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Devastating Methicillin Resistant *Staphylococcus Aureus* Wound Infection in a Post-Bariatric Patient Undergoing Abdominoplasty

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A 46-year-old female smoker presented 12 months after laparoscopic adjustable gastric banding, with massive weight loss and skin excess of the abdomen and flanks. She underwent abdominoplasty with muscle plication and flanks liposuction, but on the 14th postoperative day this was complicated by a methicillin-resistant *Staph. aureus* wound infection. Multiple surgical debridements and high doses of intravenous antibiotics were necessary for cure and to avoid further septic complications. Complete wound closure was achieved after 3 months of therapy. Concomitant risk factors for wound infection (obesity, smoking, flap construction) contributed to a rare but potentially fatal wound complication following abdominoplasty. We alert the surgeon to such postoperative infections and the necessity for a non-conservative approach.

Key words: Abdominoplasty, Methicillin Resistant *Staph aureus*, smoking, complications, infections, massive weight loss

Introduction

In the past, the large and indiscriminate use of intravenous antibiotics selected strains of Methicillin Resistant *Staphylococcus Aureus* (MRSA), characterized by a high resistance to almost all common antibiotics and increased mortality rates.^{1,2} The prevalence of such strains is high in intensive care and burn units, where large doses of antibiotics are used,^{3,4} but rare in cosmetic surgery, where patients

are generally in good clinical condition and antibiotics are limited to perioperative short-term prophylaxis. In this report we present a patient who underwent abdominoplasty after massive weight loss 1 year following bariatric surgery. Severe MRSA wound infection resulted.

Case Report

A 46-year-old female presented after massive weight loss with a skin excess of the abdomen and flanks. Twelve months previously, she had undergone laparoscopic adjustable gastric banding (LAGB), which was followed by a decrease in her BMI from 38.6 to 33.2 kg/m² (Figure 1). She had a history of smoking 20 cig-



Figure 1. Appearance before abdominoplasty.

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Araco et al

arete/day for 30 years, for which she was advised to quit 4 weeks before abdominoplasty. Preoperative management included standard prophylaxis measures for deep venous thrombosis (low molecular weight heparins and elastic stockings/mechanical calf compression) and for infection (erythromycin 1 g I.V. 10 min before the operation and during the first 2 postoperative days). Her skinfolds were cleaned preoperatively with Iodine/Povidone (2 passages) and subsequently Chlorhexidine (1 passage). An abdominoplasty with muscle plication and flanks liposuction was performed. The fat removed weighed 1,450 g for the abdominal flap and 2,000 g from aspiration. We limited the flap undermining laterally and superiorly to preserve local blood-flow. The LAGB reservoir, which had been implanted high in the abdominal wall subcutaneous tissue, was not exposed during the surgery.

She was discharged home on the 2nd postoperative day with no symptoms or signs of infection, and outpatient follow-up visits were planned for the 7th, 14th and 30th postoperative day and after 6 months.

Two weeks later, the patient presented with fever (37.8°C). On examination, she had local signs of inflammation and two necrotic areas, the first 2 cm below the umbilicus and the second along the surgical wound (Figure 2). Antibiotic therapy was immediately started with erythromycin 1 g I.V. and gentamycin 1 I.V., and surgical revision was performed. On wound opening, 200 ml of fluid were drained and sent for cultures. Both necrotic areas were debrided and an abdominal drain was placed for 12 hours. According to the antibiogram (*Staph aureus*), antibiotic therapy was changed to ciprofloxacin (500 mg twice daily per os for 7 days). The patient was discharged home 2 days later in good general and local condition, and postoperative visit was planned after 7 days.

The patient came back to the hospital with septic fever (38.8°C) and tiredness. Locally, she presented with abundant purulent discharge and a wound dehiscence that reached the muscular fascia (Figure 3). We performed urgent surgical debridement and irrigated tissues with iodine/povidone, peroxide and antibiotics (gentamycin and ciprofloxacin). We attempted to reconstruct the umbilicus with a purse-string of absorbable material (polydioxanone). Iodine/povidone gauzes were left *in situ* under the remaining flap and the wound was left open for postoperative drainage and serial medications (Figure 4). The second antibiogram indicated a

MRSA infection and vancomycin (1 g I.V. twice daily for 8 days) was started. Three additional surgical debridements were subsequently performed, each every 3 days (Figure 5). She was finally discharged home 12 days later in good general and local condition, and serial medications were continued in the outpatient setting. After 3 months, the abdominal wound had completely closed (Figure 6).

Her current BMI at 6 months after abdominal lipectomy is 31 kg/m².

Discussion

Abdominoplasty is a popular procedure used to remove excess skin and fat from the middle-lower abdomen and to tighten abdominal wall muscles. Although thousands of abdominoplasties are performed each year, they are not free from local complications such as bleeding, seroma and wound infection.⁵ Wound infections, one of the most common postoperative complications, when present endanger the esthetic outcome of the scar, the final patient satisfaction and sometimes the life. Their incidence is reported to be 2-7%.⁵⁻⁷

Numerous risk factors have been found for such complications. Smokers have an increased risk to develop this postoperative complication. Principal components of tobacco (nicotine, nitric oxide and carbon monoxide) can predispose to this phenomenon,⁸ but other factors related to the type of operation, diabetes and obesity are also important. The effects of cigarette smoking on wound healing were studied by Mosely and Finseth in 1977, confirming a role of cigarettes in the cutaneous processes of healing and repair.^{9,10} Since then, numerous studies have shown that smokers have an increased incidence of flap necrosis after face-lifting,¹¹ wound dehiscence in reduction mammoplasties¹² and worse aesthetic wounds in abdominoplasties.¹³ In fact, blood-flow is supplied to the distal portion of the flap through the dermal-subcutaneous plexus. Cutaneous vascular beds have the highest sympathetic innervations and the least self-regulatory control; thus, they are particularly exposed to the vasoconstrictive effects of cigarette smoking (mediated by sympathetic innervation through α -receptors).^{14,15} Abdominoplasty, as in face-lifting or mastectomy,

Methicillin Resistant Staph. Aureus in Abdominoplasty



Figure 2. Patient's presentation on postoperative day 14. There were local signs of inflammation and two necrotic areas, the first 2 cm below the umbilicus and the second along the surgical wound.



Figure 5. Patient's presentation on the 4th surgical debridement.



Figure 3. Patient's presentation 7 days after the first surgical debridement. Pus and wound dehiscence reached the muscular fascia.



Figure 6. Final outcome.



Figure 4. Second surgical debridement.

requires undermining a large flap and produces a random-pattern blood supply. In 2003, Manassa and colleagues¹⁶ reported 47.9% wound healing problems in smokers versus 14.8% in non-smokers.

Obesity is a chronic disease that affects the entire body and alters the immune system. It contributes to the immunosuppression status not only directly but also by the presence of concomitant diseases (i.e. diabetes).^{6,7} A recent study confirmed the increased risk of complications in obese patients after significant weight loss vs non-obese individuals.¹⁷ Although patients seeking cosmetic surgery are generally in good clinical condition and MRSA postoperative infections are uncommon, we believe that, in

Araco *et al*

our patient, the flap undermining, the post-obesity status and the heavy cigarette smoking created a predisposing status that facilitated the MRSA in overcoming local defences. The peculiar destructive effect of MRSA manifested with pus that completely filled the inside of the abdominal flap, destroyed the umbilicus and initiated septicemia. Multiple surgical debridements and intravenous vancomycin were necessary to reverse the process.

Conclusions

Risk factors for wound infections (obesity, smoking, flap development) appear to have contributed to an uncommon but potentially fatal wound complication following abdominoplasty. Invasive measures were necessary, specifically serial surgical debridements and high doses of intravenous antibiotics. We alert plastic and general surgeons to the potential for such postoperative infections.

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