

# Prospective evaluation of surgical site infection rate among patients with Mohs micrographic surgery without the use of prophylactic antibiotics

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**Background:** Antibiotics may be indiscriminately given to patients undergoing Mohs micrographic surgery (MMS) for the prevention of surgical site infections, despite a low risk of infection in these patients.

**Objective:** We sought to evaluate the rate of wound infections among patients undergoing MMS without the use of prophylactic antibiotics.

**Methods:** We prospectively evaluated 1000 consecutive patients undergoing MMS for nonmelanoma skin cancer or modified MMS/"slow Mohs" for lentigo maligna melanoma in situ.

**Results:** The overall wound infection rate among 1000 patients with 1115 tumors was 0.7% (8/1115 tumors). Five (62.5%) of 8 infections occurred on the nose with an overall 1.7% (5/302) nose infection rate. Seven (87.5%) of 8 infections occurred after flap reconstruction with an overall 2.4% (7/296) flap closure infection rate. Four (50%) of 8 infections occurred in patients requiring more than one Mohs stage for tumor clearance with a 0.8% (4/487) overall infection rate in cases requiring multiple Mohs stages. Two (25%) of 8 infections had cultures positive for oxacillin-resistant *Staphylococcus aureus*. No wound infections occurred in cases involving the lips or ears, skin-graft closures, or below-knee or modified MMS procedures.

**Limitations:** This was a prospective single institution uncontrolled study.

**Conclusion:** Rates of infections among patients undergoing MMS or modified MMS are exceedingly low. Indiscriminate use of antibiotics increases patient risk to adverse drug reactions and antibiotic resistance. Administration of antibiotics to patients undergoing MMS should be on a case-by-case basis according to the known risk factors combined with clinical judgment. (J Am Acad Dermatol 2008;59:275-8.)

The use of antibiotic prophylaxis in dermasurgery is a topic of debate and discussion. Indications for the use of antibiotic prophylaxis in dermasurgery, including Mohs micrographic surgery (MMS), include prevention of endocarditis, prosthesis infection, and surgical site infection (SSI). Considerations for SSI prophylaxis in patients

#### Abbreviations used:

BCC: basal cell carcinoma  
MMS: Mohs micrographic surgery  
SSI: surgical site infection

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undergoing MMS include patient and environmental risk factors (Table I) and select surgical scenarios (Table II).<sup>1-25</sup>

Despite the lack of evidence of increased rates of SSIs among this patient group, many surgeons continue to administer antibiotic prophylaxis on a routine basis to patients undergoing MMS without judicious consideration of each patient scenario on a case-by-case basis. Other surgeons opt to place patients undergoing MMS with certain types of closures or in certain locations on antibiotic prophylaxis routinely without solid evidence to support

**Table I.** Patient and environmental risk factors in the development of surgical site infections

Patient risk factors	Environmental risk factors
Skin condition/location	Length of operation
Bacterial colonization	Surgical technique
Malnutrition	Resection and reconstruction design
Obesity	Preoperative hair removal
Advancing age	Preoperative antiseptic showering
Diabetes mellitus	Preoperative hospitalization
Chronic renal insufficiency	
Peripheral vascular disease	
Immunosuppression	
Corticosteroid use	
Concurrent remote infection	
Perioperative transfusion of blood products	
Tobacco use	
Alcohol use	

such practices.<sup>1,2,4,5,25-28</sup> These practices may increase patient exposure to potential adverse events and increase antibiotic resistance.

Our aim was to prospectively collect data to evaluate the rate of SSIs among patients with MMS without the use of antibiotic prophylaxis to determine whether such pervasive use is warranted.

## METHODS

The protocol was reviewed by our research subjects review board. In all, 1000 consecutive patients undergoing MMS for nonmelanoma skin cancer or modified MMS ("slow Mohs") for lentigo maligna melanoma in situ were prospectively evaluated for the occurrence of SSIs postoperatively.

All procedures were performed on an outpatient basis under local anesthesia in the MMS unit in the department of dermatology/division of dermatologic surgery during a 46-week period from January to November 2005. Sterile technique was used for all first stages, closures, and their bandaging. Clean technique was used for all subsequent stages. Patients were evaluated at 1- and 4-week intervals postoperatively for signs and/or symptoms of infection. Criteria for a clinical diagnosis of infection were: greater than 1+ erythema with greater than 1+ edema, warmth, tenderness to palpation, or purulent discharge.

Wound cultures were obtained if a SSI was suggested. Definitive antibiotic therapy selection was based on microbial sensitivity according to culture results. Patients with a diagnosis of postoperative SSI were evaluated 2 weeks after initiation of antibiotic therapy.

**Table II.** Scenarios for potential administration of prophylaxis for surgical site infections

Flap or graft reconstruction
Nose or ear reconstructions
Mucosal surfaces
Below-knee procedures
Hand surgery
High-tension closures
Extended length of surgery
Multiple simultaneous procedures
Mohs micrographic surgery

Exclusion criteria included patients requiring antibiotic prophylaxis for prevention of endocarditis or prosthesis infection and patients undergoing surgical reconstruction by an outside surgeon (oculoplastics, otolaryngology).

## RESULTS

In all, 1000 consecutive patients underwent MMS (968) or modified MMS (32) for the treatment of 1115 tumors. In all, 102 patients had multiple tumors treated on the same day (89 patients with two tumors, 13 patients with 3 tumors). Of tumors, 29% required two stages to achieve tumor-free margins with 5% requiring 3 or more stages. A total of 1039 surgical defects were repaired with various techniques including primary complex, flap, skin graft, and second intention (Table III).

Of 1115 tumors, 8 SSIs occurred with a SSI rate of 0.7%. Five SSIs occurred on the nose, all of which were repaired with flap closures. One SSI occurred on the back of the hand with a high-tension, primary complex closure. One SSI occurred on the chin with an advancement flap closure. One SSI occurred on the scalp with a high-tension, rotational flap closure. Of note, 25% (2/8) of the SSIs demonstrated microbial cultures positive for oxacillin-resistant *Staphylococcus aureus*.

### Characteristics among patients with SSI

**Nose SSIs (62.5%).** Patient 1 was a 62-year-old man with a basal cell carcinoma (BCC) of the nasal tip requiring 1-stage MMS for tumor clearance and bilobe flap closure. At 1-week suture removal, the wound had 2+ erythema and 1+ edema. A wound culture revealed 2+ pan-sensitive coagulase-positive *S aureus*. The patient was treated with a 7-day course of cephalexin (250 mg 4 times/d). At 2-week follow-up, there were no signs or symptoms of SSI.

Patient 2 was an 86-year-old man with a BCC of the nose requiring 2-stage MMS for tumor clearance and glabellar rotational flap closure. At 1-week suture removal, the wound had 2+ erythema and

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