Microcystic Adnexal Carcinoma

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Microcystic adnexal carcinoma (MAC) or sclerosing sweat duct carcinoma is a rare slowly growing but locally aggressive malignant skin tumour displaying sweat duct and pilar (follicular) differentiation. It typically occurs on the face of middle aged adults. MAC is frequently misdiagnosed because of its asymptomatic clinical presentation and bland histology on superficial small punch or shave biopsy. Because of its deeply infiltrating nature, the optimal biopsy for MAC is incisional or excisional biopsy. Lack of early diagnosis can lead to an aggressive neoplasm with high rate of recurrence, and rarely regional and distant metastasis. Micrographic Mohs surgery is the preferred treatment of choice for MAC. A case history of a recent patient with MAC treated at London Health Sciences Centre is reviewed.

*This article has been reviewed by Dr. Mariamma Joseph and Dr. Dao Nguyen.*

**Introduction**

First defined by Goldstein and colleagues in 1982, there have been only approximately 150 cases of MAC described in the English medical literature. MAC is a slow-growing albeit locally aggressive adnexal carcinoma with a high tendency to recur despite excision. Its aggressive nature is often due to delay in diagnosis, inadequate tissue sampling and thus, detection at an advanced stage of disease with invasion beyond skin into underlying tissue. Thus, a high index of suspicion is necessary in assessing these tumours and adequate deep biopsy for diagnosis are essential. Surgical excision with clear margins are crucial in prevention of local recurrence and distant metastasis. We review the clinicopathologic features of MAC and present a recent aggressive case of MAC involving the scalp of a 58 year old woman.

**Clinical Presentation**

MAC typically presents as a slowly-growing flesh-coloured, yellow or erythematous firm plaque or nodule in the head and neck region. Caucasians are affected most frequently and there does not appear to be a gender predisposition. The tumour presents in a wide age group (11-90 years) although the majority of those affected are between the ages of 40 and 60 years. The patient often presents with a lesion which has been present for several years and has grown slowly.

At diagnosis, most tumours measure between 0.5 cm and 2.0 cm in diameter but occasionally can be very large measuring up to 12 cm. The skin surface of MAC is usually smooth and non-ulcerated, unlike other cutaneous carcinomas. It is almost always unilateral and predominantly left-sided in North Americans, a fact that has been suggestively attributed to greater sun exposure of the left side of North American drivers. MAC has mostly been found on the cheek, lips, nasolabial fold and in the peri-orbital area and is less common in the nose, scalp, eyelid and eyebrow. Typical clinical presentation of MAC can be seen in Figure 1.
Generally, the tumour is asymptomatic, until invasion into underlying tissue develops, causing symptoms which may include pain, stinging, change in sensation or functional motor loss due to perineural invasion. Metastasis of MAC is rare, with only four described cases in the literature. One recent case described MAC in the axilla metastasizing to the axillary lymph nodes. Haematogenous metastasis of MAC to liver and bone with intracranial spread along optic nerve into the cranium has also been discovered on autopsy of a 73 year old woman. 

**Diagnosis**

The diagnosis of MAC is made by full-thickness tissue biopsy. CT or MRI may be necessary for tumour staging and treatment planning. Histologically, MAC is a poorly circumscribed deeply invasive tumour composed of variable portions of keratocysts, basaloid or squamoid nests and infiltrating cords and ductular structures set in a paucicellular desmoplastic stroma. Keratocysts are usually present in the superficial portion and cords of cells and perineural invasion characterize the deepest portion, thus inadequate depth of tissue biopsy may result in failure to diagnose this malignancy. The nuclei of all these cells are rather uniform with only minimal pleomorphism or atypia. Mitotic figures are very rare. MAC is mostly located in the dermis but can infiltrate to subcutaneous fat, skeletal muscle, perichondrium, periosteum or perineurium. The histology of a typical case of MAC is presented in Figures 2A-D.
Deep incisional or excisional biopsy would demonstrate deep infiltration of MAC and possible perineural invasion allowing accurate diagnosis. A small superficial punch or shave biopsy that includes only keratocysts and bland basaloid cells may lead to an erroneous benign diagnosis of syringoma or trichoepithelioma. The area of the biopsy could also lead to an incorrect diagnosis of squamous cell carcinoma if the sample contains high levels of keratinised cells with few tubules.

Immunohistochemistry of MAC supports ductal differentiation, with positivity for Epithelial Membrane Antigen (EMA) and Carcino Embryonic Antigen (CEA), features common to many adnexal tumours with ductular differentiation.

Histogenesis
The histogenesis of MAC remains uncertain, but Goldstein considered origin from pleuripotential adnexal epithelial cells capable of pilar (hair) and eccrine (sweat) gland differentiation. Mostly scientists have postulated that MAC solely shows eccrine differentiation. Sub-clinical spread of the tumour beyond clinical margins may be explained by invasion through shelving or conduit spread.

Management and Outcome
The tumour does not generally respond to radiation treatment, and in those cases where response is evident, there is a high rate of recurrence. Therefore, surgical excision is currently the best method of treatment. Because of the tumour’s infiltrative nature, planned surgical excision margins are designed widely, beyond the clinically evident margins of the tumour. Surgical treatment options for MAC include wide local excision and micrographic Mohs surgery (MMS). MMS is currently the most widely accepted surgical treatment. Although there are only few studies in the literature comparing the recurrence rates in lesions treated with wide excision versus MMS, it appears that MMS provides the least morbidity and the best chance for cure. The reported rates of recurrence with wide local excision are 40-60%. The technique of MMS allows complete histologic examination of 100% of all margins while sparing maximal amount of tissue in comparison to standard “bread-loafing” techniques which permit examination of only 1-2% of specimen margins. The recurrence rate following MMS ranges from 0% to 12%. The prognosis is good if local recurrence can be prevented. Only 1 case of death due to MAC metastasis has been reported.
Case Report

A 58-year-old woman presented with a large pruritic hairless growth on the left side of her scalp which had been present for over a decade and had previously been punch biopsied twice with diagnosis of benign alopecia. She gave a recent history of paralysis of left side of face with drooping of left upper eyelid and eyebrow and ulceration of the lesion. On examination, she had a large firm, indurated skin tumour (9.5 x 5.5 cm) with irregular borders surrounded by alopecia involving the left parietal region of the scalp (Figure 3). A large elliptical skin biopsy confirmed the diagnosis of MAC. A CT scan of the head revealed invasion of the tumour through the skull into the underlying dura and leptomeninges.

The tumour was widely excised by a plastic surgeon using a modified Mohs procedure with negative circumferential peripheral skin margins, confirmed by frozen section examination intraoperatively. Classic MMS technique was not feasible in this case due to the substantial size, location and infiltrative nature of the tumour. The resected specimen included full-thickness scalp and portions of the skull and dura. Pathologic examination showed classic features of MAC (Figure 2A-D). The skin and bone margins were found to be clear on permanent section, and the patient subsequently underwent reconstruction of her cranial defect. Adjuvant radiotherapy was instituted, however, aggressive local tumour recurrence developed with brain metastasis. The patient expired 18 months following diagnosis.

Conclusion

Although rare, a high index of suspicion for MAC should maintained in the differential diagnosis of slow-growing tumours in the head and neck region, particularly on the face. Prompt diagnosis and treatment are crucial to prevent local recurrence and distant metastasis. Our case demonstrates a very rare, aggressive form of MAC of scalp with invasion into bone and meninges, leading to brain metastasis and death despite attempted wide surgical resection and radiotherapy.

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References