

Facial Fat Necrosis After Autologous Fat Grafting Caused by Cellulitis: A Case Report

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Abstract: Autologous fat grafting is a widely used soft tissue filling technique for facial rejuvenation, favored for its high biocompatibility and long-lasting effects. However, the long-term risk of infection due to alterations in local tissue structure remains unclear. This article reports a case of perforating cellulitis in the frontotemporal region of a 39-year-old female patient 3 years after multiple autologous fat grafting procedures. The patient, with no significant prior medical history or immune compromise, developed sudden redness and swelling in the right temporal region, which rapidly spread to the forehead and left temporal region, resulting in perforating abscesses and fat liquefaction necrosis at the filling sites. Laboratory tests identified *Staphylococcus aureus* as the causative pathogen. The patient was successfully treated with intravenous ceftriaxone sodium and surgical drainage, achieving full recovery with no recurrence during a 6-month follow-up. This case highlights that repeated subcutaneous fat grafting may loosen tissue structure, potentially increasing susceptibility to infection spread. It underscores the importance of vigilance for delayed infections in patients with a history of cosmetic procedures, even years post-operation. Clinicians should consider aesthetic fillings as a possible risk factor for cellulitis and prioritize prompt pathogen identification and aggressive treatment. The findings emphasize the need for long-term monitoring and further research into infection mechanisms post-aesthetic surgery to enhance procedural safety.

Keywords: autologous fat grafting, cellulitis, facial cosmetology

Introduction

Autologous fat grafting has become a cornerstone technique in facial rejuvenation due to its biocompatibility, abundant donor supply, and ability to produce natural, long-lasting results.¹ The procedure involves harvesting, processing, and reinjecting adipose tissue to restore volume and improve contour, making it widely adopted in aesthetic and reconstructive surgery. However, despite its advantages, complications such as infection, fat necrosis, and calcification can occur, with infection being one of the most concerning due to its potential for rapid progression and severe outcomes.^{2,3}

Cellulitis, a common bacterial infection of the skin and subcutaneous tissues, typically arises from breaches in the skin barrier and is frequently caused by *Staphylococcus aureus* or *Streptococcus* species.⁴ In the context of soft tissue fillers, the pathophysiology of cellulitis may involve altered local microenvironments due to grafting procedures. The disruption of subcutaneous architecture during fat injection can lead to tissue laxity, impaired lymphatic drainage, and microtrauma, creating niches for bacterial colonization and delayed infection.⁵ These changes may explain why some patients develop infections months or even years after the initial procedure, long after the presumed postoperative risk period has passed. While early postoperative infections are well-documented, delayed-onset cellulitis following autologous fat grafting remains poorly characterized in the literature. A few case reports describe late inflammatory reactions or infections attributed to fat necrosis or foreign body responses, but systematic studies on their incidence and mechanisms are lacking.⁶ This gap underscores the need for heightened clinical awareness and further research into the long-term safety of fat grafting.

The present case of perforating cellulitis occurring three years after repeated autologous fat grafting highlights several critical issues: the potential for delayed infection in patients with a history of soft tissue augmentation, the role of structural tissue changes in facilitating infection spread, and the importance of considering cosmetic procedures in the differential diagnosis of facial cellulitis, even years after surgery. By integrating this case with existing evidence, we aim to elucidate the mechanisms underlying delayed infections post-fat grafting and emphasize the need for long-term surveillance in these patients.

Clinical File

A 39-year-old female patient presented to our hospital with redness, swelling, and pain in the forehead and bilateral temporal regions for 2 days. Two days prior, the patient developed a red patch on the right temporal region without obvious cause, accompanied by a feeling of distension and pain. This rapidly extended to the forehead and left temporal region. She did not experience fever, dizziness, nausea, vomiting, or other discomforts. The symptoms gradually worsened and became uncontrollable, prompting her to seek medical attention at our hospital. The patient had no significant past medical history, denied tobacco or alcohol use, and had no history of immunosuppressive medication use. Three years prior, she had undergone two sessions of autologous fat grafting (15 mL per session) to the bilateral temporal and forehead regions along with facial thread lifting, with good postoperative recovery. On physical examination, swelling was noted in the bilateral temporal regions and forehead, with ill-defined borders. There was patchy edematous erythema, and palpation revealed significant fluctuation, increased local skin temperature, and tenderness (+) (Figure 1). Laboratory tests showed positive results for *Staphylococcus aureus* in DNA metagenomic sequencing for pathogenic microorganisms. Imaging studies revealed multiple cystic long T1 and long T2 signal shadows in the subcutaneous tissues of the bilateral maxillofacial region, with clear borders and symmetrical distribution. Arc-shaped, cystic, and patchy long T1 and slightly long T2 signal shadows were seen in the subcutaneous fat layer of the bilateral forehead and right temporal region, as well as in the left parotid gland external space, with unclear borders (Figure 2). Other tests, including fungal culture of drainage fluid, acid-fast bacillus smear, bacterial smear, *Mycobacterium tuberculosis* and rifampicin resistance (XPERT) testing of purulent fluid, as well as fungal G test and GM test, showed no abnormalities. Based on the patient's medical history, physical signs, and relevant examinations, she was ultimately diagnosed with facial cellulitis. She was treated with intravenous ceftriaxone sodium at a daily dose of 4g for 15 days, supplemented with boric acid solution compresses for swelling reduction. During the treatment, an incision was made in the temporal region to drain purulent fluid and necrotic fat tissue (Figure 3). The patient improved and was discharged from the hospital (Figure 4). Follow-up for 6 months showed no recurrence. Written informed consent was obtained from the patient for both the medical procedures and publication of this case report, including all clinical images and data.



Figure 1 The patient has patchy edematous erythema and swelling in the right temporal region.

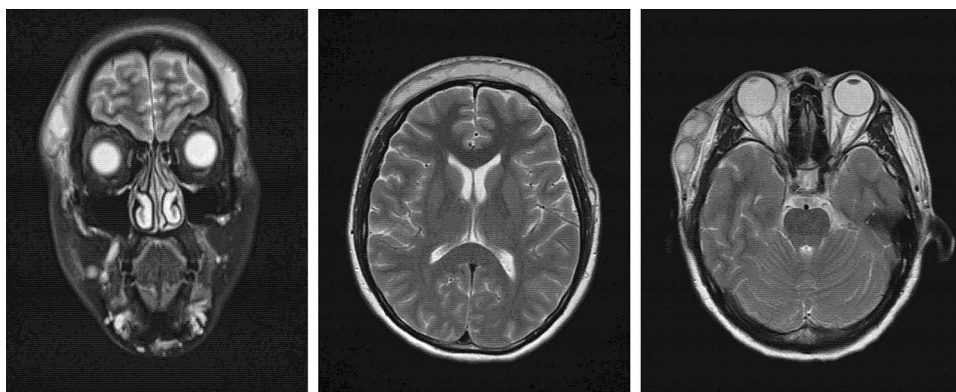


Figure 2 On the cranial MRI examination, multiple cystic signal shadows are visible in the subcutaneous area of the right temporal region.



Figure 3 Pus was aspirated during the incision and drainage procedure of the abscess.



Figure 4 The patient's condition at discharge.

Discussion

Autologous fat grafting is widely used in the field of aesthetics due to its abundant and easily accessible source, good biocompatibility, lack of immune rejection, and natural, long-lasting results.⁷ It has become an important soft tissue filler for facial rejuvenation. However, improper techniques during fat grafting may lead to postoperative complications such as infection and necrosis, as reported in multiple studies.⁸ Additionally, a study has indicated that the complication rate of

fat necrosis following autologous fat grafting for breast reconstruction after mastectomy is 5.31%, highlighting the need for increased vigilance regarding fat necrosis after autologous fat filling procedures.⁹

This article reports a case of local infection and expansion occurring 3 years after fat grafting, leading to liquefaction and necrosis of the adjacent filled tissues. This suggests that aesthetic filling may weaken the local tissue's resistance to external infections. Cellulitis is a common infection of the skin and subcutaneous tissues, typically occurring in relatively loose cutaneous soft tissue areas and often caused by infections with *Staphylococcus aureus*, *Streptococcus*, and anaerobic bacteria. In immunocompetent individuals, bacterial infection usually results from disruption of the skin barrier. Local changes in microcirculation, such as lymphedema, diabetes, and peripheral vascular disease, are risk factors for cellulitis.⁴ However, whether aesthetic filling increases the risk of cellulitis remains unclear.

In this case, the patient developed redness and pain at the filled site several years after fat grafting. Examination revealed local tissue inflammation and necrosis, leading to a final diagnosis of cellulitis. This phenomenon indicates that after fat grafting, local tissue microtrauma or foreign body reaction may lead to latent and delayed inflammation.¹⁰ The loose tissue structure may provide conditions for the spread of infection, thereby triggering a severe inflammatory response.¹¹ Moreover, the patient's medical history and individual immune status may also play an important role in the occurrence of infection. When diagnosing postoperative facial aesthetic cellulitis, a comprehensive assessment should be made by integrating clinical manifestations, imaging examinations (such as MRI), and laboratory tests (such as pathogen detection).¹² In terms of treatment, timely anti-infection therapy should be administered, and surgical drainage or other interventions should be considered based on the condition. In this case, the patient achieved good therapeutic outcomes through antibiotic therapy and incision and drainage of the abscess.¹³

Conclusion

This case demonstrates that autologous fat grafting, while generally safe, may lead to delayed complications such as cellulitis and fat necrosis years after the procedure, likely due to altered tissue structure and reduced local resistance to infection. These findings underscore the necessity for long-term postoperative monitoring to detect late-onset complications, which may manifest beyond the typical follow-up period.

Clinicians should prioritize comprehensive patient counseling during the informed consent process, ensuring patients are aware of potential delayed risks, including infection and necrosis, even years after the procedure. Also, clinicians should adopt a proactive approach, utilizing advanced diagnostics like MRI and pathogen sequencing for early detection and combining targeted antibiotics with surgical drainage when necessary.

Future research should focus on elucidating the mechanisms behind these delayed complications and developing strategies to enhance tissue resilience post-grafting, thereby improving the long-term safety and efficacy of autologous fat grafting in aesthetic practice.

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Disclosure

The authors declare that they have no conflicts of interest in this work.

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