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Mohs micrographic surgery: a treatment method for many non-melanocytic skin cancers

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Abstract

Mohs micrographic surgery (MMS) is a breakthrough surgical technique that has changed the management of neoplasms in dermatology. Through continued practice and evolution, MMS now can successfully treat a variety of rare non-melanocytic cutaneous malignancies for which achieving remission and the optimal aesthetic result after surgery was previously challenging. Mohs micrographic surgery has utility for conditions besides melanoma. Herein, we discuss this versatility of Mohs micrographic surgery. Specifically, Mohs micrographic surgery can be successfully used for cases such as dermatofibrosarcoma protuberans, atypical fibroxanthomas, extramammary Paget disease, Merkel cell carcinoma, sebaceous carcinoma, and microcystic adnexal carcinoma.

Keywords: non-melanocytic cutaneous malignancies, dermatofibrosarcoma protuberans, atypical fibroxanthomas, extramammary Paget disease, Merkel cell carcinoma, sebaceous carcinoma, and microcystic adnexal carcinoma

Introduction

Many neoplasms in dermatology are managed with the innovative surgical technique of Mohs micrographic surgery (MMS). This precise technique involves progressive removal of the target lesion in layers that are then processed as horizontal sections and examined under microscopy for tumor clearance by the Mohs surgeon before the defect is repaired. The introduction of fresh frozen tissue, in lieu of in vivo tissue fixation, further accelerated the practice of MMS as it became standard of care for

treating basal cell and squamous cell carcinomas with high-risk microscopic features or in cosmetically sensitive locations. Mohs micrographic surgery can treat a variety of rare non-melanocytic cutaneous malignancies (with a contiguous growth pattern) for which achieving remission and the optimal aesthetic result after surgery was previously difficult.

Discussion

Dermatofibrosarcoma protuberans is a spindle cell, locally aggressive tumor with a predilection for the trunk and proximal extremities. Owing to their contiguous but asymmetric growth pattern, dermatofibrosarcoma protuberans tumors can have a high rate of margin positivity and recurrence following standard excision [1]. Margins as high as 10cm were used to excise dermatofibrosarcoma protuberans, though standard margins were generally less than 5cm [1]. As it can gradually track microscopic tumor extension, the MMS technique became the treatment of choice for dermatofibrosarcoma protuberans. This technique is further optimized with CD34 immunohistochemical staining on frozen sections to help assess tumor margins. As a result, MMS for dermatofibrosarcoma protuberans, particularly with successful immunohistochemical staining, can minimize the chance of tumor recurrence as well as morbidity from re-excision.

Atypical fibroxanthomas are pleomorphic spindle cell neoplasms frequently found on the head and neck, with predominance in males [2]. They appear as a nonspecific pink or red papule or nodule on sun-damaged skin. Atypical fibroxanthomas are considered to be part of the spectrum of

pleomorphic dermal sarcomas. Surgery remains the mainstay of management and complete margin control is critical [3]. To date, several retrospective studies have found a lower local recurrence rate with MMS compared to standard excision, with the added benefit of tissue preservation. Thus, MMS is an excellent option for atypical fibroxanthomas, especially as they tend to arise in cosmetically sensitive regions.

Extramammary Paget disease is a rare and slow-growing epithelial tumor with a predilection for the genitalia or less commonly, axilla. Its diagnosis is often delayed because it mimics numerous benign entities, including eczema, psoriasis, seborrheic dermatitis, contact dermatitis, or cutaneous fungal infections. In addition, the margins of extramammary Paget disease can be multifocal and difficult to distinguish both microscopically and clinically, resulting in a high recurrence rate following excision [4]. Because standard surgical excision can result in significant morbidity and deformity of the genitourinary region, the MMS technique became increasingly utilized. Evidence suggests that MMS with an average of 2.5cm margins led to decreased recurrence rates of primary as well as recurrent extramammary Paget disease compared to standard excision with 5cm margins [4]. As it is tissue sparing, MMS furthermore allows preservation of important genitourinary anatomic structures such as the vulva, urethra, and scrotum.

Merkel cell carcinoma is another rare but fast-growing malignancy of neuroendocrine origin that often appears on the head and neck. Risk factors for Merkel cell carcinoma include sunlight exposure, immunosuppression, and exposure to polyomaviruses [5]. Although excision is standard of care for the management of Merkel cell carcinoma, a recent review of all stage I and II Merkel cell carcinoma cases in the National Cancer Database found that MMS was equally as effective as wide local excision. This data suggests MMS as a viable option for Merkel cell carcinoma in functionally sensitive areas without sacrificing survival rates [5].

Sebaceous carcinoma, a rare epithelial malignancy most commonly from the eyelid Meibomian glands, is an aggressive tumor. Like extramammary Paget

disease, early diagnosis can be difficult, as its periocular predilection can clinically mimic a benign chalazion or chronic blepharoconjunctivitis. Notably, 70% of sebaceous carcinomas occur on the head or neck, for which a tissue preserving surgical technique is functionally essential. In addition, MMS for sebaceous carcinoma had significantly lower rates of local recurrence (11%) and regional metastases (6-8%) when compared to excisional removal (37% and 28%, respectively), [6]. Thus, MMS is the first-line treatment for sebaceous carcinoma as a result of its improved tissue conservation and better outcomes.

Microcystic adnexal carcinoma is an epithelial tumor of follicular and glandular differentiation with potential for deep infiltration and perineural invasion. It often appears as a smooth-surfaced, non-ulcerated, flesh-colored-to-yellowish asymptomatic nodule, papule, plaque, or cystic lesion. Because microcystic adnexal carcinoma also favors the head and neck, with a predilection for central face, increasing interest has been placed on MMS for tumor removal. As the Mohs technique allows systematic margin control, the rate of tumor clearance is optimized. This has been demonstrated in a study where 30% of patients treated initially with wide local excision required at least one additional procedure, either re-excision or subsequent MMS, owing to pathologic confirmation of positive margins on the excision specimen. In contrast, none of the MMS surgery patients required further procedures [7]. These findings suggest that MMS can offer a higher likelihood of tumor clearance on a single visit for management of microcystic adnexal carcinomas.

Conclusion

Today, MMS has utility for non-melanocytic skin cancers beyond basal cell and squamous cell carcinomas. Its effective removal of more rare neoplasms, including those of fibrohistiocytic, neuroendocrine, and adnexal origins described above, makes dermatology surgeons an essential part of the team approach in the management of cutaneous malignancies that were previously referred out to surgery subspecialty teams.

Potential conflicts of interest

The authors declare no conflicts of interests.

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