

CLINICAL UPDATE

Use of the Mohs Moat Technique for Large Cutaneous Non-Melanoma Skin Cancer

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Introduction

Mohs micrographic surgery is recommended for larger cutaneous non-melanoma skin cancers (greater than 2 cm in diameter). However, treatment of these larger lesions often requires longer tissue processing and histologic examination time, affecting patient waiting times and office workflow. We employ and review a method used to address these challenges via a modified Mohs micrographic surgery approach known as the Mohs moat or perimeter technique to treat a large cutaneous basal cell carcinoma.

A 52-year-old Caucasian male presented for treatment of a basal cell carcinoma of the right upper chest. A shave biopsy prior to presentation confirmed basal cell carcinoma. On exam, there was a 6 cm x 4.5 cm red pearly plaque with rolled borders (Figure 1).

Technique

The clinical margin of the tumor was outlined. Three millimeters within the outlined margin, a second line was drawn (Figure 2). Under local anesthesia, the band of tissue delineated by these markings was incised and removed with a #15 blade. The specimen was divided into 4 sections with careful attention to numbering, orientation, inking, and mapping. Tissue sections were prepared by horizontal frozen section and stained with hematoxylin and eosin. Histologic examination revealed residual tumor focally at three peripheral margins. An additional stage of tissue was removed from these involved margins. Upon histologic examination, each of these sections was negative for residual tumor; thus, the peripheral cutaneous margin was cleared. Centrally, the tumor bulk remained (Figure 3). At this point, the central tumor was debulked by surgical excision to subcutaneous fat, and the underlying subcutaneous fat was excised, processed, and evaluated for tumor involvement of the deep margin. The deep margin was clear in one stage. The modified Mohs surgery technique successfully treated the 6 cm x 4.5 cm cutaneous basal cell carcinoma with clearance of the peripheral and deep margin on histologic exam after three stages (Figure 4). The patient tolerated the procedure well.

Discussion

Mohs micrographic surgery is a specialized procedural and histopathologic method of removing high-risk skin cancers, offering the highest cure rates for cutaneous basal cell and squamous cell carcinoma. Advantages include the histologic

examination of all tissue margins, as well as the conservation of normal tissue. Mohs surgery is recommended for tumors greater than 2 cm in diameter as increased size is directly related to recurrence rate. Furthermore, the considerable defects caused by the removal of larger lesions in cosmetically or functionally sensitive areas underscore the value of tissue sparing with the Mohs technique.¹

However, the treatment of larger lesions with Mohs surgery requires longer processing and histologic examination time, causing significant procedure delays and increased patient waiting times. Prolonged operative time may also affect surgical site infection risk.² Simple modifications to the Mohs technique increase efficiency while maintaining accuracy and improving patient safety and overall care.

A single-section method has been described to improve handling of large Mohs cases. Large tissue sections decrease tissue orientation and labeling complexity and reduce time delays created by the processing of multiple tissue sections.³ The method is limited by size of available glass slides.⁴ Furthermore, large tissue pieces may hinder quality sectioning.⁵ Thus, the single-section technique may require additional training of histotechnicians as well as specialized equipment or supplies.³

Various Mohs surgery modifications centered on initial peripheral margin clearance have been used to treat large, aggressive, and deeply invasive skin cancers including lentigo maligna,⁶ giant BCC (tumor greater than 5 cm), and dermatofibrosarcoma protuberans. Referred to as the Mohs moat, perimeter, or spaghetti technique, the modification has allowed for peripheral margin clearance under local anesthesia prior to tumor extirpation and closure by head and neck or plastic surgery under general anesthesia. Benefits of this collaborative technique include evaluation of 100% of the peripheral cutaneous margin and decreased general anesthesia time.^{7,8}

Applying this modified Mohs method to the removal of larger, skin-limited basal cell or squamous cell carcinomas can improve efficiency in the outpatient Mohs setting. The excised tissue sections are focused on pertinent margins and are comparative in size to those of routine Mohs cases, aligning with customary processing and analysis by the Mohs surgeon and staff. Importantly, the Moat technique preserves the fundamentals of Mohs surgery, including the examination of

the entire peripheral and deep margins, precise mapping and re-excision of positive margins, and tumor-free tissue sparing. With the perimeter or Moat technique, no additional training or equipment is necessary as processing remains similar to that of routine tissue stages. However given the multiple tissue sections, special attention must be paid to tissue orientation, mapping, and labelling. Also with cutting of sections, malignant cells may be displaced causing false-positive margins.³

Despite the limitations, the careful implementation of the Mohs Moat technique may significantly improve efficiency, enhancing office work flow, and the overall patient experience, while preserving the benefits of standard Mohs surgery in the treatment of large cutaneous basal cell or squamous cell carcinomas.

Figures

Figure 1. Preoperative image of 6 cm x 4.5 cm basal cell carcinoma.



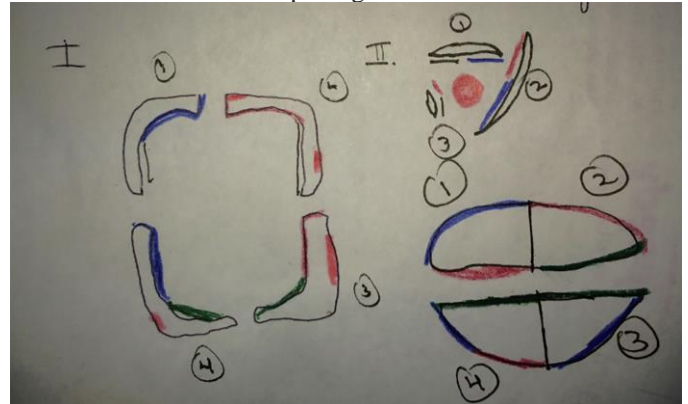
Figure 2. First stage: initial outline of the 3 mm band at the tumor perimeter to be excised, processed and evaluated.



Figure 3. The peripheral margin has been cleared, creating a moat which separates the central remaining tumor and uninvolved skin.



Figure 4. Mohs map. *Left, Stage I:* narrow band of skin resected. *Top right, Stage II:* Tissue resected at the 3 positive peripheral margins is clear. *Bottom right,* Excised subcutaneous tissue at deep margin is clear.



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Submitted July 23, 2015