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Second Intention Infections In Dermatologic Surgery

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Abstract

Background: There are few studies analyzing the surgical site infection (SSI) rate of second intention wounds following dermatologic surgery and the results are inconclusive.
Objective: To determine the rate of SSI and associated pathogenic organisms of second intention wounds compared to sutured wounds following skin cancer extirpation.
Methods & Materials: This was a retrospective cohort study of 5679 patients who had either Mohs micrographic surgery (MMS) or wide local excision (WLE) for skin cancer extirpation between 2012 and 2016.
Results: The overall infection rate was 3.9%. The infection rate for sutured and second intention wounds was 3.2 % and 6.8%, respectively. Second intention wounds were associated with a significantly higher risk of infection compared to sutured wounds (OR=2.31, 95% CI 1.74-3.04).
Conclusion: MMS or WLE performed on the LE or lesions allowed to heal by second intention have an increased risk of SSI.

Introduction

The infection rate in dermatologic surgery, including wide local excision (WLE) and Mohs micrographic surgery (MMS) ranges from 0.7-4.2%. (1-4) Despite the lack of objective data, there is a commonly held belief in dermatologic surgery that second intention wounds have a similar, or even lower, infection rate than primary closures, flaps, or grafts. The few studies that report wound infection rates following second intention closure in dermatologic surgery either contain small sample sizes (<150) or are limited to lesions on the head/neck or back of the hand.

To our knowledge, there are no studies directly comparing infection rates of second intention versus closure of surgical defects following MMS or WLE. Additionally, there are no studies analyzing the association between closure type, wound location, and the isolated bacterial pathogen. The purpose of this study is to determine the rate of SSI and associated pathogenic organisms for second intention wounds compared to sutured wounds (primary closures, flaps, and grafts) following skin cancer extirpation. This data may enable more directed empiric antibiotic use in suspected SSI and improve pre-and postoperative wound care.

Methods and Materials

We conducted a retrospective cohort study examining the rate of postsurgical infections following skin cancer removal by either MMS or WLE between January 1, 2012, and December 31, 2016, at a single academic center. All other closures, (primary closures, flaps, and grafts), were classified as sutured wounds. Wounds exhibiting signs or symptoms of infection (e.g. local swelling, erythema, warmth, tenderness, purulent discharge) were sampled with aerobic and anaerobic culture swabs. Lesions were stratified by anatomic location: face, hand, scalp (including forehead), ear (including the periauricular region), arm, trunk, and lower extremity (LE) (including groin).

Results

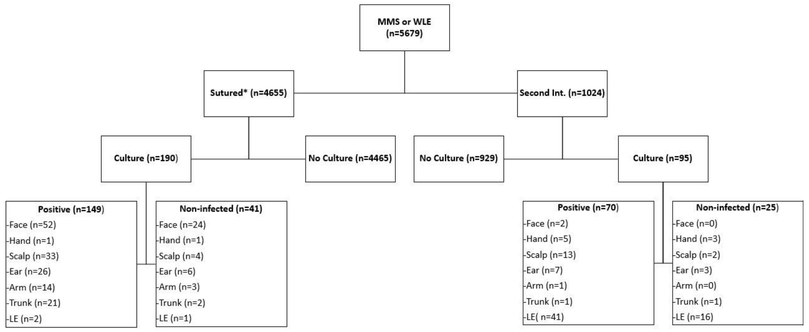

Figure 1. Study outline, repair type, and culture outcomes. * Includes primary closures, flaps, and grafts. *1 Includes delayed repairs and interpolated flaps

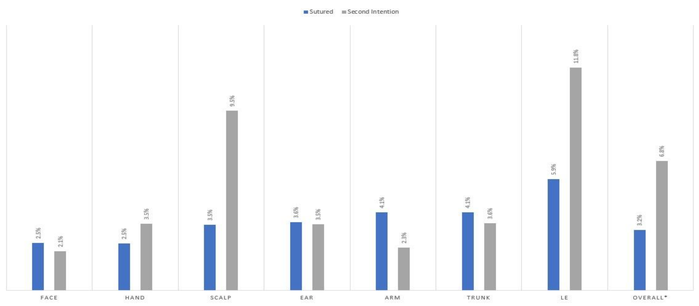

Figure 2. Infection rate vs. surgical site for sutured and second intention wounds. LE, lower extremity. *OR=2.31, 95% CI 1.74-3.04.

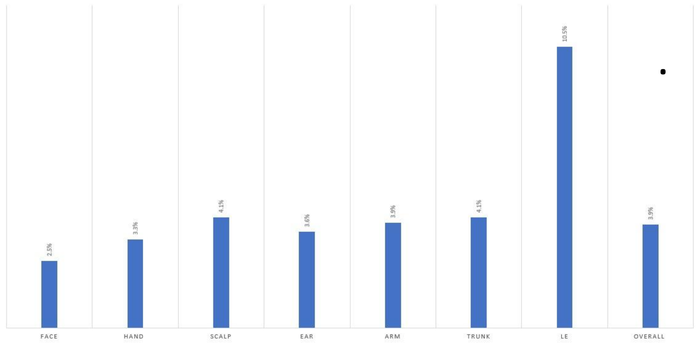

Figure 3. Infection rate vs. surgical site for combined closures. LE, lower extremity

Discussion

There is a lack of literature analyzing the characteristics of SSI (infection rate, location, associated organisms, etc.) between the various closure methods. This is especially true for second intention infections. The few studies analyzing infection rate in second intention healing are limited by sample size and repair location.

The goal of our study was to address this paucity of data on second intention infections by analyzing data from a large cohort of patients who underwent MMS and WLE for skin cancer removal in various anatomic locations. To our knowledge, this is the largest study analyzing second intention infection rates following dermatologic surgery. Based on our data, there was a significantly increased risk of developing SSI in wounds allowed to heal by second intention (6.8%) vs other closure methods (3.2%) (Figure 2). This data challenges the current dogma in dermatologic surgery that second intention infection rates are associated with lower infection rates. Our large sample size and distribution of repairs to a variety of anatomic locations provide a more comprehensive evaluation of second intention infections that previous studies failed to establish. None of the other studies analyzed second intention wounds on the LE, which had a significantly higher infection rate than other locations in our study (Figure 3). The increased risk of SSI in the LE may be explained by the high rate of S. Aureus colonization in the groin and poorer hygiene practices in the LE.(6) Future studies on the use of S. Aureus decolonizing strategies (chlorhexidine wash, bleach baths, and topical mupirocin) on the groin and LE prior to MMS or WLE may be useful.

Limitations include a retrospective, single-institution study design performed at an academic practice with many large, complicated defects. The specific patient population may have also been a contributing factor to the increased rate, however, this is unlikely considering the overall infection rate in our study (3.9%) is consistent with the current estimated rate of 0.7-4.2%.(1-4)

Conclusions

This retrospective review of 5679 dermatologic surgeries supports that MMS or WLE performed on the LE or allowed to heal by second intention have an increased risk of SSI. Clinicians should carefully monitor patients who have these risk factors. Future studies analyzing the efficacy of antibiotics and prophylactic washes, specifically in treating LE and second intention wounds, may be useful in reducing infection rate in dermatologic surgery.

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