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Initial Mohs Surgery Followed by Planned Surgical Resection of Massive Cutaneous Carcinomas of the Head and Neck

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Objective: To review our experience with Mohs excision of massive cutaneous carcinomas for peripheral margin control, followed by planned definitive resection of the deeply invasive component of the carcinoma.

Study Design: Retrospective review.

Methods: All cases of massive (at least 10 cm in dimension) cutaneous carcinomas treated by the technique outlined by Yadranko Ducic from 1998–2006.

Results: A total of 28 cases (7 squamous cell carcinomas, 14 basal cell carcinomas, 7 basosquamous carcinomas) were treated in this manner. Average maximal tumor dimension was 12.7 cm with a range of 10–21cm. None of the patients recurred at the peripheral margin at an average follow-up of 3.2 years. There were a total of 7 local recurrences (5 squamous cell carcinoma and 2 basal cell carcinoma). All recurrences occurred within the deep resection bed.

Conclusions: The technique appears to be an excellent means of treatment of massive, neglected, and deeply invasive cutaneous carcinomas of the face and neck. It allows for more precise margin control than can be afforded by surgical pathology, decreases length of anesthesia, and enables the surgeon to more accurately plan the required reconstruction to review with the patient preoperatively.

Key Words: Mohs surgery, skull base surgery, skin cancer.

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INTRODUCTION

First described by Dr. Frederic E. Mohs over a half century ago, Mohs surgery has become a mainstay of treatment for cutaneous carcinomas. It has excellent cure rates because of precise surgical margin control that minimizes the resulting defect created by resection. This is especially important in certain cosmetically and functionally important areas of the face: eyelids, ears, lips, and nose. It represents the modality with the highest rate of cure and the smallest possible defect for superficial cutaneous carcinomas.[1–6]

Traditionally, Mohs surgery has been felt to be most appropriate for relatively superficial, limited lesions, with classic surgical (nonMohs) resection being reserved for more deeply invasive and extensive lesions for which Mohs has not been readily applied. Some medical practitioners have felt aggressive Mohs excision in the office setting to be appropriate.[7]

We present our favorable experience with the use of initial Mohs surgery for peripheral margin control, followed by definitive surgical resection of the deeply invasive component within the "ring of Mohs" in the treatment of massive basal and squamous cell carcinomas of the face and neck.

MATERIALS AND METHODS

Institutional review board approval was obtained for this study. All patients with massive cutaneous carcinomas of the face, scalp, and neck of at least 10 cm in dimension whose charts were available for review and who were surgically treated by Yadranko Ducic from 1998–2006 were selected for this study. Only those patients treated with initial Mohs surgery for margin control followed by definitive resection of the deeply invasive central component were included in this review. Definitive resection is generally planned 1–3 days following creation of a ring of Mohs around the deeply invasive component (Figures 1–6).

RESULTS

A total of 28 cases (7 squamous cell carcinomas, 14 basal cell carcinomas, 7 basosquamous carcinomas) were treated in this manner. Average age was 66.5 years with a male:female ratio of 1:2.5. Average maximal tumor dimension was 12.7 cm with a range of 10–21cm. Definitive resection of the deeply invasive central component included maxillectomy (11), orbital exenteration (6), craniectomy (5), rhinectomy (6), skull base excision (14), and dural resection (4). None of the patients had a recurrence

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Fig. 1. Preoperative frontal view of patient with massive, neglected squamous cell carcinoma of the right face. Metastatic workup was negative. [Color figure can be viewed in the online issue, which is available at www.interscience.wiley.com.]

at the Mohs treated peripheral margin at an average follow-up of 3.2 years. Seventeen patients received postoperative radiation therapy; 6 received preoperative radiation, and the remainder refused adjunctive therapy. There were a total of 7 local recurrences (5 squamous cell carcinoma and 2 basal cell carcinoma). All recurrences occurred within the deep resection bed. Of these, 2 were surgically salvaged; 1 refused further treatment, and the remaining recurrences were considered nonsurgical candidates because of extensive brain involvement. We encountered no significant complications from the application of Mohs surgery in this setting.

Fig. 2. Intraoperative view of patient undergoing Mohs excision for a massive carcinoma, demonstrating initial margin of 5 mm prior to histopathologic examination. [Color figure can be viewed in the online issue, which is available at www.interscience.wiley.com.]

Fig. 3. The patient in Fig. 1 has undergone Mohs clearance of the peripheral margin. A so-called "ring of Mohs" is now seen around the central, deep seated carcinoma. [Color figure can be viewed in the online issue, which is available at www.interscience.wiley.com.]

DISCUSSION

Mohs surgery, when available, clearly represents the best option for patients with superficial cutaneous carcinomas of the face, scalp, and neck, particularly in aesthetically and functionally important facial areas such as the eyelids, nose, lips, and ears. It has, however, limited use in deeply invasive lesions that involve noncutaneous tissues such as globe and bone or skull base. These are not appropriate for this type of resection.[8] No major complications were encountered with this technique. This is in concurrence with previously reported data that demonstrates Mohs represents a very safe surgical modality in the office setting.[9,10]

Fig. 4. The surgical resection now consists of removing the entire central core of the tumor within the "ring of Mohs." This should be done en bloc if feasible as demonstrated here. [Color figure can be viewed in the online issue, which is available at www.interscience.wiley.com.]

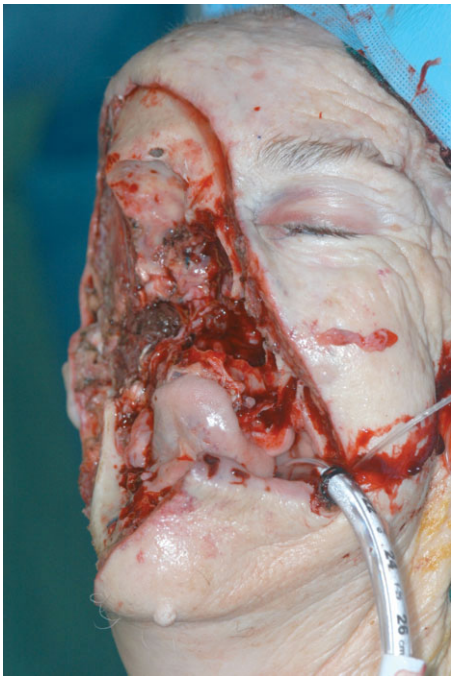

Fig. 5. Defect remaining following resection of the entire carcinoma. [Color figure can be viewed in the online issue, which is available at www.interscience.wiley.com.]

Traditionally, such deeply invasive lesions have been dealt with by surgical excision in the operating room. Peripheral margin control has been done by surgical pathology. Surgical frozen section analysis only samples a small percentage of the true margin as compared to Mohs excision, which continuously evaluates the entire margin with no area skipped.[11] These nonsampled regions on frozen section analysis are felt to be the major source of recurrence in this patient population. The larger the lesion being evaluated by frozen section analysis, the greater the total length of the peripheral margin that is not truly cleared and the greater the incidence of local recurrence.

In addition, there is a tremendous amount of operating room time spent clearing cutaneous margin. It is often impossible to proceed with a clean underlying deep tissue resection. It is not unusual in some of these cases to give the pathologist a 40–60 cm margin of tissue to evaluate while the patient is receiving general anesthesia.

For these reasons, we have found our technique to be invaluable in this difficult to treat patient population. These patients tend to be older and have poorer overall health (patients with long-standing, neglected cutaneous carcinomas generally have neglected other parts of their health management through physician avoidance). Shorter anesthesia times are found to be the norm in our cases, saving operating room time, surgeon time, and patient exposure to general anesthetic. In addition, it allows the reconstructive surgeon to tell the patient precisely which modality will be utilized for preoperative reconstruction (once the "ring of Mohs" has been completed), resulting in improved consent, and easier, more accurate surgical reconstruction planning and prosthetic planning, if appropriate.

There is essentially no limitation on the size of lesions that can be treated using this technique. The use of Klein-type tumescent anesthesia in conjunction with judicious standard local anesthesia allows the periphery of even the largest lesions to be safely and painlessly addressed in the Mohs surgical suite. It has the added benefit of outstanding hemostatic control.[12]

When working with large circumferential margins, care should be taken to ensure appropriate subdivision of tissue to allow proper processing and histopathologic interpretation. Meticulous attention must be paid to proper orientation, mapping, and color coding of specimens, given the large number of specimens often involved. In our practice, we utilize a modified histopathology map consisting of a photograph of the lesion printed on standard paper on which the specimens are placed directly after excision. The inking is also performed on this template, which then serves as a permanent and inalterable record of specimen number, code, and positioning.

Although traditional Mohs surgery relies on minimalist clinical resection margins, often 1–2 mm from the discernible lesion, an initial clinical margin of at least 0.5 cm is advisable when utilizing this technique in large, aggressive tumors. A double-bladed handle is invaluable in obtaining a rim of tissue of consistent thickness for proper processing and helps to ensure a constant margin. It should be noted that with aggressive malignancies, no attempt should be made to spare any structures, such as peripheral nerves or facial subunits, during the Mohs

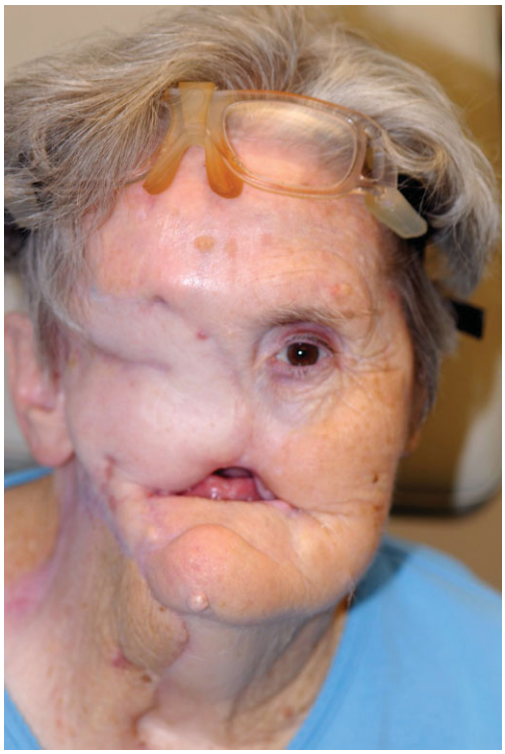

Fig. 6. Three and a half-year postoperative result following rectus free-tissue transfer reconstruction without prosthesis in position. Patient remains disease free. [Color figure can be viewed in the online issue, which is available at www.interscience.wiley.com.]

procedure. Appropriately aggressive Mohs excision should be used to control peripheral margins without regard to the position of underlying nerves, particularly the facial nerve. Under no circumstance should this principle be violated. Our lack of recurrence in any patient at the peripheral margin is in keeping with the accuracy of this technique. We have encountered no significant problems with this method of resection.

CONCLUSION

Peripheral margin control utilizing Mohs surgery followed by definitive resection of intervening deep tumor components, including the skull base, represents an excellent alternative to traditional surgical resection. It is associated with excellent cure rates, saves operating room time, and allows for more precise planning of the reconstruction. Based upon our favorable experience, we would highly recommend this technique.

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