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Prevention of surgical site infection using 2-octylcyanoacrylate following Mohs micrographic surgery: case series in a high-risk patient population

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To the Editor:

Surgical site infections (SSI) related to methicillin-resistant *Staphylococcus aureus* (MRSA) have posed a significant burden to patients and providers for decades. New antibiotic classes and improved decolonization regimens have shown some success in reducing MRSA SSI. However, with resistant bacteria increasing in frequency, novel approaches to minimize SSI should be explored. We report clinical outcomes following preemptive 2-OCA use in five high-risk, MRSA positive patients during wound reconstruction subsequent to Mohs micrographic surgery (MMS).

The inherent antibacterial properties of 2-OCA have been demonstrated in disc sensitivity studies, most significantly against gram-positive bacteria [1]. Although the exact antibacterial mechanism is unclear, the strong electronegative charge of the polymer reacting with the cell wall of gram-positive organisms is believed to play a role [1]. Additionally, physical occlusion created by 2-OCA, imparts a hypoxic, acidic wound environment with a high concentration of viable leukocytes, which likely diminishes the local bacterial population [2]. Lastly, 2-OCA use precludes the need for percutaneous sutures, removing an additional portal of entry and foreign body for bacterial contamination.

Notwithstanding, benefits of 2-OCA include ease of use, painless application, expeditious closure, obviated need for suture removal, reduced needle-stick injuries, improved hemostasis, and favorable cosmetic outcome [3].

Our study included 5 MMS patients identified preoperatively as having a high-risk for MRSA SSI. The high-risk designation was based on several factors including history of SSI, chronic cutaneous MRSA infection, or chronic MRSA carriage. In each patient, subcutaneous and dermal layers were approximated with absorbable suture and 2-OCA was used instead of percutaneous sutures for epidermal closure. All repaired wounds were covered with one layer of non-adhesive gauze under adhesive tape. This dressing was left on for one week for head and neck areas and two weeks for any areas below the neck. No patients received prophylactic pre or post-operative antibiotics. Case details and outcomes are summarized below.

Patient 1

A 73-year-old woman was referred for an invasive squamous cell carcinoma (SCC) on the left anterior thigh. Her history included advanced chronic obstructive pulmonary disease with chronic pulmonary MRSA carriage. During the antecedent year she had undergone MMS for three isolated lower leg SCCs, all complicated by MRSA SSI, necessitating systemic antibiotic usage. The lesion was excised in one stage with primary closure. There was no evidence of infection and excellent wound

healing was noted throughout the post-operative period.

Patient 2

An 87-year-old woman was referred for an infiltrative basal cell carcinoma (BCC) on the right medial chin. A routine nasal culture swab taken the morning of surgery revealed MRSA. The lesion was completely excised in two stages and reconstructed with a bilateral rotation flap. Three weeks postoperatively, the wound was entirely healed with no evidence of infection.

Patient 3

A 75-year-old woman was referred for a SCC on the right nasal sidewall. Her history included chronic lymphocytic leukemia and chronic recalcitrant MRSA infections. She also had a recent history of recurrent furuncles and abscesses of the upper extremities and buttocks. The nasal SCC was excised in three stages and reconstructed with a V-to-Y advancement flap. The wound healed with excellent cosmesis without infection. She continued to develop cutaneous MRSA abscesses at other sites within weeks after her Mohs surgery site had healed.

Patient 4

An 89-year-old man with a history of previous cutaneous MRSA infections was referred for an invasive SCC of the left temple. The lesion was completely excised in two stages and reconstructed using a rhombic flap with a single Z-plasty. The wound healed with no evidence of MRSA infection. Three months later, the patient underwent MMS for an invasive SCC of the left dorsal hand. As the wound dimension was much larger, percutaneous sutures were needed to approximate the skin. The patient subsequently developed a florid culture-positive MRSA infection two weeks following the surgery.

Patient 5

A 70-year-old woman with a history of previous cutaneous MRSA infections was referred for a BCC of the left medial lower eyelid. The lesion was excised in

three stages and repaired with a cheek advancement flap. A nasal swab was taken at the conclusion of the Mohs procedure from the nasal vault, which grew MRSA. Her post-operative course was uneventful.

Sutureless closure with 2-OCA has been most extensively studied in the field of plastic surgery, where it has been shown that 2-OCA can decrease SSI rates as well as the number and length of post-operative evaluations [4]. To our knowledge, there are no randomized clinical trials (RCT) evaluating the use of 2-OCA to limit SSI specifically in high-risk, MRSA positive patients. A single study investigating this topic in the dermatology literature is a case report, which describes the successful treatment of one patient with a history of recurrent infection and prolonged wound healing. The authors did not mention a history of MRSA infection. This report introduced a strategy involving three distinct second intention wounds covered with 2-OCA. The patient experienced no complications and all wounds healed with good cosmetic outcome and without post-operative antibiotics [5].

Despite prevention strategies and decolonization methods, there are increasingly resistant strains of MRSA that will evade current and future aseptic measures. Our study demonstrates the prevention of SSI in five high-risk, MRSA positive patients with the use of 2-OCA and without prophylactic antibiotics. These results support the use of 2-OCA to decrease SSI in high risk groups and offers a method to potentially limit the propagation of antibiotic resistance in the community. This case series is inherently limited in its sample size and single site design. An RCT is needed to substantiate the effectiveness of 2-OCA in the prevention of SSI in this high-risk patient population.

Potential conflicts of interest

The authors declare no conflicts of interest.

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