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CLINICAL COMMENTARY

Facial fat necrosis after autologous fat transfer possibly associated with SARS-CoV-2 vaccine

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Abstract

A 52-year-old female patient developed facial fat necrosis presenting with cutaneous induration three weeks after minimal access cranial suspension (MACS) lift with autologous fat grafting from the abdomen. Given that the patient received the Moderna SARS-CoV-2 vaccine one week after surgery, we hypothesize that the former predisposed her to tissue ischemia leading to fat necrosis. Histological findings after biopsy were consistent with fat necrosis, which included marked dermal fibrosis with areas of focal fat necrosis, lipophages, multinucleated giant cells, and siderophages. It is our hope that documenting this rare development in literature may serve as encouragement for adverse effect reporting after the SARS-CoV-2 vaccine administration and may boost inspection and monitoring of other health consequences by regulating agencies.

KEYWORDS
autologous fat transfer, COVID-19 vaccine, cutaneous induration, fat necrosis, flap necrosis, SARS-CoV-2 vaccine

1 | INTRODUCTION

Fat necrosis, in particular fat necrosis of the newborn, is well recognized as an entity in literature and fat necrosis post autologous fat transfer to the breast has been described.[1] Fat necrosis resulting from autologous fat transplantation (AFT) performed for facial filling has, however, been less extensively reported and is noteworthy for recognition, especially due to the potential of permanent scarring.[2] The clinical presentation of fat necrosis can be varied and ranged from palpable firm papules, nodules, and plaques to a tender mass. The most commonly described types of fat necrosis include oil cysts, calcification, and sclerosing nodules.[3] If fat necrosis takes place superficially or close to the skin, it tends to induce more inflammatory responses and can cause dermatitis, skin retraction, and cutaneous eruptions because of the inherently higher immunogenicity of skin.[3] Postinflammatory hyperpigmentation can also develop. Detection of fat necrosis is based primarily on physical examination followed by imaging (ultrasonography, computed tomography, magnetic resonance imaging) or histologic studies when necessary.[3]

There is a wide range of fat necrosis rates after AFT on the breast; anywhere from 2–20% has been published in the literature.[4–7] To our knowledge, there are only two published cases of facial fat necrosis after AFT.[2,8] This is not unexpected, as the face consists of well-vascularized tissue that makes it easier for autologous transfers to survive. Predisposing factors that could compromise the viability of fat grafting include insufficient vascularization, intratissue mechanical stresses, inflammatory reactions, and overfilling.[9,10]

The incidence of skin flap necrosis as a postoperative complication of rhytidectomy has been reported between 1.1% to 3.0%.[11] Flap necrosis is commonly linked to ischemia due to hematoma formation, which limits blood flow via vascular congestion.[11] Ischemic changes may present in two ways: a purplish discoloration of the skin flap as a result of venous congestion, or a more pale flap due to arteriolar compromise.[12] It is most frequently seen in the pre- and postauricular areas since the tension is greatest in this area, the blood supply travels farthest in this location, and the available flap is the thinnest.[11] Some associated causal factors include excessive undermining, infection, history of diabetes, history of radiation therapy, and some systemic medical conditions such as Raynaud's disease.[11,12] Smoking and tobacco use are directly linked to an ischemic process in these manipulated tissues that can lead to necrotic tissue formation.[11,12]

Here we report the case of an adult female who developed facial fat necrosis after autologous fat transfer and facelift surgery. The case is unique not just because of the rarity of this adverse event but also because of the potential connection to the Moderna SARS-CoV-2 vaccine.

2 | CASE PRESENTATION

A 52-year-old nonsmoking female with a past medical history of asthma, presented with skin-colored nontender indurated 1–3 cm papules and nodules coalescing into plaques with associated dimpling over the nasolabial folds extending to bilateral cheeks (Figure 1). The patient had previously undergone a minimal access cranial suspension (MACS) lift with autologous fat grafting from the abdomen six months prior to presentation. She had a total of 3 mL of harvested fat injected into the nasolabial folds and marionette lines. She denied any discharge from the wound, skin discoloration, ulceration, abscess formation, fever, chills, malaise, weight loss, respiratory or gastrointestinal discomfort. She received her second dose of Moderna SARS-CoV-2 vaccine one week after surgery and two weeks after vaccination, she started to notice induration on her cheeks. She had no personal or family history of VTE, PE, or known hypercoagulable state.

Laboratory examination for protein C, protein S, Factor V Leiden, ANA, anticardiolipin antibody, ANCA, and lupus anticoagulant was all negative. Coagulation studies were normal. Tissue cultures for bacteria, atypical mycobacteria, and fungi were negative. The patient underwent an incisional biopsy that revealed marked dermal fibrosis with areas of focal fat necrosis, lipophages, multinucleated giant cells, and siderophages (Figure 2). PAS and acid-fast stains were negative. Her clinical and pathological findings were suggestive of facial fat necrosis. Informed consent was obtained prior to the biopsy.

3 | DISCUSSION

While it is impossible to determine why our patient developed facial fat necrosis, a very rare event, the timing between her surgery

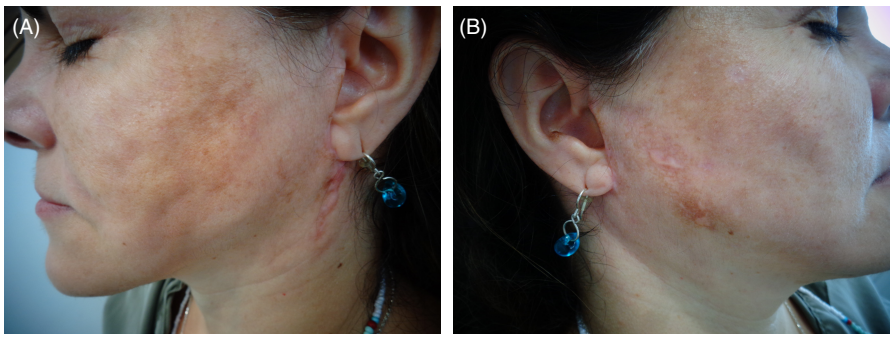

FIGURE 1 (A and B) Skin-colored nontender indurated 1–3 cm papules and nodules coalescing into plaques with associated dimpling over bilateral cheeks

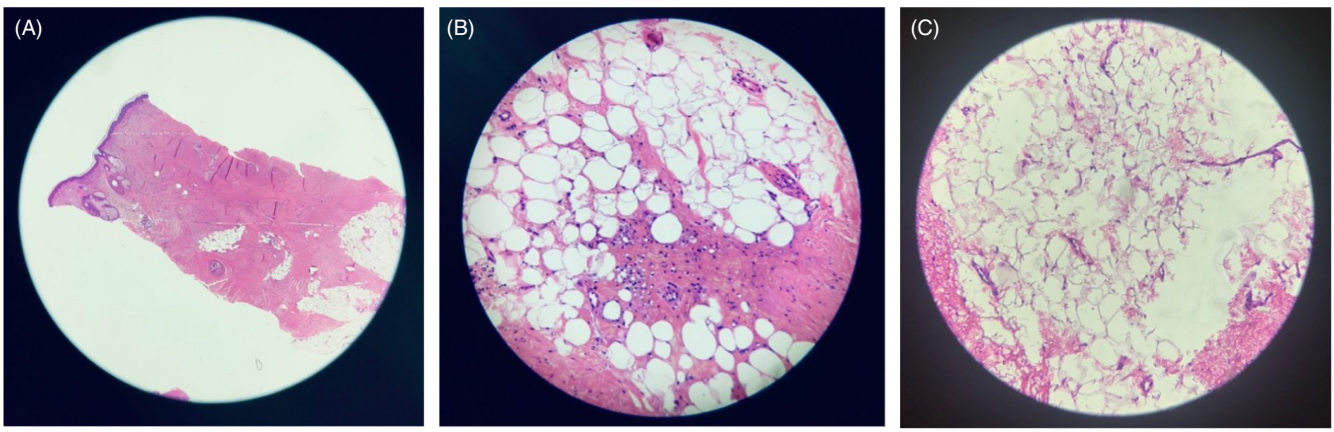

FIGURE 2 (A) Incisional biopsy showing marked dermal fibrosis. (B) Areas of focal fat necrosis surrounded by inflammatory cells. (C) Vacuoles with remnants of necrotic adipocytes.

and 2nd dose of the Moderna SARS-CoV-2 vaccine is concerning for a potential connection to the COVID-19 vaccine itself. It is possible that she developed a hypercoagulable state leading to tissue ischemia after her immunization that compromised the survival of her graft and facelift flap.

Reports of thrombosis & thrombocytopenia have been described for two adenovirus-based vaccines, the AstraZeneca ChAdOx1 nCoV-19 vaccine and the Janssen Ad.26.COV2.S vaccine, leading to further regulatory and safety review.[13–15] There are few published reports of venous thromboembolism (VTE) after mRNA SARS-CoV-2 immunizations. At the moment of writing, there were two described cases of VTE shortly after patients received the Pfizer-BioNTech BNT162b2 mRNA vaccine and five described cases after the Moderna SARS-CoV-2 vaccine.[16–20] It is very important to emphasize that the risk of VTE after SARS-CoV-2 immunization is significantly lower than the risk of VTE during COVID-19 infection, which is approximately 21% per infection in a recent meta-analysis.[21] The incidence of cerebral venous thrombosis was 39.0 per million people over a 2-week period after COVID-19 diagnosis versus 4.1 per million people over a 2-week period after receiving either the Pfizer-BioNTech BNT162b2 or Moderna mRNA-1273 vaccines.[22]

Reports of ischemic events as a result of the SARS-CoV-2 vaccine, such as acute ischemic stroke[23,24] and myocardial infarction and ischemia,[25] have been documented. Cases of COVID-19-associated coagulopathy (CAC) have been reported after flap reconstruction,[26] but no cases in published literature report a link to the SARS-CoV-2 vaccine. We hypothesize that an ischemic event could have been precipitated by our patient's second Moderna SARS-CoV-2 vaccine, thus compromising the viability of her graft and facelift flap.

The presentation of our patient is an interesting one. Fat necrosis from AFT can certainly present with cutaneous induration as observed in our patient. However, fat necrosis from AFT alone cannot explain her symptoms as the cutaneous induration was not localized only to the areas of injected fat—the nasolabial folds and marionette lines—but extended to cover most of the cheek area. This indicates that the viability of her facelift flap was most likely compromised as well. Usually, the ischemic changes associated to flap necrosis present with either a violaceous or pale discoloration as a result of venous congestion or arterial compromise, respectively, but in our patient, it presented with cutaneous induration.

There is a possibility that the ischemia leading to fat necrosis and her SARS-CoV-2 vaccine is coincidental; however, the timing of events suggests a possible relationship that is important to document. It is our goal to contribute to the body of knowledge regarding SARS-CoV-2 vaccines and encourage vaccine adverse event reporting so that clinicians can have a full appreciation and awareness of the possible adverse events related to these critical vaccines. We look forward to the publication of more reports on *Facial Fat Necrosis after SARS-CoV-2 immunizations* so that a better assessment of potential mechanisms and comparison of patient characteristics can be performed. The reports of ischemic events after SARS-CoV-2 immunizations including the present one should never discourage the vaccine rollout but monitoring of evolving data should be carried on by manufacturers and independent authorities before coming to a definitive conclusion.

AUTHOR CONTRIBUTIONS

All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed by Dr. Cristina Brau, Dr. Andrea Caro, and Dr. Orlando Canizares. The first draft of the manuscript was written by Dr. Cristina Brau and all authors contributed to subsequent versions of the manuscript. All authors read and approved the final manuscript.

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None.

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

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

STATEMENT ON ANY PRIOR PRESENTATION

This work has not been presented previously.

ETHICAL APPROVAL

Authors declare human ethics approval was not needed for this study.

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REFERENCES

1. Mann CV, Russell RC. *Bailey and Love's Short Practice of Surgery*. 21st ed. Chapman & Hall; 1992:793-794.
2. Rai S, Marsland AM, Madan V. Facial fat necrosis following autologous fat transfer and its management. *J Cutan Aesthet Surg*. 2014;7(3):173-175. doi:10.4103/0974-2077.146678
3. Lin JY, Song P, Pu LLQ. Management of fat necrosis after autologous fat transplantation for breast augmentation. *Plast Reconstr Surg*. 2018;142(5):665 e-673 e. doi:10.1097/prs.0000000000004898
4. Zheng DN, Li QF, Lei H, et al. Autologous fat grafting to the breast for cosmetic enhancement: experience in 66 patients with long-term follow up. *J Plast Reconstr Aesth Surg*. 2008;61:792-798. doi:10.1016/j.bjps.2007.08.036
5. Mu DL, Luan J, Mu L, Xin MQ. Breast augmentation by autologous fat injection grafting: management and clinical analysis of complications. *Ann Plast Surg*. 2009;63:124-127. doi:10.1097/sap.0b013e318189a98a
6. Hyakusoku H, Ogawa R, Ono S, Ishii N, Hirakawa K. Complications after autologous fat injection to the breast. *Plast Reconstr Surg*. 2009;123:360-372. doi:10.1097/prs.0b013e31819347ba
7. Petit JY, Lohsiriwat V, Clough KB, et al. The oncologic outcome and immediate surgical complications of lipofilling in breast cancer patients: a multicenter study—Milan-Paris-Lyon experience of

646 lipofilling procedures. *Plast Reconstr Surg*. 2011;128:341-346. doi:10.1097/prs.0b013e31821e713c
8. Brodell LA, Gru AA, Haughey B, Hurst EA. Autologous fat transfer-induced facial nodule. *J Am Acad Dermatol*. 2013;69(2):e107-e108. doi:10.1016/j.jaad.2013.02.018
9. Largo RD, Tchang LA, Mele V, et al. Efficacy, safety and complications of autologous fat grafting to healthy breast tissue: a systematic review. *J Plast Reconstr Aesthet Surg*. 2014;67(4):437-448. doi:10.1016/j.bjps.2013.11.011
10. Wetterau M, Szpalski C, Hazen A, Warren SM. Autologous fat grafting and facial reconstruction. *J Craniofac Surg*. 2012;23:315-318. doi:10.1097/scs.0b013e318241e1de
11. Moyer JS, Baker SR. Complications of rhytidectomy. *Facial Plast Surg Clin North Am*. 2005;13(3):469-478. doi:10.1016/j.fsc.2005.04.005
12. Bloom J, Immerman S, Rosenberg D. Face-lift complications. *Facial Plast Surg*. 2012;28(3):260-272. doi:10.1055/s-0032-1312703
13. MacNeil JR, Su JR, Broder KR, et al. Updated recommendations from the advisory committee on immunization practices for use of the Janssen (Johnson & Johnson) COVID-19 vaccine after reports of thrombosis with thrombocytopenia syndrome among vaccine recipients—United States, April 2021. *MMWR Morb Mortal Wkly Rep*. 2021;70:651-656. doi:10.15585/mmwr.mm7017e4
14. Scully M, Singh D, Lown R, et al. Pathologic antibodies to platelet factor 4 after ChAdOx1 nCoV-19 vaccination. *N Engl J Med*. 2021;384:2202-2211. doi:10.1056/nejmoa2105385
15. Mahase E. Covid-19: unusual blood clots are "very rare side effect" of Janssen vaccine, says EMA. *BMJ*. 2021;373:n1046. doi:10.1136/bmj.n1046
16. Carli G, Nichele I, Ruggeri M, Barra S, Tosetto A. Deep vein thrombosis (DVT) occurring shortly after the second dose of mRNA SARS-CoV-2 vaccine. *Intern Emerg Med*. 2021;16:803-804. doi:10.1007/s11739-021-02685-0
17. Al-Maqbali JS, Al Rasbi S, Kashoub MS, et al. A 59-year-old woman with extensive deep vein thrombosis and pulmonary thromboembolism 7 days following a first dose of the Pfizer-BioNTech BNT162b2 mRNA COVID-19 vaccine. *Am J Case Rep*. 2021;22:e932946. doi:10.12659/ajcr.932946
18. Wiest NE, Johns GS, Edwards E. A case of acute pulmonary embolus after mRNA SARS-CoV-2 immunization. *Vaccine*. 2021;9(8):903. doi:10.3390/vaccines9080903
19. Andraska EA, Kulkarni R, Chaudhary M, Sachdev U. Three cases of acute venous thromboembolism in females following vaccination for COVID-19. *J Vasc Surg Venous Lymphat Disord*. 2022;10(1):14-17. doi:10.1016/j.jvsv.2021.07.009
20. Syed K, Chaudhary H, Donato A. Central venous sinus thrombosis with subarachnoid hemorrhage following an mRNA COVID-19 vaccination: are these reports merely Co-incidental? *Am J Case Rep*. 2021;22:e933397. doi:10.12659/AJCR.933397
21. Malas MB, Naazie IN, Elsayed N, Mathlouthi A, Marmor R, Clary B. Thromboembolism risk of COVID-19 is high and associated with a higher risk of mortality: a systematic review and meta-analysis. *EClinicalMedicine*. 2020;29:100639. doi:10.1016/j.eclinm.2020.100639
22. Taquet M, Husain M, Geddes J, Luciano S, Harrison PJ. Cerebral venous thrombosis: a retrospective cohort study of 513,284 confirmed COVID-19 cases and a comparison with 489,871 people receiving a COVID-19 mRNA vaccine. *MedRxiv*. 2021;39:101061. doi:10.1016/j.eclinm.2021.101061
23. Alammar MA. Ischemic stroke after AstraZeneca (Covid-19) vaccination. *Saudi Med J*. 2021;42(10):1136-1139. doi:10.15537/smj.2021.42.10.20210326
24. Al-Mayhani T, Saber S, Stubbs MJ, et al. Ischaemic stroke as a presenting feature of ChAdOx1 nCoV-19 vaccine-induced immune thrombotic thrombocytopenia. *J Neurol Neurosurg Psychiatry*. 2021;92(11):1247-1248. doi:10.1136/jnnp-2021-326984
25. Fazlollahi A, Zahmatyar M, Noori M, et al. Cardiac complications following mRNA COVID-19 vaccines: a systematic review of case reports and case series. *Rev Med Virol*. 2021;32:e2318. doi:10.1002/rmv.2318
26. Dugue D, Hsu KT, Wagner IJ, Jones C. Implications of COVID-19-associated coagulopathy on reconstructive surgery: a case of ongoing tissue necrosis. *Plast Reconstr Surg*. 2020;8(12):e3366. doi:10.1097/GOX.0000000000003366

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