglyceridemia, relative increase in intra-abdominal fat and insulin resistance. The investigators proposed that subcutaneous adipose tissue essentially protects against metabolic syndrome via disposal and storage of excess ingested energy. These findings suggest that removal of subcutaneous fat could actually induce rather than improve metabolic syndrome. Today, Dr. Weber, who is an assistant professor of plastic and reconstructive surgery at Albert Einstein College of Medicine’s Montefiore Medical Center, describes the aim of the study as a way to figure out if getting rid of superficial fat is a bad thing or a good thing. “I don’t know if we actually answered that question,” Dr. Weber says of the 10-year old study, “But as far as I can tell it doesn’t appear that liposuction provides any benefit for a patient’s overall health.”

Dr. Steinbrech points out that when a study offers a noteworthy outcome with implications for clinical use, it usually is performed repeatedly with variations. “When you look at the history of the medical literature, if something bears out it usually is repeated over and over in many different ways. If a finding is reported in 2000 and by 2009 it hasn’t been repeated by others or the original investigator doesn’t take it a step further, maybe the true science isn’t there. With respect to this particular study, I haven’t found anything that goes on to support it, but I still have to look more deeply into it,” he added.

Subhead: International Studies

Several international studies looked at the connection between liposuction and metabolic syndrome and found a positive association. In 2004, 2005 and 2006 Italian studies showed respectively that, “liposuction is associated with amelioration of insulin resistance and reduced circulating markers of vascular inflammation which may help obese subjects to reduce their cardiovascular risk;
large volume liposuction resulted in a significantly improved insulin sensitivity, resting metabolic rate, serum adipocytokines and inflammatory marker levels, which correlates with a decrease in fat mass and waist-hip ratio; and adipose tissue is an endocrine organ that produces numerous proteins that play an important role in obesity associated complications." 4,5,6

Dr. Steinbrech remains skeptical. “Rarely do we find that international studies that are not repeated in the US offered findings that are really noteworthy,” he says.

Subhead: Reliably designed

Two U.S. studies that Dr. Steinbrech describes as reliably designed suggest that abdominal liposuction brings nothing to the metabolic syndrome solutions table. In the first, researchers from Washington University School of Medicine, St. Louis, evaluated insulin sensitivity of liver, skeletal muscle and adipose as well as levels of inflammatory mediators and other risk factors for coronary heart disease in 15 obese women before and 10 to 12 weeks after abdominal liposuction. 7 They found that the procedure did not significantly improve obesity associated metabolic abnormalities and concluded that decreasing adipose tissue mass alone will not achieve the metabolic benefits of weight loss. In the second, researchers from the same institution revisited the hypothesis and the same subjects to see if perhaps postoperative inflammation masked some beneficial effects.8 Four years after their original study they found that metabolic endpoints obtained from 10 through 208 weeks were no different from baseline and did not change over time.

Dr. Steinbrech isn’t alone in his skepticism. Boca Raton, Fl, plastic surgeon Louis DeLuca, MD, points to pair of Georgetown University studies – a pilot and a follow-up – that found improvements in cardiovascular risk profiles after large volume liposuction and concluded that if the improvements could be maintained over time – which they were – and if they could be confirmed in larger
studies – which remains to be seen – then liposuction might prove to be a valuable tool for reducing some of the co-morbidities associates with obesity. Yet, Dr. Deluca, dismisses the findings as inconclusive. “Over the years I have seen referrals from physicians who felt that liposuction would improve some of the metabolic derangements facing their overweight patients. Their intentions are absolutely genuine but I have always been disappointed with the lack of conclusive data that would support this theory,” says Dr. Deluca.

Dr. Steinbrech points out that there is quite a bit of scientific noise in all of the studies that address the connection between abdominal liposuction and metabolic syndrome. “There aren’t enough numbers or the conclusions are misinterpreted or the studies have not been repeated, so all of these things make one think that the phenomenon is not there or that there is not enough science at this point to say conclusively that it’s a real medical phenomenon.”

In part two and three: Cosmetic surgeons discuss how liposuction can be employed to help patients lose weight; a world renowned endocrinologist talks about fat’s ‘bad reputation’ and notes that some of it isn’t so bad after all, and while some investigators at Georgetown are still evaluating the effects of liposuction on metabolic syndrome, their colleagues have moved on to examining the effects of lipomodeling -- which uses Neuropeptide Y receptor modulators (NPY2R) to remodel fat tissue.