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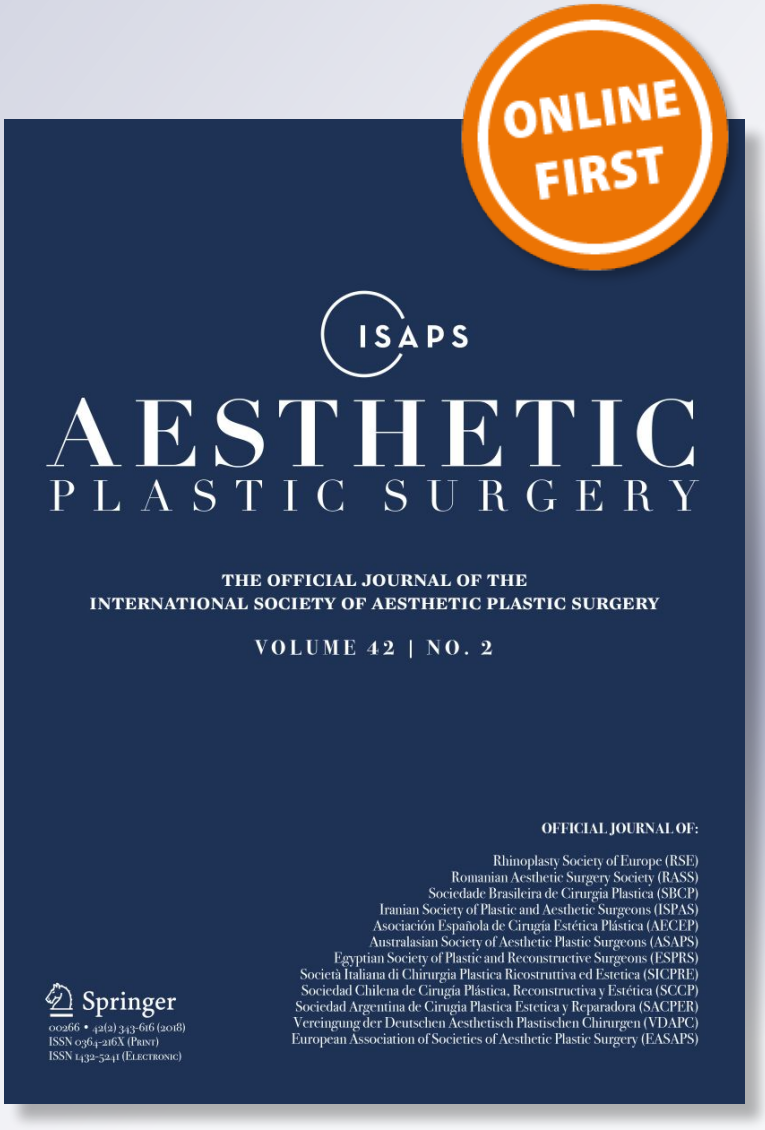

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Successful Management of Infected Facial Filler with *Brucella*

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Abstract

Background The widespread desire to maintain youth and beauty with minimally invasive procedures made the use of soft tissue fillers an attractive option to correct numerous aesthetic problems. However, many complications have emerged recently especially with the use of non-FDA-approved permanent materials. In this case report, we are demonstrating the effective management of a patient with *Brucella* isolated from a facial abscess at the site of prior permanent filler injection done 17 years ago.

Methods A 56-year-old woman presented complaining of painful swelling of the right cheek after a failed trial of filler evacuation and intralesional corticosteroid injection. The patient was interviewed carefully, and physical examination was performed, followed by culture and imaging.

Results The patient had a facial abscess that was complicated by parotid infiltration by *Brucella*. Eventually she was managed successfully by anti-*Brucella* antibiotics for 6 months with no further complaints. A review of causative organisms in the literature along with recommendations for management is discussed.

Conclusion Permanent fillers have shown many complications that can occur even years after injection. Therefore, physicians should be careful when using permanent fillers and should restrict their use to certain situations. Moreover, rare infections must be kept in mind and careful history, including travel history and animal contact, needs to be considered particularly in the unusual scenarios.

Level of Evidence V This journal requires that authors assign a level of evidence to each article. For a full description of these Evidence-Based Medicine ratings, please refer to the Table of Contents or the online Instructions to Authors www.springer.com/00266.

Keywords *Brucella* · Filler · Facial abscess · Infection

Introduction

The rising concerns of maintaining a youthful, beautiful, three-dimensional, more attractive appearance, together with the influence of social media, have led people to look for noninvasive, affordable, readily available aesthetic procedures. Therefore, soft tissue augmentation with injectable substances has increased dramatically over the last decades.

Modern soft tissue augmentation goes back to 1893 when Neuber first started it using autologous fat, while in May 1899, Gersuny was the first to use a bioinjectable substance "paraffin" to correct a cosmetic deformity [1]. Injectable soft tissue fillers can be classified according to many characteristics such as chemical structure, source, permanence or indications [2]. However, the most practical classification is by their biodegradability in the tissue after injection. They are categorized into three categories: Non-permanent fillers that last months up to 2 years then get absorbed by the body, semipermanent fillers that last 2–5 years or permanent fillers that last more than 5 years [3].

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With this growing trend of using soft tissue fillers, there is the constant quest to identify an ideal filler. The ideal filler should be safe with minimal complications, easy to inject, non-allergic, has natural look and feel, cost-effective, suitable to be used in different areas of the body and durable but reversible [4]. Unfortunately, until now there has been no one type of filler that is considered ideal, and regardless of the impressive safety reputation of fillers, there is an increased rate of complications with the increasing use, particularly with the permanent filler types.

Complications, as described by Sclafani and colleagues [5], are categorized into three types: immediate complications that occur within 24 h of injection, early-onset complications that occur within 2 weeks and delayed complications that start after 2 weeks. Sadly, most people tend to prefer permanent types of fillers, despite the fact that they are associated with more complications, to avoid the cost of multiple injection sessions. In this article, we are reporting a case of a patient with *Brucella* species isolated from a facial abscess which improved dramatically after incision and drainage and effective antimicrobial regimen.

Materials and Methods

A 56-year-old woman, with a known case of acquired hypothyroidism, presented to the emergency department in our hospital complaining of a painful swelling of the right cheek after a failed trial of filler evacuation and intralesional corticosteroid injection. She had a history of permanent filler injection in both cheeks by a dermatologist 17 years prior to this presentation; however, we could not obtain any information regarding the type or origin of the filler material because the patient did not know and the dermatologist passed away. The patient reported having intermittent fever with chills and rigors, loss of appetite, decreased concentration and feeling fatigued all the time.

On examination, the patient was conscious, oriented and alert to time, place and person, and she was vitally stable. She had mild facial swelling mainly on the right side which was erythematous and tender with a small boil discharging pus (Fig. 1a, b).

Results

On investigation, fastidious culture, surgical culture and gram stain, MRSA and *Staphylococcus aureus* screening from the nose and skin were all found to be negative. Hence, more careful history was taken from the patient when she reported contact with animals and raw milk ingestion which led us to suspect zoonotic infection. Later on, the microbiology laboratory isolated a few *Brucella* species, which was alarming; thus, the infectious diseases team was consulted for the treatment plan.

Ultrasound of the face demonstrated two lobulated, hypoechoic, heterogeneous structures, with minimal vascularity in both cheeks. The one in the left cheek measured $3.7 \times 1.7 \times 5.3$ cm, and the other one in the right cheek measured $1.4 \times 3.1 \times 0.5$ cm.

Brain CT confirmed the absence of any evidence of intracranial abscess or cavernous sinus thrombosis.

CT scan of the face with axial contrast was done, and enhanced images with sagittal and coronal reformations were obtained, which showed a large fluid collection associated with mild peripheral enhancement superficial to the left masseter muscle at the anterior aspect of the left parotid gland, measuring approximately 3.8×1.8 cm in axial plane dimensions. Inflammatory changes were noted superficial to the right masseter muscle surrounding the superficial lobe of the right parotid gland without discrete drainable collection (Fig. 2a, b). No abnormalities were detected in the orbits or in the included portions of the brain parenchyma. Bony structures were intact. Paranasal sinuses, mastoid air cells and middle ear cavities were clear.

Our otolaryngologist colleagues decided to incise and drain the abscess. Hence, the patient was taken to the operating theater, and under general anesthesia, she was prepped and draped in the regular sterile technique. Then, an incision was made on the lower part of the right cheek at the area that was discharging pus. The incision was then extended 1 cm, and a large amount of pus was drained. Caution was taken not to leave any septae or any hidden collections.

Another incision was made on the superior part to drain the remaining pus, and 30 cc of pus was drained. Cultures were taken and sent to the microbiology laboratory. Then, the area was irrigated with normal saline. The wound was packed with iodoform strips and kept open for subsequent drainage. Finally, dressing was applied along with some sutures. The patient tolerated the procedure well without any complications.

The patient was then admitted and received intravenous cefazolin 1 g every 8 h for 8 days and intravenous acetaminophen 1 g every 6 h for 2 days. She was followed by the plastic surgery team on a daily basis with daily packing and dressing change. The patient improved dramatically and was discharged on oral cefuroxime and acetaminophen and followed up in the outpatient clinic.

The patient came back to the emergency department due to persisting symptoms of Malta fever, and the otolaryngology team took her to the operating room for a second incision and drainage. The infectious diseases team advised giving the patient doxycycline 100 mg tablets every 12 h for 42 days and streptomycin 1 g intramuscular injection

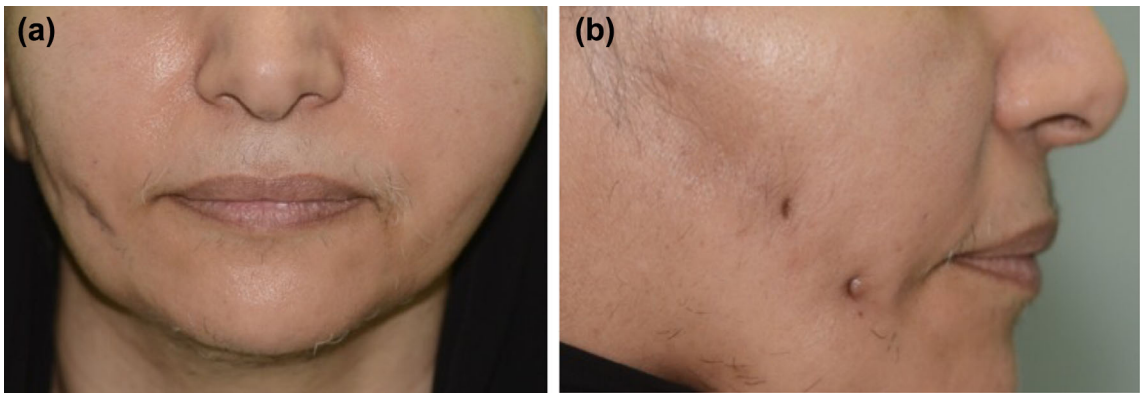

Fig. 1 **a**, **b** Anterior and lateral pictures of the patient showing mild facial swelling on the right side and scars of previous attempts at filler evacuation

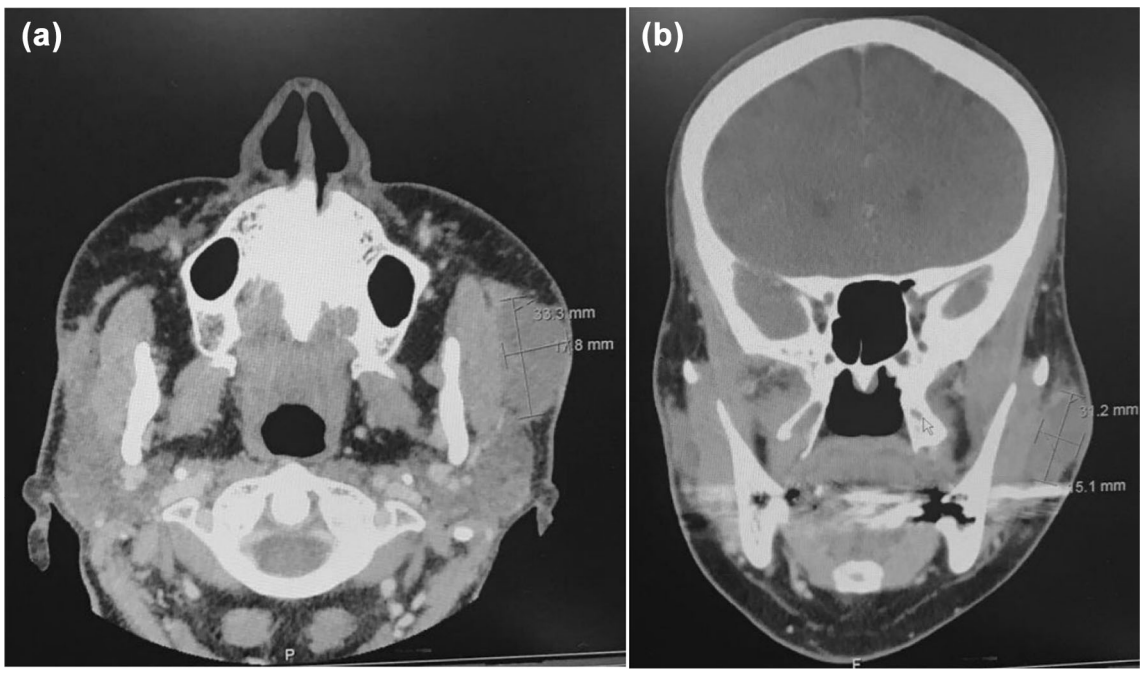

Fig. 2 **a**, **b** CT axial and coronal views showing large fluid collection on the left side with mild peripheral enhancement and inflammatory changes on the right side

daily for 14 days. The patient was discharged home after she was educated about the importance of compliance to the prescribed medications and potential side effects.

On follow-up, facial swelling and redness were completely resolved. However, there was some residual fluctuation in the right cheek. The infectious diseases team advised continuing the doxycycline for another 42 days. On the next follow-up appointment, it was difficult to take a sample from the cheek, so MRI was done which revealed parotid gland infiltration. Therefore, the patient received another 3 months of doxycycline. After the last treatment, the *Brucella* titer became negative, and the MRI showed clear parotids. Ultimately, facial swelling and brucellosis symptoms were all resolved, and the patient was happy and satisfied with no further complaints.

Discussion

The growing desire to hide any signs of aging has led to a significant increase in the use of filler materials to remove wrinkles, aging lines or to fill depressions, correct loss of volume and contouring deformities. The use of FDA-approved soft tissue fillers in proper techniques and for appropriate applications is generally safe with a low complication rate. However, there are potential complications especially with the permanent types of fillers that can

be attributed to filler material, region injected, technique of injection or patient factors.

Permanent fillers are not absorbed by the body due to their large particle size and irregular surface which prevents phagocytosis leading to foreign body reaction and eventually granuloma formation [6].

We could not find any studies done in our country discussing the permanent filler materials used or their complications. However, some of the delayed complications of permanent fillers that were described in the literature are telangiectasia, hypertrophic scarring, persistent redness, infection, abscess formation, delayed granulomatous reaction, nodules, migration and hyperpigmentation.

In a study performed on 85 patients, the most common complications were low-grade inflammation in 40% and migration in 40%, followed by non-inflammatory nodules in 39%. Abscess was found at the site of filler material in 29% of patients who were all injected with permanent fillers [7].

Furthermore, positive cultures in the aforementioned study isolated *Staphylococcus aureus* predominantly, followed by *Enterobacter aerogenes*, *Streptococcus sanguinis*, *Pseudomonas aeruginosa*, *Escherichia coli* and *Streptococcus agalactiae* [7]. In a case series of 22 patients who received treatment for infected facial filler, the organisms identified in their cultures were *Klebsiella oxytica*, *Staphylococcus aureus* and anaerobic gram-positive cocci [8].

To the best of our knowledge, this article is the first to report a case of filler infection with *Brucella* that was treated successfully with incision and drainage followed by a course of doxycycline and streptomycin. This case highlights the importance of considering *Brucella* as a causative organism of facial abscess particularly in areas where it is endemic.

One suggested theory that could explain the delayed onset of the symptoms in our case is biofilm development. Biofilms are defined as aggregates of bacteria that attach to surfaces and surround themselves by a hydrated polymeric matrix which interferes with phagocytosis and lead to development of antimicrobial resistance [9]. The chronic biofilms may become activated by bacteremia even after years leading to acute purulent infection. However, this theory needs additional evidence as it has been challenged recently.

In similar scenarios of *Brucella* infections, we recommend at least a 6-week course of antibiotics preferably doxycycline 100 mg tablets every 12 h and streptomycin 1 g intramuscular injection daily for 2 weeks for uncomplicated cases. However, in more complicated cases such as parotid involvement as in our case, it is suggested to continue the antibiotic course up to 4–6 months depending on the patient's response.

In our case, the filler injection was done 17 years ago, and at that time dermal fillers were not approved to be used for facial volume enhancement. Such a practice is considered as off-label use of filler. However, because this is consistent with the practice of other physicians, it could be considered legal, as concluded in an article discussing the legal ramifications of off-label filler uses, which stated that the FDA-approved labeling is only used for informational purposes and that the FDA considered off-label use as an accepted medical practice [10].

In addition, obtaining informed consent before injecting any material is essential to minimize legal issues and to ensure that the patient has adequate knowledge of the material injected, procedure and possible complications [11].

Conclusion

Permanent fillers have shown many complications that may occur even years after injection. Therefore, physicians should be careful when using permanent fillers and should restrict their use to certain situations. Furthermore, any patient who presents with signs of a facial infection should be asked about and investigated for the possibility of the use of filler materials. Moreover, rare infections must be kept in mind and a careful history including travel history and animal contact needs to be considered, especially, in scenarios of persistent infection and when the culture is negative for common organisms.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest to disclose.

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