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Recurrence of Basosquamous Carcinoma after Mohs Micrographic Surgery

A.M. Skaria

Micrographic Surgery, University of Geneva, Vevey, Switzerland

Key Words
Basosquamous carcinoma · Mohs micrographic surgery · Basal cell carcinoma · Squamous cell carcinoma

Abstract
Background: The recurrence rate of basal cell carcinoma (BCC) after Mohs micrographic surgery (MMS) is well documented. Only little is published concerning the recurrence rate in relation to the different histologic subgroups. ***Objective:*** To analyze the recurrence rate of the different histologic groups and subgroups after MMS. ***Subjects and Methods:*** We investigated 1,000 cases of epidermal tumors in a private center of MMS including BCC, squamous cell carcinoma and basosquamous carcinoma (BSC) treated by MMS from 1998 to 2007 in a retrospective study. The cases where analyzed regarding the histologic groups and subgroups. The mean follow-up time was 59.55 months. ***Results:*** The recurrence rate of epidermal tumors in this study was about 2.5% and comparable to that in the literature. Interestingly we observed a relatively high incidence and recurrence rate of BSC compared to other studies. ***Conclusion:*** BSC seems to be highly aggressive and subject to recurrence even after MMS. The classical approach to stop further excision once the excision is total should be reevaluated.

Introduction

The recurrence rate of epidermal tumors after classic and Mohs micrographic surgery (MMS) is still a matter of debate. Although MMS has proven its reliability and low recurrence rate compared to classic surgery, little information exists on the recurrence rate of the different histologic groups and subgroups, especially basosquamous carcinoma (BSC) [1–4]. The diagnosis of BSC was made according to the WHO definition of 2005 [5] and discussed by Garcia et al. [6] of a BCC with infiltrative growth with areas of keratinization and/or intercellular bridge formation in the setting of a prototypic proliferative stromal reaction. Before 2005, different terms had been used (BSC, mixed carcinoma, metatypical carcinoma, basal cell carcinoma, BCC, with squamoid differentiation and keratotic BCC) [6]. Since 2005 these different terms are considered as synonyms of BSC after the last edition of the WHO classification of tumors, ICD-O code 8094/3 [5]. All cases where operated by micrographic surgery and analyzed for histologic group [BCC, squamous cell carcinoma (SCC) and BSC] and histologic subgroup (BCC with aggressive growth pattern and nonaggressive growth pattern) according to the criteria of the French working group Agence Nationale d'Accréditation et d'Evaluation en Santé [7]. We have chosen to

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Dr. A.M. Skaria
Micrographic Surgery
Rue de Lausanne 15
CH–1800 Vevey (Switzerland)
Tel./Fax +41 21 925 4801, E-Mail skaria@vtxnet.ch

Table 1. Recurrence rates of the different histologic groups and subgroups

Histology	Total	Recurrence	Recurrence, % (to specific histology group)
BCC			
Nonaggressive growth pattern	206	1	0.5
Aggressive growth pattern	650	14	2.1
BSC	56	5	8.9
SCC	88	5	5.6

Table 2. Different histologic groups and subgroups and relation to recurrence

Histology	Total	Recurrences
BCC		
Nonaggressive growth pattern	206 (20.6)	1 (4)
Aggressive growth pattern	650 (65)	14 (56)
BSC	56 (5.6)	5 (20)
SCC	88 (8.8)	5 (20)

Figures in parentheses indicate the percentage of total number = 1,000 or that of recurrent tumor = 25, respectively.

compare the incidence and recurrence of BSC after Mohs surgery in relation to the other groups which have already been extensively studied in the literature and therefore serve as reference for standard treatment. The incidence of BSC is mentioned in the literature – before 2005, the year when the WHO classification of tumors was changed – as being between 1.2 and 2.7% [8–10]. The clinical behavior and prognosis of BSC are worse and present a greater incidence of recurrence and metastasis compared with BCC. Some authors equate its behavior to that of SCC [6, 9, 11–13]. We analyzed the incidence and behavior of different histologic groups and subgroups of 1,000 consecutive cases of epidermal tumors operated by MMS.

Subjects and Methods

We retrospectively reviewed 1,000 cases of epidermal tumors operated in a private center for MMS from October 1998 until September 2007. We created 3 main groups (BCC, BSC and SCC) and 2 subgroups (BCC with aggressive growth pattern and nonaggressive growth pattern). All patients had had a biopsy before surgery. Diagnosis was made primarily based on the initial biopsy; when the examination of the tissue of Mohs surgery differed in diagnosis, we referred to the latter and revised the histologic diagnosis. In mixed-pattern BCC, we always classified the tumor in the most aggressive subgroup (nonaggressive vs. aggressive subgroup). We analyzed all cases concerning sex, age and follow-up. The recurrent cases were compared concerning histologic diagnosis, sex and age. In addition we analyzed whether the tumor was pretreated, either by immunomodulation, cryotherapy, surgery and/or radiotherapy, and whether there was any other risk factor for recurrence as immunodepression, perineural infiltration or multifocality. Each recurrence was compared to all patients and to its own histologic group or subgroup.

Results

1,000 cases of epidermal tumors operated by MMS where included in the study. The mean follow-up was 59.55 months with a range from 24 to 129 months, which means a minimal follow-up time of 2 years. In total, 25 cases recurred after MMS. Of the 1,000 cases, the initial diagnosis was 206 (20.6%) BCC of low aggressive type, 650 (65%) BCC of high aggressive type, 56 (5.6%) BSC and 88 (8.8%) SCC (table 1). We analyzed pretreatment (which includes cryotherapy, immunomodulators, radiotherapy and surgery) overall and specific to each group and subgroup: 25% of the nonaggressive-type BCC, 34% of the aggressive-type BCC, 26% of BSC and 39% of SCC were pretreated. Looking at the recurrence in relation to the histologic type and subtype, we noted that out of the 25 recurrences 1 (4% with reference to the 25 cases) was a nonaggressive BCC, 14 aggressive BCC (56%), 5 BSC (20%) and 5 SCC (20%) as shown in table 2. We analyzed the recurrence specific to histology and the percentage of recurrence in each group or subgroup compared to the whole number of cases of this group. In the group of the BCC, only 1 case was of the nonaggressive type which corresponds to 0.5% compared to the whole number of cases (206). In the group of the aggressive-type BCC, 14 out of 650 cases recurred which is 2.1%. BSC recurred in 5 out of 56 cases which is 8.9%, and in the SCC group 5 out of 88 cases recurred which means 5.6% (table 2). Finally we looked at the relation to pretreatment and other potential risk factors for the different histologic types and subtypes. Of the nonaggressive BCC, the only case which recurred was pretreated which led to multifocality and corresponds to 100%. In the group of the aggressive BCC, 10 out of 14 cases were pretreated which is 72%. BSC were

Table 3. Relation between histology and additional risk factors

Histology	Number	Multifocality	Perineural infiltration	Pretreatment	Without additional risk factors
BCC					
Nonaggressive growth pattern	1	1		1	0 (0%)
Aggressive growth pattern	14		2	10	3 (21%)
BSC	5	1	1	3	2 (40%)
SCC	5		1	4	1 (20%)

only pretreated in 60% (3 out of 5), and SCC was pretreated in 4 out of 5 cases (80%) as shown in table 3. So finally we compared recurrences with reference to any additional risk factor: immunosuppression, perineural invasion, multifocality and/or pretreatment.

The recurrent BCC of the nonaggressive type showed 1 additional risk factor (multifocality) which means 0% without additional risk factor. The BCC of the aggressive type showed no additional risk factors only in 3 patients out of 14 (21%). In the group of BSC 2 out of 5 cases had no additional risk factors (40%), and in SCC only 1 out of 5 patients had no additional risk factors (20%). This means that the group of BSC had the largest proportion of recurrence with no additional risk factors compared to any other group.

Discussion

This is the first European survey on different epidermal tumors treated by MMS. Most studies mention the treatment of BCC by MMS or the slow Mohs technique alone. Although it is well known in the literature that SCC has a higher recurrence rate than BCC [14], the overall recurrence rate of all tumors of 2.5% is comparable to other studies from the USA and Europe [1–4]. As we implemented different types of epidermal tumors, we could compare the recurrence rate of the different groups and subgroups and analyze possible cofactors leading to recurrence. BSC is mentioned in the literature as a not very frequent tumor in relation to other subtypes of BCC [8–10]. Although the literature mentions an incidence between 1.2 and 2.7% in different studies, the number in our patients was much higher with 8.8%. This might be due to the fact that, being a Mohs clinic, we have a preselection for recurrent and more aggressive tumors. This point might have been amplified by the fact that Mohs surgery, at this time, was restricted to 3 centers in Switzerland and therefore the selection of cases was even more biased. Whatever the reason might be, the relation of the incidence of each tumor group and subgroup compared to different parameters such as pretreatment, multifocality, immunosuppression and perineural infiltration allowed us to compare its behavior compared to the other groups and subgroups and to define the potential recurrence risk compared to the others. The recurrence rate of BSC after Mohs surgery was 8.9% which is lower than that mentioned in the literature for BSC after classic surgery which is 12–45.7% [8, 15, 16]. Pretreatment might be the major risk factor for recurrence. As mentioned 26% of all BSC had been treated before, compared to 25% in the nonaggressive BCC group, 34% in that with aggressive BCC and 39% in the SCC group. To our surprise we observed that there were fewer pretreatments for BSC which recurred compared to the other groups (table 2). Even though BSC had the lowest number of additional potential risk factors (multifocality, perineural invasion), it showed the highest rate of recurrence (8.9%) compared to the other histologic subtypes (table 3).

Compared to other studies on BSC and Mohs surgery, our recurrence rate is unfortunately higher than data given in 2 other studies [7, 10]. Leibovitch et al. [15] mention a recurrence rate of 4% in a study with a follow-up of 5 years (4 cases of 91); 2 (2%) patients had lymph node metastasis; 7.9% of all BSC presented perineural infiltration; 47.8% were pretreated, and 1 of the recurrent tumors had perineural invasion (25%). Bowman et al. [10] found 2.7% of BSC in 1,000 cases of Mohs surgery and 7.9% with metastases. In our study we found a higher incidence and a higher recurrence rate compared to the 2 other studies. To see this difference between the 2 studies mentioned above, one could suggest first that the operating technique and/or histologic analysis might be the reason. For the operating technique it is barely possible as the recurrence rates overall (2.5%) as well as for the other groups and subgroups are absolutely comparable to the data

mentioned in the literature. Concerning histologic analysis we have mentioned that we used the definition of the WHO of 2005, which is more largely defined than the criteria applied by the 2 studies published before that date. The authors confined themselves to examining BCC with differentiation into SCC; in contrast, we applied the broader definition of the WHO. Therefore more cases have been included as BSC in our study which would have counted as BCC or SCC before 2005 as mentioned by Garcia et al. [6] in their review of 2009. None of our patients had metastasis in contrast to the 2 other studies.

In conclusion, BSC seems to present a higher recurrence rate than BCC with aggressive growth pattern or SCC even when treated by MMS. The broader definition of the WHO from 2005 seems to include a tumor type with different clinical behavior than BCC. BSC seems in our survey to present higher recurrence rates even though they were less pretreated and presented fewer potential risk factors (multifocality, perineural invasion) than the other histologic types and subtypes. The reason for this is difficult to explain. Some authors argued that rupture of the basement membrane might be the reason for the higher risk of recurrence and metastasis [6, 9]. Our results confirm that, even with the broader definition, BSC remains a more aggressive tumor compared to BCC and SCC, and therefore this classification is justified. Even though the recurrence rate after MMS remains relatively high, treating this tumor by MMS is probably an advantage. One should evaluate whether an additional minimal margin of 2–3 mm should be taken once the excision is complete. At least this is the attitude which we have adapted since this study. Knowing that MMS is about 25% more expensive than classic surgery, the pros and cons of this technique concerning BSC have to be evaluated in further studies. The number of cases of BSC being small, these preliminary results should be confirmed by a larger survey.

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