Differences in Biopsy Techniques of Actinic Keratoses by Plastic Surgeons and Dermatologists

A Histologically Controlled Pilot Study

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**Objective:** To compare differences in biopsy techniques of actinic keratoses between dermatologists and plastic surgeons.

**Design:** Blinded, comparative, retrospective study.

**Setting:** Dermatopathology laboratory at a major academic medical center with referral of outside cases.

**Intervention:** We reexamined the histopathologic slides of 405 actinic keratosis biopsy specimens obtained by plastic surgeons and dermatologists from January 1, 1992, through May 31, 2002. We were specifically interested in the type of biopsy technique (shave, punch, or excisional biopsy) used for the surgical management of actinic keratoses by both groups of physicians. We also recorded the clinical diagnoses rendered on the dermatopathology request form and compared them with the histopathologic diagnoses.

**Results:** Excisional biopsies were performed by plastic surgeons in 50.0% of the cases, compared with only 1.4% by dermatologists. In contrast, shave biopsies of actinic keratoses were performed by plastic surgeons in only 32.4% of the cases, compared with 89.4% by dermatologists. Only 1 (0.5%) of the 198 dermatopathology request forms submitted by the plastic surgeons mentioned actinic keratosis, compared with 82 (39.6%) of 207 histopathologic evaluation requests submitted by dermatologists.

**Conclusions:** The predominance of excisional biopsies of actinic keratoses by plastic surgeons may be related to a different ability in the clinical recognition of actinic keratoses compared with that of dermatologists. The surgical approach of dermatologists to shave diagnostically uncertain cutaneous lesions is less invasive than that of plastic surgeons and is more likely to achieve a better cosmetic outcome.

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**METHODS**

**RETRIEVAL OF CASES**

In this retrospective study, we retrieved and reexamined the histopathologic slides of 405 actinic keratosis biopsy specimens obtained by plastic surgeons and dermatologists from January 1, 1992, through May 31, 2002, who submitted their specimens for histopathologic evaluation to the Section of Dermatopathology, The Cleveland Clinic Foundation, Cleveland, Ohio. The Section of Dermatopathology functions as a referral center for dermatopathologic specimens for physicians in Ohio. All slides represented hematoxylin-eosin-stained sections from archival material. They included 198 actinic keratoses treated by 7 plastic surgeons and 207 actinic keratoses treated by 26 dermatologists. The cases were randomly selected from a computer-generated database. No repeat excision specimens, in which the diagnosis was known, were enrolled in the study. All subsequent data were recorded as anonymous. The project was approved by the Internal Review Board of The Cleveland Clinic Foundation.
ASSESSMENT

The histopathologic slides were reexamined by one dermatopathologist (K.S.) blinded to the subspecialty of the physicians submitting the specimens. At review of the slides, the actinic keratoses were histopathologically classified as either hyperplastic types or other variants, including atrophic, acantholytic, lichenoid, Bowenoid, and pigmented variants, which were grouped together. This differentiation was done because hyperplastic actinic keratoses may be clinically mistaken for invasive squamous cell carcinomas. The biopsy techniques (punch, shave, or excisional) used to surgically treat the keratoses were entered on the data sheet. Separate from the histopathologic evaluation, our section secretary recorded the clinical diagnosis and the anatomical location from which each specimen was obtained.

In addition, we evaluated the concordance between clinical and histopathologic diagnoses. This was performed blindly without knowledge of the subspecialty of the treating physician. Using the histopathologic diagnosis as the gold standard, we carefully avoided being overstringent when we considered a clinical diagnosis rendered by the submitting clinician to be incorrect. We identified a clinical diagnosis as correct if the clinician listed several alternatives, for example, basal cell carcinoma, squamous cell carcinoma, or actinic keratosis, and when an actinic keratosis was confirmed at histopathologic analysis. If only 1 clinical diagnosis was listed, for example, basal cell carcinoma, the clinical diagnosis was considered incorrect, as was the lack of provision of any clinical data. Unspecific clinical data, such as “lesion,” were also considered incorrect.

After all data were retrieved and blindly evaluated, the cases were matched with the subspecialty of the treating physician and grouped into those submitted by the plastic surgeons and those submitted by the dermatologists. The data from both physician groups were then compared with each other.

STATISTICAL ANALYSIS

The comparison of both groups was performed using the $\chi^2$ test of association. The Fisher exact test was applied when frequencies or group sizes made the $\chi^2$ test results questionable (determined by an expected 2x2 cell count <5). Initially, an overall group comparison between plastic surgeons and dermatologists was done to address the question of whether the distribution of responses (among punch, shave, and excisional biopsy specimens) was different between both groups of physicians. Subsequently, individual comparisons of the frequency of each biopsy type were performed to more specifically evaluate how the groups differ. Statistical significance was set at $P < .05$.

RESULTS

When analyzing all actinic keratoses combined, plastic surgeons performed excisional biopsies in 50.0% of the cases, compared with only 1.4% by dermatologists ($P < .001$) (Figure 1 and Figure 2). In contrast, shave biopsies of actinic keratoses were performed by plastic surgeons in only 32.4% of the cases but by dermatologists in 89.4% of the cases ($P < .001$) (Figure 1). The difference in the use of punch biopsies between both physician groups was less pronounced but still statistically significant ($P = .02$) (Figure 1).

There was no difference in the biopsy approach chosen by the dermatologists when the actinic keratoses were classified as either the hyperplastic type or other variants (atrophic, acantholytic, lichenoid, Bowenoid, or pigmented) and were compared with each other (Figure 3A). Plastic surgeons had a slightly higher tendency to perform excisional biopsies in cases of actinic keratoses of the hyperplastic type (63%) compared with...
the other variants (47.7%). This was not statistically significant \( (P = .10) \) (Figure 3B). The only statistically significant difference found in the group of plastic surgeons was the lower number of shave biopsies in cases of hyperplastic actinic keratoses (16.7%) compared with the other variants \( (P = .04) \) (Figure 3B). Overall, however, with only 36 cases, the total number of hyperplastic actinic keratoses treated by plastic surgeons was low, making the comparisons difficult. Of the 99 excisional biopsies performed on actinic keratoses by plastic surgeons, 57 were located in the central face (Table). Of the 7 plastic surgeons who submitted specimens of actinic keratoses, 5 performed more excisional biopsies than shave and punch biopsies. One of the other 2 plastic surgeons submitted only 5 cases of actinic keratoses, making a useful analysis impossible. The other plastic surgeon, who performed more shave biopsies than excisional biopsies, submitted only 36 (18.2%) of the 198 cases of actinic keratoses analyzed. Over the study period from January 1, 1992, through May 31, 2002, there was a higher tendency for the plastic surgeons to use shave biopsies compared with excisional biopsies. This was mainly due to 1 of the 7 plastic surgeons. In 2001, the last entire year analyzed in the study period, 12 (37.5%) of 32 actinic keratoses were performed as excisional biopsies by plastic surgeons, compared with none by dermatologists.

Only 1 (0.5%) of the 198 dermatopathology request forms submitted by the plastic surgeons mentioned actinic keratosis, compared with 82 (39.6%) of 207 histopathologic evaluation requests from dermatologists. In the single case of a specific clinical diagnosis of an actinic keratosis reported by a plastic surgeon, a shave biopsy was performed. The most common statements by plastic surgeons made on the dermatopathology request form were “lesion” or “multiple skin lesions.” Some reports were more specific and mentioned “rule out squamous cell carcinoma,” “squamous cell carcinoma,” or “basal cell carcinoma.” In the case of the 3 excisional biopsy specimens of actinic keratoses performed by the dermatologists in 1995, 1999, and 2002, the clinical diagnosis on the dermatopathology request form was recorded as “rule out verruca vulgaris vs intradermal nevus,” “history of squamous cell carcinoma,” and “basal cell carcinoma.”

In 1997, 60 million of 703 million physician office visits in the United States were for skin examinations. 

1 For the diagnosis of actinic keratosis and nonmelanoma skin cancer alone, published data are available from the National Ambulatory Medical Care Survey for 1993 and 1994. During that time, 13.5 million physician office visits were recorded for these conditions. That proportion may likely be higher today because of heightened public awareness of the prevalence of precancerous and cancerous skin conditions.

While most actinic keratoses are treated by dermatologists, a smaller percentage of cases are treated by other physician groups. In cases of diagnostic uncertainty, for example, to rule out invasive squamous cell carcinoma, a biopsy is performed. In our retrospective and

**Table. Number of Excisions per Anatomic Area Performed by Plastic Surgeons for Treatment of Actinic Keratoses**

<table>
<thead>
<tr>
<th>Anatomic Area</th>
<th>No. of Excisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central face (chin, nose, cheek, and forehead)</td>
<td>56</td>
</tr>
<tr>
<td>Peripheral face (temporal and ears)</td>
<td>11</td>
</tr>
<tr>
<td>Scalp</td>
<td>6</td>
</tr>
<tr>
<td>Neck</td>
<td>3</td>
</tr>
<tr>
<td>Trunk</td>
<td>4</td>
</tr>
<tr>
<td>Upper extremities</td>
<td>15</td>
</tr>
<tr>
<td>Lower extremities</td>
<td>2</td>
</tr>
<tr>
<td>Unspecified</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>99</td>
</tr>
</tbody>
</table>

*Comparable data for dermatologists are not given because they performed excision biopsies in only 3 of 207 actinic keratoses.
blinded study, our objective was to determine differences in biopsy techniques used by dermatologists and plastic surgeons. We analyzed the biopsy approach to 405 actinic keratoses submitted during 10 years by both specialties. The cases were randomly selected from a computer-generated database, excluding any sampling bias. While we believe that the results show clear evidence of a difference in the biotic management of actinic keratoses between the 2 specialties, the study is limited by the small numbers of dermatologists and plastic surgeons studied. The results from this pilot study clearly suggest that a larger, multi-institutional study is needed.

We found that the biotic approach used by dermatologists consisted of shave biopsy in almost 9 (89.4%) of 10 cases. Dermatologists performed excisional biopsies in only a fraction (1.4%) of actinic keratoses. This was in sharp contrast to plastic surgeons, who performed excisional biopsies in 50.0% of cases, with more than half (56.6%) located in the cosmetically important central face. Based on these numbers, we believe that the care provided by dermatologists in the evaluation and treatment of actinic keratoses may be more cost-effective than care by plastic surgeons.

The high percentage of excisional biopsies performed by a surgical subspecialty for a cutaneous lesion confined to the level of the epidermis, for which a superficial shave biopsy would have sufficed, raises the question of why this treatment was chosen. There are probably multiple answers. The treatment options of dermatologists for skin conditions are typically and naturally much broader than those of plastic surgeons and include cryosurgery, electrosurgery, curettage, dermabrasion, and chemical destruction. Because of the prevalence of non–scalpel-based methods for the treatment of actinic keratoses, a more hesitant use of the scalpel by dermatologists is likely in cases of diagnostic uncertainty, resulting in a preference for superficial shave biopsies. Depending on the histopathologic evaluation of the removed specimen, a second, deeper procedure (excision) may follow. This ensures against an unnecessary deep, wide excision with a cosmetically less favorable outcome. We cannot exclude that there are differences in perceptions between dermatologists and plastic surgeons of which procedures lead to better cosmetic outcomes.

Another reason for the predominance of excisional biopsies by plastic surgeons may be related to a different ability in the clinical recognition of actinic keratoses compared with that of dermatologists. Numerous studies have documented that dermatologists are far more capable of recognizing skin lesions than other specialists. A recent article compared the histopathologic diagnosis with the clinical diagnosis of oculoplastic surgeons who treated cutaneous periorcular lesions. For actinic keratoses, a low concordance rate was found between clinical impression and histopathologic evaluation. Actinic keratoses constituted only a small percentage of the conditions treated by oculoplastic surgeons.

A correct clinical preoperative diagnosis (or differential diagnosis) of a skin lesion ensures that the appropriate procedure is chosen. In the case of seborrheic keratoses, lesions that were clinically correctly identified by the treating physician were more than 8 times more likely to receive appropriate care. The study also concluded that dermatologists provided appropriate care in 90% of cases of seborrheic keratoses vs only 38% by plastic surgeons and 13% by general surgeons. The procedures performed for the treatment of seborrheic keratoses and deemed by the authors to be appropriate included curettage, shave biopsy, and punch biopsy; excision was deemed inappropriate for the surgical care of seborrheic keratoses.

We cannot exclude that there are systematic differences in the types of patients consulting dermatologists and plastic surgeons that could explain why different biopsy approaches were used by the 2 specialties. It is possible that patients consulting plastic surgeons seem to have more clinically advanced skin lesions, such as an invasive squamous cell carcinoma, precipitating a more aggressive therapeutic approach. However, hyperplastic actinic keratoses, which may clinically be mistaken for invasive carcinoma, made up only 23 (25.6%) of all actinic keratoses excised by the plastic surgeons in our study. The remaining 76 (76.8%) were of the nonhyperplastic type and were still excised.

Only 0.5% of the dermatopathology request forms submitted by the plastic surgeons in our study mentioned actinic keratosis as a clinical diagnosis, compared with 39.6% of histopathologic evaluation requests from dermatologists. In the single case of a specific clinical diagnosis of an actinic keratosis reported by a plastic surgeon, the appropriate surgical method of shave biopsy was performed. While the statements on the dermatopathology request forms may not necessarily indicate the exact clinical diagnostic accuracy of the submitting physician, they are certainly indicative of the uncertainty in the clinical recognition of skin lesions by plastic surgeons. The frequent use of nonspecific descriptions such as “lesion” or “multiple skin lesions” by plastic surgeons is a further indication for such lack. The use of descriptive, nonspecific terms for skin conditions by non-dermatologists is also well documented in the literature. This clinical diagnostic uncertainty may have been another reason for the frequent use of excisional biopsies.

Our study is limited by being confined to the clinical practice of 7 plastic surgeons who submitted cases for histopathologic evaluation to our institution. However, despite these limitations, we believe we have documented a tendency of a surgical subspecialty to be more inclined to use invasive diagnostic surgical procedures more often than necessary. Our conclusion is supported by recent data on the frequency of high-intensity procedures (excisions and repair procedures) chosen by non-dermatologists, including plastic surgeons, as a choice for the treatment of seborrheic keratoses. Dermatologists treated 89% of seborrheic keratoses using low-intensity procedures (punch and shave biopsy), compared with 51% of other specialties. Our conclusion is also supported by an earlier study that found that 61% of seborrheic keratoses were excised by plastic surgeons vs only 4% excised by dermatologists. The biotic approach to actinic keratoses by these 2 specialties is not different from that chosen for seborrheic keratoses.

While we realize that our study is a snapshot of a local experience that involves primarily 2 specialties submitting specimens to 1 institution, we believe that the
results represent current practice. However, the results from this pilot study clearly suggest that a larger, multi-institutional study is needed.

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**REFERENCES**