Efficacy of Curettage Before Excision in Clearing Surgical Margins of Nonmelanoma Skin Cancer

Katarina Chiller, MD, MPH; Douglas Passaro, MD, MPH; Timothy McCalmont, MD; Kirsten Vin-Christian, MD

Objective: To determine whether curettage before excision of basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) improves margin clearance rates.

Design: A retrospective, nonrandomized, case-control series of nonmelanoma skin cancers treated with preexcisional curettage followed by simple excision was identified using a computerized search of the database of a dermatopathology service. A validation cohort was established by manually identifying nonmelanoma skin cancers treated with wide excision on a given day.

Setting: All analyzed specimens were derived from the Dermatopathology Service at the University of California, San Francisco, a university-based laboratory that provides interpretation of skin biopsy specimens received directly from community (90%) and academic (10%) practices.

Patients: Our retrospective cohort consisted of all nonrecurrent nonmelanoma skin cancers diagnosed by biopsy and treated by simple excision between April 1, 1997, and April 30, 1999. There were 1983 BCCs and 849 SCCs included in our study. The validation cohort included skin cancers diagnosed by biopsy treated with simple excision on the 16th day of each month during the same period.

Intervention: Preexcisional curettage.

Main Outcome Measure: We compared the frequency of tumor margin involvement of curetted vs noncuretted lesions. Margin involvement was considered surgical failure.

Results: Forty-two percent of BCCs and 34% of SCCs were curetted before excision. In BCC, risks for surgical failure included head and neck lesions ($P < .001$), lesions treated by physicians performing fewer than 51 procedures ($P < .001$), and invasive subtypes ($P < .01$). Factors associated with surgical failure in SCC included in situ disease ($P = .01$) and an older (77 vs 74 years) patient population ($P = .05$). In univariate analysis, curettage before excision decreased the surgical failure rate for BCC by 24% ($P = .03$) but did not decrease the rate for SCC ($P = .8$). In multivariate analysis, curettage of BCC reduced surgical failure rates by 26% when the physician performed 50 skin cancer excisions or less during the study (odds ratio, 0.74; 95% confidence interval, 0.57-0.95; $P = .02$).

Conclusion: Preoperative curettage decreases the frequency of positive margins in the management of BCC but not of SCC.

Arch Dermatol. 2000;136:1327-1332
MATERIALS AND METHODS

COHORT SELECTION

Our cohort, identified through a standardized computer-based search, consisted of excisional specimens of BCC and SCC accessioned by the Dermatopathology Service at the University of California, San Francisco, between April 1, 1997, and April 30, 1999. The macroscopic and microscopic descriptions of all specimens were reviewed. Information regarding patient age, sex, treatment date, treating physician, lesion location, lesion subtype, previous biopsy, biopsy subtype, and previous excision was obtained through the database. Information regarding width of safety margins used by the treating physician was not available. Lesions were excluded if there was a history of previous treatment of the same lesion, if the specimen measured less than 1 cm at its longest diameter and there was no evidence of a previous biopsy, or if the treating physician was not a dermatology resident or a board-certified dermatologist. Our computer search method did not capture specimens that were “de novo” excisions, without histologic or historical evidence of a previous biopsy documenting the presence of carcinoma.

VALIDATION COHORT

To demonstrate the validity of our sampling method, we performed a manual retrieval of every excisional specimen accessioned on the 16th day of each month during the study. These specimens constituted our validation cohort and were compared with our study population. Specimens identified by both our manual search and the computer search were included in the validation cohort only.

LESION SUBTYPE

Excisional specimens of BCC were classified as superficial, nodular, micronodular, infiltrative, and morpheaform, listed in order of increasing invasiveness, as described in the literature. If the pattern could not be assessed because the biopsy specimen was too superficial, and the excisional specimen did not reveal residual tumor, the lesion was classified as “not otherwise specified.” If a mixed subtype (such as superficial-nodular) was reported, or if a previous biopsy of the same lesion revealed a different subtype, the lesion was classified according to the most invasive subtype. For statistical purposes, and based on their biological behavior, a subgroup of noninvasive BCC was compiled by including all superficial and nodular BCCs. Conversely, the invasive BCC subgroup included micronodular, infiltrative, and morpheaform BCCs.

Specimens of SCC were classified as in situ if the proliferation was intraepidermal. Any evidence of infiltration into the dermis led to the lesion being classified as invasive. If the depth of the carcinoma could not be assessed because the biopsy specimen was too superficial, and the excisional specimen did not reveal residual tumor, the lesion was classified as not otherwise specified. Keratoacanthomas were excluded.

CHANGE IN SUBTYPE

The relative invasiveness score of 1 was attributed to superficial BCC, and a 5 designated morpheaform BCC. When the biopsy and excisional specimens revealed differing BCC subtypes, the change was recorded as an upgrade if the subtype of the biopsy specimen was less invasive than that of the excisional specimen. A downgrade signified the converse. The degree of upgrade or downgrade was established by subtracting the relative invasiveness score of the biopsy specimen from that of the excisional specimen. Information regarding the specific method used for biopsy was not available.

TREATMENT GROUPS

Excisional specimens of BCC and SCC were classified into 2 treatment groups: curetted vs noncuretted. Lesions were classified as curedt only if there was evidence of acute ulceration without granulation at the tumor site on microscopic evaluation of the excisional specimen. Evidence of granulation tissue or scar was not considered to be consistent with curettage before excision.

Surgical failure was defined as the presence of carcinoma at or within 1 mm of the peripheral or deep surgical margin of the specimen.

STATISTICAL ANALYSIS

Dichotomous variables were compared using the Mantel-Haenszel χ² test. Continuous and integer variables were compared using the Kruskal-Wallis 2-sample test. Multivariate analyses were performed using simple logistic regression (Stata 6.0; Stata Corp, College Station, Tex). All P values were 2-tailed; P≤.05 was considered statistically significant.

RESULTS

GENERAL

Our search strategy yielded 2832 lesions from 2167 patients treated by 135 dermatologists.

Of 1983 BCC lesions, 821 (41%) were in women. Mean age at treatment for these tumors was 68.5 years. The head and neck region contained 1092 lesions (35%). Nearly one third of the lesions (32%) were invasive (Table 1). Treating dermatologists performed a mean of 137 BCC excisions (range, 1-333); 69% of BCC excisions (1369 lesions) were performed by physicians who had done more than 50 procedures (MD>50 group) during the 25-month study.

There were 849 SCC lesions; 385 (45%) were in women. Mean age at treatment was 74.9 years. The head and neck region contained 442 lesions (52%). Nearly one third of the lesions (33%) were invasive (Table 2). Treating dermatologists performed a mean
of 146 SCC excisions (range, 1-353); 72% of all SCC excisions were performed by the MD > 50 group.

TREATMENT SUBGROUPS

Basal cell carcinomas were more often curetted than were SCCs (841 [42%] of 1983 vs 290 [34%] of 849; P < .001). Not-otherwise-specified BCC lesions were curetted more frequently than all other subtypes (54%; P = .001), as were head and neck BCC lesions compared with all other locations (45%; P = .05) (Table 1). The most invasive subtypes of BCC were less frequently curetted (37% in infiltrative BCC; P = .02) (Table 1). The MD > 50 group curetted more frequently than the MD < 51 group (48% vs 30%; P < .001). Median age and the sex distribution were similar in the 2 treatment groups.

For SCC, the curetted treatment group consisted of 290 lesions (34%). In situ SCCs were curetted more frequently than other subtypes (37%; P = .05), as were head and neck SCCs (38%; P = .02) (Table 2). The MD > 50 group curetted more frequently than the MD < 51 group (40% vs 18%; P < .001). Median age was significantly greater in the SCC curetted group (77 years; P = .02) (Table 2). The sex distribution was similar in the 2 treatment groups.

TREATMENT FAILURE

The overall surgical failure for BCC specimens was associated with invasive histologic features (22% in micronodular BCC; P < .001; 18% in infiltrative BCC; P = .02; 50% in morpheaform BCC; P < .001; and 20% in all invasive BCC lesions; P = .01). Failure rates were also associated with the MD < 51 group (21%; P < .001) and location on the head and neck (20%; P < .001) (Table 1). As expected by the intrinsic definition of this subgroup, not-otherwise-specified BCC lesions had significantly less tumor margin involvement (5%; P < .001) (Table 1). With respect to the 659 lesions that had sufficient carcinoma on both biopsy and excisional specimens to establish histologic correlation, failure rates were increased compared with the entire BCC population (Table 3). This finding results from tumors being present on the excisional specimen, an inherent characteristic of this subgroup.

Surgical failure in SCC specimens was associated with in situ SCC lesions (14%; P = .01) (Table 2) and with an older patient population (77 years for margin involvement vs 74 years for tumor-free margins; P = .05). The surgical failure rate in the in situ SCC lesions was itself associated with an older population (77.5 years for margin involvement vs 74.5 years for tumor-free margins; P = .02). As expected, surgical margin involvement was less frequently observed in not-otherwise-specified SCC (4%; P < .01) (Table 2).

EFFECTS OF CURETTAGE BEFORE EXCISION

In univariate analysis, curettage before excision of BCC decreased surgical failure from 17% to 13% (risk reduc-
Curettage did not affect overall tumor margin involvement, 24%; 95% confidence interval, 2%-41%; \( P = .03 \) (Table 3). Curettage was most helpful in decreasing surgical failure in lesions of patients younger than 51 years (by 40%), lesions treated by the MD<51 group (by 35%), lesions with noninvasive subtypes (by 24%), and lesions on the head and neck (by 27%) (Table 3). The improvement in surgical failure rates offered by curettage in head and neck lesions was most pronounced when these lesions were noninvasive (32% improvement) (Table 3). The improvement in surgical failure rates offered by curettage was most helpful in decreasing surgical failure in lesions of patients younger than 51 years (by 35%), and being more often located on the head and neck (by 27%) (Table 3). The improvement in surgical failure rates offered by curettage in head and neck lesions was most pronounced when these lesions were noninvasive (32% improvement) (Table 3). Using multivariate analysis accounting for lesion severity, lesion location, patient age, and sex, curettage resulted in a 26% decrease in surgical failure rates (95% confidence interval, 5%-41%; \( P = .02 \)).

Curettage did not affect overall tumor margin involvement in SCC (11% for noncuretted vs 12% for curetted; \( P = .6 \)) (Table 3). This held true regardless of lesion invasiveness and location, patient sex and age, and number of procedures performed by the treating physician.

### EFFECTS OF CHANGE IN MICROSCOPIC PATTERN

Of 659 lesions for which both biopsy and excisional subtypes were identified, 276 (42%) had a change in subtype and 383 were unchanged. Of those that changed, 109 had an upgrade, with a mean relative invasiveness score change of 1.6, whereas 167 had a downgrade, with a mean relative invasiveness score change of \(-1.5\). There was no difference in tumor margin involvement between lesions that upgraded and lesions that downgraded or between lesions that exhibited or did not exhibit a change in microscopic pattern. This finding was unaltered by curettage (Table 3).

Curettage was associated with increased surgical failure rates (17% vs 26%; \( P = .04 \)) in the 383 unchanged lesions (Table 3). However, this association is the result of curetted lesions within this subgroup being more invasive (41% of curetted lesions vs 27% of noncuretted lesions; \( P = .01 \)) and being more often located on the head and neck (36% of curetted lesions vs 26% of noncuretted lesions; \( P = .03 \)). In a multivariate model including head and neck location and lesion invasiveness, lack of change in microscopic pattern did not increase surgical failure rates in curetted specimens (risk reduction, 1.20; 95% confidence interval, 0.81-1.78; \( P = .4 \)).

### VALIDATION COHORT

Our validation cohort consisted of 115 lesions identified using a manual search. Of these, 94 (82%) were identified using both methods and 21 were identified manually only (18%). When accounting for sex, age, anatomic location, lesion subtype, MD<51 group, and frequency

---

**Table 3. Effectiveness of Curettage on Margin Tumor Involvement**

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Total Lesions</th>
<th>Total Lesions With Involved Margins†</th>
<th>Noncuretted With Involved Margins‡</th>
<th>Curetted and Involved Margins§</th>
<th>Risk Reduction (95% CI), %</th>
<th>( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCC</td>
<td>1983</td>
<td>304 (15)</td>
<td>192 (17)</td>
<td>112 (13)</td>
<td>24 (2-41)</td>
<td>.03</td>
</tr>
<tr>
<td>Noninvasive (superficial-nodular)</td>
<td>1084</td>
<td>163 (15)</td>
<td>106 (17)</td>
<td>57 (12)</td>
<td>24 (1-53)</td>
<td>.04</td>
</tr>
<tr>
<td>Invasive</td>
<td>640</td>
<td>127 (20)</td>
<td>80 (20)</td>
<td>47 (20)</td>
<td>...</td>
<td>.8</td>
</tr>
<tr>
<td>Head and neck</td>
<td>1092</td>
<td>212 (19)</td>
<td>133 (22)</td>
<td>79 (16)</td>
<td>27 (5-50)</td>
<td>.01</td>
</tr>
<tr>
<td>Body</td>
<td>891</td>
<td>92 (10)</td>
<td>59 (11)</td>
<td>33 (9)</td>
<td>...</td>
<td>.5</td>
</tr>
<tr>
<td>Noninvasive on head and neck</td>
<td>512</td>
<td>96 (19)</td>
<td>62 (22)</td>
<td>34 (14)</td>
<td>32 (5-66)</td>
<td>.03</td>
</tr>
<tr>
<td>Invasive on head and neck</td>
<td>416</td>
<td>104 (25)</td>
<td>67 (27)</td>
<td>37 (22)</td>
<td>...</td>
<td>.3</td>
</tr>
<tr>
<td>In patients &lt;51 y</td>
<td>393</td>
<td>64 (16)</td>
<td>45 (20)</td>
<td>19 (12)</td>
<td>40 (5-75)</td>
<td>.03</td>
</tr>
<tr>
<td>MD&gt;50 treatment</td>
<td>1369</td>
<td>178 (13)</td>
<td>94 (13)</td>
<td>84 (13)</td>
<td>...</td>
<td>.8</td>
</tr>
<tr>
<td>MD&lt;51 treatment</td>
<td>612</td>
<td>126 (21)</td>
<td>98 (23)</td>
<td>28 (15)</td>
<td>30 (4-61)</td>
<td>.04</td>
</tr>
<tr>
<td>Changed histologic features</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lesions downgraded</td>
<td>167</td>
<td>46 (28)</td>
<td>33 (28)</td>
<td>13 (28)</td>
<td>...</td>
<td>.9</td>
</tr>
<tr>
<td>Lesions upgraded</td>
<td>109</td>
<td>26 (24)</td>
<td>15 (23)</td>
<td>11 (25)</td>
<td>...</td>
<td>.8</td>
</tr>
<tr>
<td>Unchanged histologic features</td>
<td>383</td>
<td>77 (20)</td>
<td>46 (17)</td>
<td>31 (26)</td>
<td>...</td>
<td>.04</td>
</tr>
<tr>
<td>SCC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>849</td>
<td>95 (11)</td>
<td>60 (11)</td>
<td>35 (12)</td>
<td>...</td>
<td>.6</td>
</tr>
<tr>
<td>In situ</td>
<td>462</td>
<td>63 (14)</td>
<td>35 (12)</td>
<td>28 (16)</td>
<td>...</td>
<td>.2</td>
</tr>
<tr>
<td>Invasive</td>
<td>278</td>
<td>28 (10)</td>
<td>22 (12)</td>
<td>6 (7)</td>
<td>...</td>
<td>.2</td>
</tr>
<tr>
<td>Head and neck</td>
<td>442</td>
<td>56 (13)</td>
<td>37 (13)</td>
<td>19 (11)</td>
<td>...</td>
<td>.5</td>
</tr>
<tr>
<td>Body</td>
<td>407</td>
<td>39 (10)</td>
<td>23 (8)</td>
<td>16 (13)</td>
<td>...</td>
<td>.1</td>
</tr>
<tr>
<td>In situ on head and neck</td>
<td>193</td>
<td>33 (17)</td>
<td>20 (18)</td>
<td>13 (15)</td>
<td>...</td>
<td>.6</td>
</tr>
<tr>
<td>Invasive on head and neck</td>
<td>181</td>
<td>22 (12)</td>
<td>17 (12)</td>
<td>5 (8)</td>
<td>...</td>
<td>.4</td>
</tr>
<tr>
<td>MD&gt;50 treatment</td>
<td>608</td>
<td>62 (10)</td>
<td>31 (9)</td>
<td>31 (12)</td>
<td>...</td>
<td>.1</td>
</tr>
<tr>
<td>MD&lt;51 treatment</td>
<td>241</td>
<td>33 (14)</td>
<td>29 (15)</td>
<td>4 (9)</td>
<td>...</td>
<td>.3</td>
</tr>
</tbody>
</table>

*Data are given as number (percentage) except as specified otherwise. CI indicates confidence interval; BCC, basal cell carcinoma; SCC, squamous cell carcinoma; MD>50 and MD<51, physician performed more than 50 or less than 51 procedures during the study; and ellipses, no significant risk reduction.
†The percentages are the number of lesions with involved margins within the specified subgroup divided by the total number of lesions within the specified subgroup.
‡The percentage of total noncuretted lesions in that subgroup.
§The percentage of total curetted lesions in that subgroup.
||Statistically significant.
Use of curettage before excision in the treatment of nonmelanoma skin cancer is a relatively easy and safe adjunct used by many dermatologists. We report the first systematic investigation of the surgical failure rates between curetted and noncuretted excisional specimens. The sex, age, and anatomic distributions of the lesions in this series were similar to those reported in the literature.

Our lesion selection method was supported by the findings in a validation cohort. This cohort revealed a higher frequency of noncuretted specimens compared with our study population. This finding is likely the result of manual identification of excisional biopsies (an excision performed with intent to cure when no previous biopsy had been performed). The difficulty of distinguishing these particular biopsies from a simple biopsy using a computer-based search led to their exclusion from our study population. This might have led to selection bias against surgical failures in the noncuretted treatment group, thereby increasing the relevance of preexcisional curettage.

In our series, most lesions (70%) were treated by physicians who had done more than 50 procedures. Lesions treated by this group were more frequently curetted. Also, not-otherwise-specified subtypes of BCC were more frequently curetted. A degree of uncertainty with respect to these lesions’ invasive potential may be a motivating factor in using curettage.

In BCC, our retrospective cohort revealed that surgical failure was associated with greater tumor invasiveness, head and neck location, and physicians performing fewer than 51 procedures. Based on the assumption that physicians performing fewer than 51 procedures were dermatologists with less surgical experience, it is not surprising that an increased surgical failure rate was observed in lesions treated by these physicians. Nevertheless, it is impossible to certify that some dermatologists in our study did not submit surgical specimens to other pathology laboratories, and, therefore, the accessioning of less than 30 lesions through our database might not reflect the full surgical activity of a specific physician.

Surgical failure in SCC lesions was associated with an older patient population. This phenomenon was specific to in situ SCC. Head and neck SCC lesions were also associated with this older population (P < .001 for head and neck). Being independently related to surgical failure, this location might be responsible for the tendency for increased surgical failure rates in this patient population.

Unlike BCC, invasive SCC tended to have fewer positive excisional margins. This finding may indicate a more careful approach in the extirpation of these potentially more morbid lesions. On the other hand, the decrease in surgical failure rates noted in not-otherwise-specified lesions of either BCC or SCC was likely the result of the definition of this subgroup because not-otherwise-specified lesions did not have enough (or any) residual carcinoma at the margins.

Surgical failure was not significantly related to the ability of the biopsy to predict the pattern of the carcinoma in the excisional specimen, as upgrade, downgrade, and unchanged pattern showed no impact on cure. Type of biopsy performed, whether punch or shave, was not accounted for in our study because this has not been shown to affect assessment of pattern. The relative increase in surgical failure noted in these subgroups is a direct result of their inclusion criteria. Multivariate analysis showed that an unexpected increase in the surgical failure rate in the curetted lesion with unchanged microscopic pattern could be accounted for by the overrepresentation of infiltrative subtypes and head and neck location.

Our data, which show curettage to be a relatively common technique used in the treatment of nonmelanoma skin cancers, offers a 24% reduction in surgical failure rates in the treatment of BCC. This reduction was even higher when accounting for tumor invasiveness and location, patient sex and age, and physician expertise. Benefits could be specifically noted in noninvasive BCC, in younger patient populations, or in the hands of less experienced physicians. We were unable to account for the safety margins required by each surgeon on excision. This has been reported to significantly impact the frequency of cure and represents an area for further study. Nevertheless, the ease with which curettage can be performed and the significant improvement in the surgical failure rate when this technique is applied in treatments of BCC should be an incentive for practitioners to adopt this technique.

On the other hand, curettage showed no benefit in the treatment of SCC. We suspect that subclinical extension of tumor could have misled the clinician into underestimating the size of the lesion. Furthermore, we theorize that SCC differs from noninvasive BCC in that SCC invades as small nests in the absence of mucinous stroma and therefore does not loosen as readily from its surrounding matrix as would BCC. Thus, although preexcisional curettage of SCC does no harm, it may not improve surgical cure rates.

A similar and more striking finding was an increase of tumor margin involvement in curetted BCC lesions that did not exhibit a change in microscopic pattern. As shown by our data, the marked propensity for these curetted lesions to be invasive and on the head and neck may explain our findings. Thus, curettage before excision of more aggressive tumors of the head and neck region is not an appropriate substitute for Mohs surgery.

Curettage before excision is a simple technique that has been demonstrated to impart a definite decrease in the rate of tumor margin involvement of BCC surgical excisional specimens. Its relative ease of use renders it an excellent tool to teach to beginning physicians in an attempt to assist them in better defining tumor margins and achieving higher surgical cure rates.
REFERENCES