Facial Flap Necrosis From COVID-19 Face Mask Precautions

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Abstract: Use of facial mask coverings has been a strong Centers for Disease Control and Prevention recommendation as an essential mitigation measure in the spread of the SARS-CoV-2 novel coronavirus (COVID)-19 virus. Face mask utilization has been shown to induce changes in the skin microclimate, especially around the perioral and perinasal regions. This results in increased mask adjustments and development of friction between masks and the underlying skin. The authors report novel findings of 2 individuals with skin cancer who underwent facial reconstruction during the COVID-19 pandemic. They encountered untoward sequelae of facial flap pressure necrosis due to the use of face mask coverings. These individuals were ultimately successfully treated with local wound care. One individual experienced auricular implant extrusion and flap loss. It is critical that reconstructive surgeons be aware of potential complications and the need for potential revision surgeries due to the use of face masks, and educate their patients to properly position the protective face masks based on the type of reconstruction performed. Plastic surgeons might also reconsider reconstructive management options in light of these additional obstacles.

Key Words: COVID-19, face mask, reconstruction, skin cancer, wound healing

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SARS-CoV-2 novel coronavirus (COVID-19) pandemic has led to the devastation of economies, disruption of social practices, and the loss of millions of lives across the globe since its reported discovery in December 2019. To date, there have been 283 million confirmed cases and 5.41 million confirmed deaths worldwide.[1] Development of the more contagious Delta variant has amplified the effects of the pandemic, along with the rise of the new, rapidly spreading Omicron variant.[2,3] Since the beginning of the COVID- 19 pandemic in 2020, hospitals have mandated the use of personal protective equipment to help prevent the spread of disease. Use of face masks has been deemed an essential measure to mitigate the spread of the COVID-19 virus, especially among the general public. Centers for Disease Control and Prevention first recommended in April, 2020 wearing face masks in public venues. Since then, the use of facial coverings has been mandated by businesses, schools, airlines, and other settings. This has subsequently impacted the entire population's daily lives and habits. Patients seeking care in hospitals are also required to wear face masks during clinic and postoperative visits. We will describe 2 individuals who underwent skin cancer excision and subsequent reconstruction of the face during the COVID-19 pandemic. Eventually, they developed facial flap necrosis due to the pressure generated by use of face mask coverings.

FINDINGS

A 70-year-old male diagnosed with biopsy-proven right cheek squamous cell carcinoma was evaluated in clinic. He was offered Mohs chemoresection of the right cheek skin lesion with subsequent reconstruction. In the OR, a 3 cm × 5.5 cm × 0.5 cm defect was noted on the right cheek with exposed superficial muscular aponeurotic system and subcutaneous fat at the wound base (see Fig. 1A). An inferiorly based modified cervico-facial flap was designed to rotate healthy tissue from the lateral cheek into the defect (see Fig. 1B). Flap was raised in the subcutaneous supra-fascial plane and rotated into the right cheek defect. Prior to flap inset, hemostasis was obtained with bipolar electrocautery and topical application of tranexamic acid. Flap was secured in place with buried interrupted 4-0 vicryl suture. Skin was closed with interrupted 5-0 prolene suture (see Fig. 1C). The patient tolerated the procedure well. He was seen 1 week postoperatively and was noted to have some distal epidermolysis (see Fig. 2A and B). The patient had been consistently wearing a face mask. Decision was made to monitor the flap and manage with local wound care with an antibiotic ointment and showers. He was then seen 2 weeks post-operatively and noted to have partial thickness necrosis of the distal skin flap with eschar formation, 2 × 3 cm (see Fig. 2C). Lateral to the area of flap necrosis was an additional area of wound separation with underlying fibrinous tissue. Wound management as previously recommended was continued.

FIGURE 1. A, Right cheek defect with exposed SMAS and subcutaneous fat. B, Inferiorly based cervico-facial flap. C, Cervico-facial flap inset with skin closure. SMAS, superficial muscular aponeurotic system.

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FIGURE 2. A, Distal epidermolysis seen 1 week postop. B, Demonstration of position of face mask on patient's face in contact with area of reconstruction. C, Development of partial thickness necrosis with eschar formation seen 2 weeks postop.

A 72-year-old male was noted to have lesions on the left helical rim and left conchal bowl/antihelical fold (see Fig. 3A). He underwent Mohs micrographic extirpation of the lesions. Helical rim defect was closed primarily. For the left conchal bowl and antihelical rim defects, the reconstruction was performed in 2 stages with a delayed postauricular flap and otoplasty with the placement of a Medpore auricular implant and division of the flap due to the size of the defects. During the first stage of reconstruction, a posterior auricular flap was marked immediately beneath the left lobule. Great auricular nerve was identified and preserved. Flap was undermined and advanced to cover the surface of the anterior ear with exposed cartilage (see Fig. 3B and C). Flap was secured to the ear and inset with 4-0 vicryl suture and further reinforced with a running 5-0 prolene suture. A small opening was left for xeroform gauze to be packed beneath the flap between the area of the lobule of the ear where there was still skin coverage (see Fig. 3D). Two weeks later, the patient returned for the second stage of reconstruction. Anterior aspect of the skin flap was released and mobilized off the wound bed near its base and completely divided. Skin around the cartilage deficit was mobilized and lifted with a superior and inferior tunnel created along the helical rim for the placement of a Medpore implant. Implant was opened and soaked in antibiotic irrigation and contoured to match the segment of cartilage deficit after. Amniotic membrane was wrapped around the implant segment (see Fig. 3E). Ear was prepped with betadine and the implant was placed in the previously created tunnel to bridge the cartilage defect and then covered with the divided postauricular flap. Flap was inset and closed using 4-0 prolene suture. Defect from the donor site of the postauricular skin flap

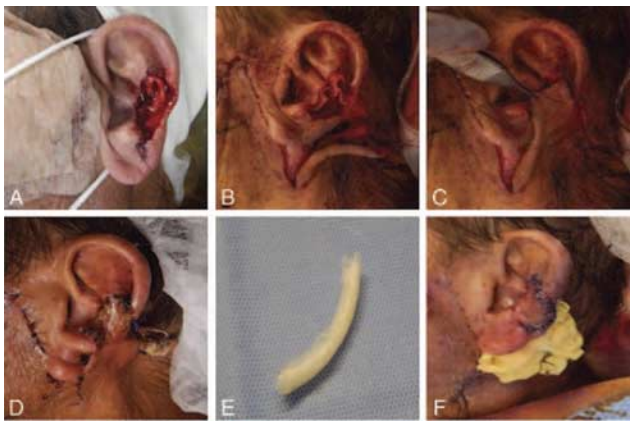

FIGURE 3. A, Left ear defect. B, Posterior auricular flap raised. C, Advancement of posterior auricular flap to cover exposed cartilage. D, Posterior auricular flap inset with packed xeroform. E, Medpore implant with wrapped amniotic membrane. F, Divided posterior auricular flap inset with bolster dressing overlying full-thickness skin graft at donor site.

FIGURE 4. A, Wound breakdown seen 4 weeks postop. B, Developing eschar at distal tip of the divided flap seen 4 weeks postop. C, Demonstration of position of face mask ear loop in contact with area of reconstruction. D, Healed wound after implant extrusion seen 20 weeks postop.

was closed. There remained a 5 cm × 3 cm skin defect at the donor site. Skin from the excess post-auricular skin flap was thinned to be used as a full-thickness skin graft at this site. An additional full-thickness skin graft was harvested from the lateral check to further cover the donor site defect. Both grafts were pie crusted and inset using 4-0 chromic sutures. Antibiotic ointment was applied over the skin grafts and a bolster dressing was secured (see Fig. 3F). The patient tolerated the procedure well. He was seen 1 week postoperatively after the second stage of the reconstruction and was noted to be healing well; he was advised to continue applying bacitracin to the incisions. Four weeks postoperatively he was noted to have an eschar along the distal tip of the divided flap at the posterior mid-helical rim (see Fig. 4A and B). The patient reported wearing a facial covering with ear loops (see Fig. 4C). He was advised to continue applying bacitracin to his incisions. Six weeks postoperatively he was seen again with an eschar over the distal tip of the divided flap and was recommended to continue with antibiotic ointment. Ten weeks postoperatively he was noted to have an exposed implant. He had continued to wear a face mask with ear loops which appeared to have eroded the flap; however, there were no signs of infection to the area of reconstruction. It was recommended that the patient have a revision surgery due to the risk of infection with the exposed implant; however, the patient declined and the implant eventually extruded completely. He was seen 20 weeks postoperatively with complete wound healing at the site of the implant extrusion, no signs of infection, with minimal aesthetic deformity (see Fig. 4D).

DISCUSSION

We have identified 2 individuals who underwent facial reconstruction for skin cancer lesions during the time of the COVID-19 pandemic. Unfortunately, they experienced flap necrosis of their reconstructions due to the use of protective face masks. These patients ultimately did not require further operative care and were successfully treated with local wound care. A recent case study identified an individual who developed linear pressure ulcers and bleeding around the ear due to constant wearing of a surgical mask with earloops.[4] The ulcers eventually healed after the removal of the earloops.[4] Despite the Centers for Disease Control and Prevention's changing guidelines regarding facial mask coverings, various institutions and businesses still require the use of facial mask coverings in public. Wearing surgical or N-95 masks has been shown to increase the temperature, humidity, and discomfort to the facial region, leading to an increased number of mask adjustments.[5–7] A series of cross-sectional studies detailed a 79.5% prevalence of mask-induced injury among medical staff during COVID-19 due to these changes in skin microclimate.[6] These studies cite a combination of skin irritation from sweating and applied pressure from the masks causing increased friction between the personal protective equipment and the skin.[5,6] This predisposes the underlying skin to risk of skin tears upon rapid removal of masks.[6] Therefore, while the use of facial mask coverings is critical to decrease the spread of disease among the general public, their effects on the skin may be detrimental to wound healing, as evidenced by our 2 clinical reports. Additionally, the rise and development of the Delta and Omicron COVID-19 variants, along with the possibility of new variants, suggests the potential need for face covering use for the foreseeable future. We hope to bring awareness of this potential complication to reconstructive surgeons, who may need to consider advising patients to avoid face mask use for a certain period of time. Surgeons should also consider the use of protective dressings for the areas of reconstruction, especially in areas of mask-to-skin contact, such as the nose, cheek, chin, and ear. A different type of facial covering may also need to be considered that does not apply pressure to areas of reconstruction. Lastly, plastic surgeons may need to reevaluate and modify their available reconstructive options during the utilization of protective face masks in this ongoing pandemic.

SUMMARY

Facial masks have an integral role in the mitigation effort to curtail the spread of the COVID-19 virus. It is imperative that plastic surgeons are aware of this potential complication and educate their patients appropriately.

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