DERMATOLOGY PRACTICAL & CONCEPTUAL
www.derm101.com

Use of double-bladed biopsy in distinguishing keratoacanthoma from squamous cell carcinoma—a case report

Keith Hopkins MBBS[1], Sharad Paul, M.D., MPhil[2,3], David Weedon, M.D.[4], Cliff Rosendahl, MBBS, Ph.D.[2]

[1]Noosaville 7 Day Medical Centre & Molescan, Noosa, Australia
[2]School of Medicine, The University of Queensland, Brisbane, Australia
[3]Faculty of Surgery, University of Auckland, New Zealand
[4]Sullivan Nicolaides Pathology, Brisbane, Australia

Key words: biopsy, scalpel, double-bladed, squamous cell carcinoma, keratoacanthoma

Citation: Hopkins K, Paul S, Weedon D, Rosendahl C. Use of double-bladed biopsy in distinguishing keratoacanthoma from squamous cell carcinoma—a case report. Dermatol Pract Conc. 2013;3(1)12. http://dx.doi.org/10.5826/dpc.0301a12.

Received: November 4, 2012; Accepted: December 13, 2012; Published: January 31, 2013

Funding: None.

Competing interests: The authors have no conflicts of interest to disclose.

All authors have contributed significantly to this publication.

Corresponding author: Cliff Rosendahl, PO Box 734, Capalaba, Queensland, Australia 4157. Tel. +61.7.3245.3011; Fax. +61.7.3245.3022. Email: cliffrosendahl@bigpond.com

ABSTRACT "The SCC Biopsy Tool" (name provided by current authors) is a double-bladed scalpel handle (manufactured and distributed by Surgidental Instruments, Deer Park, NY, USA) with two No. 11 scalpel blades (Swann-Morton, Sheffield, England) set in parallel, 1.5 mm apart (Figure 1). It provides an alternative to other partial biopsy methods and provides advantages over established techniques of shave and punch biopsy, particularly in differentiating squamous cell carcinoma (SCC) from keratoacanthoma (KA) on the leg and foot. The method of obtaining a full-thickness sample across the total width of a lesion with histologic sectioning in a longitudinal plane enables both architecture and cytology to be assessed accurately; precisely the requirement for distinguishing SCC from KA. The advantage over traditional incisional biopsy with a single blade is precision of parallel edges in a situation where central keratin provides an obstacle to such precision.

Background

The double-bladed scalpel was originally used in 1977 by Coiffman to harvest strip grafts for hair transplantation [1]. In 1982, Schultz used a double-bladed scalpel for peripheral margin assessments [2]. Other studies describing its use for intraoperative margin control include studies by Johnson et al in 1997 [3], Moosavi et al in 2000 [4], Cernea et al in 2006 [5], and Aoyagi et al in 2010 [6]. In 1994, Bowen et al described the use of the double bladed scalpel for the revision of old surgical scars [7]. A search of the literature has not discovered previous use of this instrument for taking partial biopsies of skin tumors and, in particular, a search has not discovered any previous reference to its use for differentiating between KA and SCC on the leg and foot.

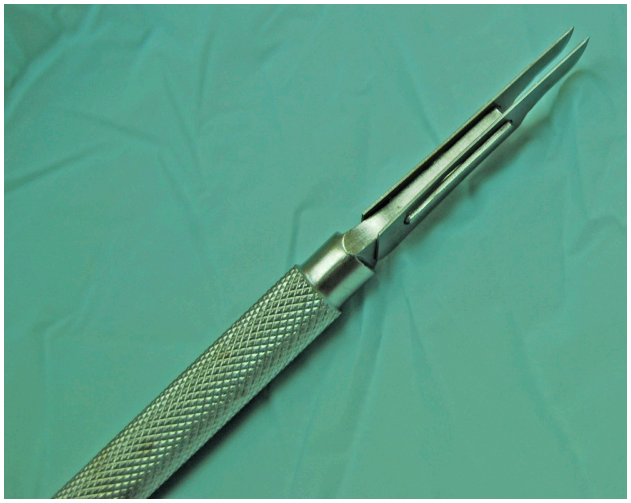

Figure 1. A double-bladed scalpel handle mounted with two No. 11 blades.

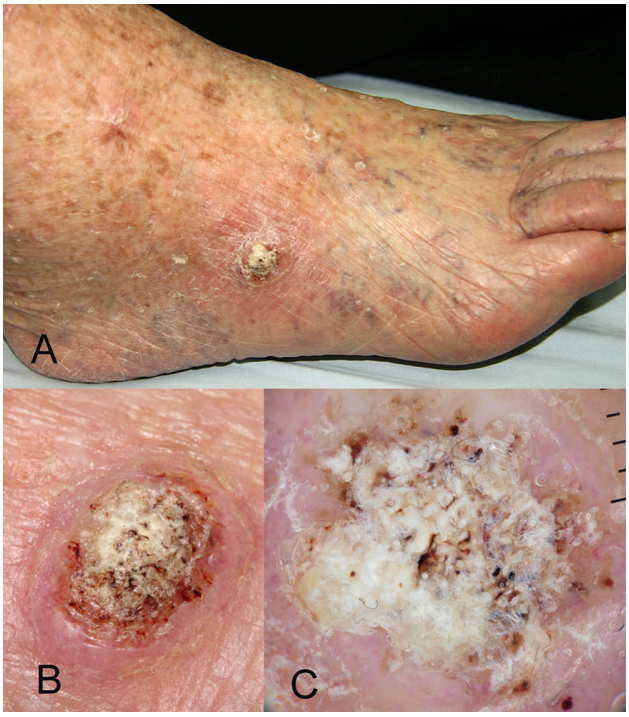

Figure 2. Clinical (A), macro (B) and dermatoscopic (C) images of a rapidly growing, non-pigmented, raised lesion on the foot of a 94-year-old female.

While KA is often suspected clinically due to the features of a rapidly appearing and growing raised, non-pigmented lesion with a central keratin plug, SCC can also have this appearance. Furthermore, cases of KA with SCC arising from the base have been reported [8]. It has been shown that SCC and KA cannot be reliably distinguished dermatoscopically [9]. Whether KA is a form of SCC with benign, non-metastasizing behavior [10] or, as the current authors believe, a distinct, benign histologic entity [11], we believe that the differentiation is of practical significance. While it is regarded as appropriate to treat KA rather than to monitor them, it is also accepted that the majority of KA have a good prognosis with conservative treatment [12].

We propose that, because of the potential for increased morbidity with complex surgery on the leg and foot, histologically confirmed KA on these locations can be monitored for a limited time in anticipation of resolution and subsequently excised if this does not occur. Due to the properties of skin of the leg and foot, excisional biopsy at these locations may require a complex closure with a significant risk of flap or graft failure, and for this reason we believe an effective but minimally invasive biopsy method is desirable. The case presented here illustrates such a biopsy method. It provides a biopsy specimen through the center of a suspect lesion, which provides the dermatopathologist with information on both cytology and architecture through the entire central cross section and depth of the lesion. Since the tissue removed is only 1.5 mm in width, the defect can easily be closed even in very tight tissue, such as in cases of lipodermatosclerosis, and in more pliant tissue, closure can usually be achieved simply with Steristrips. If the lesion is a KA, we believe this can be confirmed with a high degree of confidence. The KA can then be observed for anticipated resolution. We have also observed anecdotally that regression often follows immediately after the act of biopsy, although we have not discovered published evidence to support this observation. The authors do not recommend incisional biopsies for suspected KA/SCC if a full excisional biopsy can be easily performed. The authors also do not recommend observation for resolution if any high risk features are present, e.g., location on head and neck or with perineural infiltration. The authors especially recommend incisional biopsies using the double-bladed technique on the leg and foot where primary closure of an excisional biopsy site may not be feasible.

Case report

A 94-year-old lady presented with a rapidly growing, non-pigmented nodular lesion on the lateral side of the right foot (Figure 2). Clinically there was central keratin, as can be seen in both KA and SCC. The symmetry of the lesion was consistent with KA but it was tender to palpation, a feature commonly regarded as a clue to SCC. At approximately 2 mm in thickness it was at the threshold of metastatic potential if it was to be an SCC [13].

Dermatoscopic assessment revealed central structureless white (keratin) with blood spots. It has been shown that KA cannot be reliably distinguished from SCC with dermatoscopy [9], and certainly in this case dermatoscopy did not clarify the differential diagnosis.

The lesion was 13 mm in diameter, in which case excisional biopsy with 1 mm margins would have created a defect 15 mm in diameter, and it was assessed that primary closure

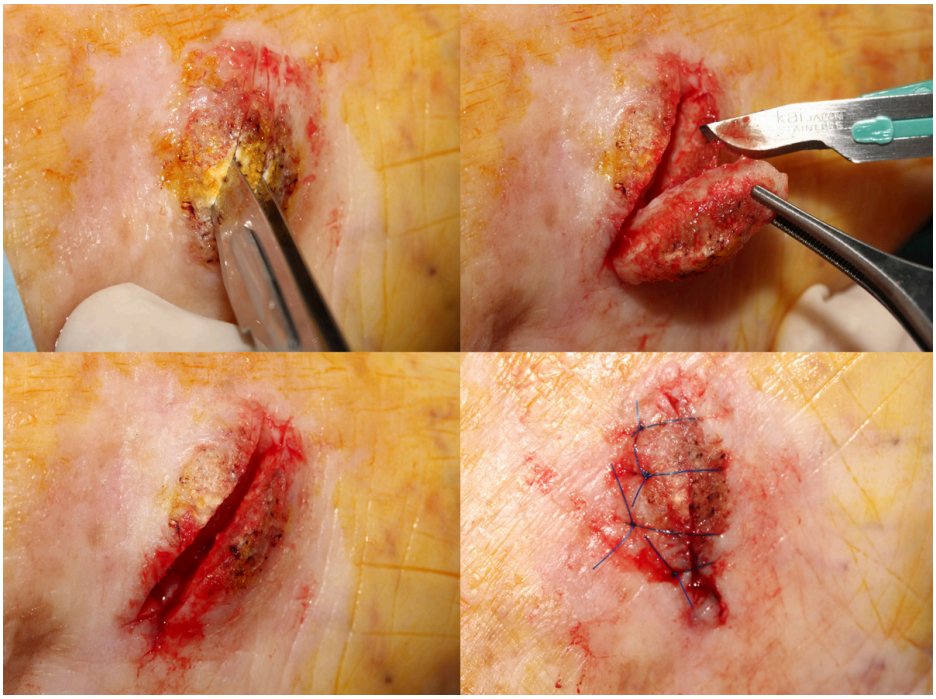

Figure 3. Biopsy procedure of the lesion shown in Figure 2 using the double-bladed scalpel (images taken by Marcia Muraca, RN). Note that a second standard scalpel (with single blade) was used to transect each end and to undermine the base of the biopsy specimen.

would not be possible. An experienced dermatopathologist would be able to diagnose KA on a punch biopsy from the unique histologic characteristics of KA because the cells in a KA have a distinct hue in their cytoplasm that is paler than that seen in SCC, best visualized in the large central cells in the squamous nests which may be up to double the size of the peripheral cells [14,15]. These central pale cells of KA tend to be much larger than the cells of SCC [14,15]. The diagnosis of KA from a punch biopsy may not detect SCC arising in the base, which has been shown to occur in 5-13% of KA [8]. To diagnose KA with more confidence, most pathologists would also prefer to see the architecture of the squamoproliferative lesion showing the characteristic crateriform appearance with buttressing of both side margins [14].

In this case, the assessment was made that even a defect created by a 4 mm punch biopsy might not be able to be closed without excessive skin tension. It was decided that incisional biopsy through the center of the lesion would achieve an optimum biopsy for dermatopathologic assessment and permit satisfactory surgical closure of the defect.

Biopsy was performed under sterile conditions in the General Practice Operating Room (Figure 3). In accordance with the instruction "block whole—longitudinal section" the biopsy specimen was not sectioned prior to mounting in paraffin but was laid on its side intact so that the full face of the lesion from the stratum corneum (in this case surface keratin) to the deepest part of the dermis and through the full width of the lesion was presented to the dermatome (Figure 4).

Dermatopathologic assessment by author DW revealed a squamoproliferative lesion with a characteristic crateriform appearance with buttressing of both side margins (Figure 5A). The central cells of each squamous nest showed the characteristic pale pink cytoplasm characteristic of KA (Figure 5B) [14,15]. There was no superimposed SCC, as is seen

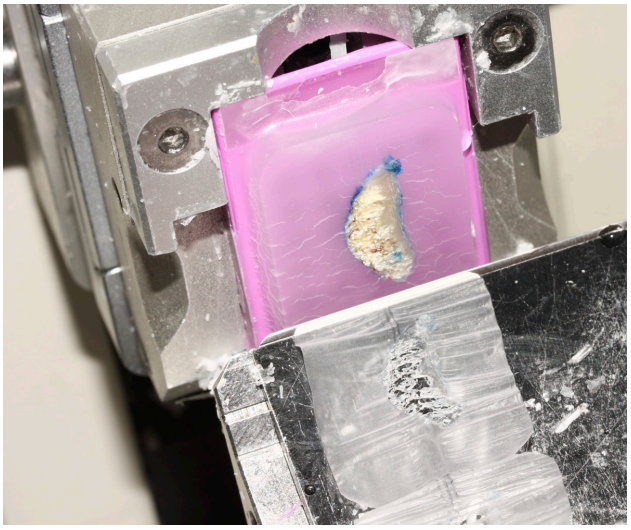

Figure 4. Processing for dermatopathologic assessment involved mounting the entire biopsy specimen, without sectioning, so that the 'full face' of the lesion was presented to the dermatotome.

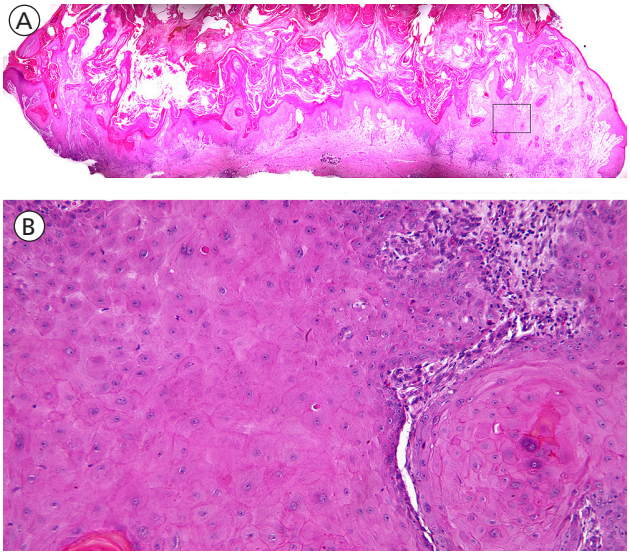

Figure 5. Low power overview (A) and high power view of boxed area in A (B), of the lesion shown in Figure 2. Figure 2A illustrates the typical architecture of KA, while B shows the typical cytology of a KA with nests containing large pale central cells.

in at least 10% of KA in patients of this age [8]. On the basis of this report the decision was made not to immediately proceed to formal excision and complex closure but to observe for up to two months in anticipation of resolution. The lesion had clinically regressed completely when reviewed two months after the biopsy procedure. We believe that this was a favorable course of action for the patient, who, at the age of 94, was agreeable to avoiding any potentially unnecessary procedure.

Warning

Mounting blades on a double-bladed scalpel is technically more difficult than with conventional scalpels. The authors advise physicians and/or support staff to perform this task with care.

Conclusion

The double bladed scalpel with blades 1.5 mm apart has been shown in this case report to have utility as an "SCC biopsy tool." It enabled an optimum dermatopathologic assessment to distinguish KA from the differential diagnosis of SCC. An immediate formal excision with associated complex closure was avoided in a 94-year-old patient. We believe the double-bladed scalpel, used as described in this report, is a useful tool especially for lesions on the leg and foot when it is desirable to differentiate KA from SCC and to minimize surgical trauma.

References

1. Coiffman F. Use of square scalp grafts for male pattern baldness. Plast Reconstr Surg. 1977;60(2):228–32.
2. Schultz BC, Roenigk HH Jr. The double scalpel and double punch excision of skin tumors. J Am Acad Dermatol. 1982;7(4):495–9.
3. Johnson TM, Headington JT, Baker SR, Lowe L. Usefulness of the staged excision for lentigo maligna and lentigo maligna melanoma: the "square" procedure. J Am Acad Dermatol. 1997;37(5 Pt 1):758–64.
4. Moossavi M, Alam M, Ratner D. Use of the double-bladed scalpel in peripheral margin control of dermatofibrosarcoma protuberans. Dermatol Surg. 2000;26(6):599–601.
5. Cernea CR, Velasco O, Gomes MQT, Vellutini E, Hojaij FC, de Carlucci D Jr, et al. Double-bladed scalpel: a new option for harvesting margins in head and neck cancers. ORL J. Otorhinolaryngol Relat Spec. 2006;68(2):83–7.
6. Aoyagi S, Hata H, Homma E, Shimizu H. Controlling the histological margin for non-melanoma skin cancer conveniently using a double-bladed scalpel. J Surg Oncol. 2010;101(2):175–9.
7. Bowen ML, Charnock FM. The Bowen double-bladed scalpel for the reconstruction of scars. Obstet Gynecol. 1994;83(3):476–7.
8. Weedon DD, Malo J, Brooks D, Williamson R. Squamous cell carcinoma arising in keratoacanthoma: a neglected phenomenon in the elderly. Am J Dermatopathol. 2010;32(5):423–6.
9. Rosendahl C, Cameron A, Argenziano G, Zalaudek I, Tschandl P, Kittler H. Dermoscopy of squamous cell carcinoma and keratoacanthoma. Arch Dermatol. 2012;17:1–7.
10. Hodak E, Jones RE, Ackerman AB. Solitary keratoacanthoma is a squamous-cell carcinoma: three examples with metastases. Am J Dermatopathol. 1993;15(4):332–342; discussion 343–352.
11. Weedon D, Malo J, Brooks D, Williamson R. Keratoacanthoma: is it really a variant of squamous cell carcinoma? ANZ J Surg. 2010;80(3):129-30.
12. Ko CJ. Keratoacanthoma: Facts and controversies. Clinics in Dermatology. 2010;28(3):254–61.
13. Nuño-González A, Vicente-Martín FJ, Pinedo-Moraleda F, López-Estebaranz JL. High-risk cutaneous squamous cell carcinoma. Actas Dermosifiliogr. 2012;103(7):567–78.
14. Weedon D. *Weedon's Skin Pathology.* 3rd ed. London: Churchill Livingstone, 2009:702-8.
15. Tschandl P, Rosendahl C, Williamson R, Weedon D. A keratoacanthoma with venous invasion. Dermatol Pract Conc. 2012;2(4):3. http://dx.doi.org/10.5826/dpc.0204a03.