

Focus

Episcope use speeds melanoma detection

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Introduction

Skin surface microscopy is the use of an incident light and magnification system in conjunction with immersion oil on a cutaneous lesion. The oil removes the scattering of light at the stratum corneum, allowing the epidermis to become translucent and permitting detailed examination of the pigmented structures of the epidermis and dermo-epidermal junction.

Skin surface microscopy has been shown to greatly enhance the timely diagnosis of pigmented skin tumours, especially melanoma.

New Zealand has the highest death rate from melanoma in the world.¹ Each year 200 people die from melanoma and another 50 die from preventable skin cancers.¹ There are about 1600 new cases of melanoma each year with about 7 per cent under the age of 30, and 17 per cent under the age of 40 years.¹

The episcope or skin surface microscope was initially a binocular instrument (6-40x magnification) but, in recent times, hand held instruments (10x) have been developed to allow ease of use in the clinical office setting.

The episcope is most helpful in discerning melanotic lesions and also some non-melanotic lesions. It requires training and time to become familiar with the oil immersion views and interpretation of the key features. It is advisable to have a skin surface atlas for reference at all times. A suitable atlas is *An Atlas of Surface Microscopy of Pigmented Lesions*.²

Key diagnostic features

There are in excess of 100 different features that can be identified using surface microscopy. Each feature has a known sensitivity and specificity for a particular diagnosis. However, in practice, a small number of diagnostic features are essential to the improved diagnosis of pigmented skin lesions.

Some clinical studies have reported an initial reduction in the accuracy of clinical diagnosis using this instrument,



Key points

- Skin surface microscopy has been shown to greatly enhance diagnosis of pigmented skin tumours, especially melanoma
- Use of an episcope requires training and practice and must be in conjunction with a pictorial atlas of skin microscopy
- Mole Map, a computer assisted tool that magnifies, analyses and stores episcope images on a personalised body map, can be well applied to high risk individuals and families with melanoma.
- The 10 key skin surface microscopy features are: pigmentation, blue

which may lead to false reassurance of both clinician and patient. With time and training this situation reverses. It is important to use this tool as an adjunct to clinical judgement and not as a definitive test.

white vein, dots and globules, pseudopods, radial streaming, pigmented network, negative pigmented network, lesion edge and shape, the vasculature and symmetry

A recently developed system known as Mole Map uses episcopes images in high magnification and has software to discern key features. The images are stored on a personalised body map for later reference. This has good application to high-risk individuals and families with melanoma.

When assessing a lesion via the episcopes the trends and themes parallel basic visual clinical criteria. Degrees of regularity, symmetry and order are important. A transition, as seen in the episcopes view, specifies a suspicious state in the development of a skin cancer: from regularity to irregularity, from symmetry to asymmetry and from ordered patterns to chaos.

Melanoma is a disease of growth and change. The deeper the melanoma has penetrated (Breslow depth or increasing Clarks level), the poorer the prognosis. Histological findings of the excisional biopsy of suspected melanoma remain the definitive for diagnosing a cutaneous melanoma but "when in doubt, cut it out". Early excision and adequate excision margins are the best predictors of a good prognosis.

The 10 key features:

1. Pigmentation

There are two main forms of overall pigmentation, vascular (red or blue) and melanin (black-brown or grey depending on depth.) The presence of multiple colours is highly suggestive of melanoma.

Specificity: 46 per cent, sensitivity: 100 per cent for melanoma¹

2. Blue white veil

This is a blue whitish veil or "milky way" over the lesion with an overlying ground glass film appearance. Specificity: 97 per cent, sensitivity: 51 per cent for melanoma¹

3. Dots and globules

There are four main types:

- Black dots and globules _ represent localised pigment accumulation in the stratum corneum and are more specific for melanoma when found in the periphery of the lesion.
- Multiple brown dots _ represent aggregations in the intradermal area and are highly specific for melanoma.
- Brown dots and globules _ common in all pigmented lesions and helpful in the diagnosis of Spitz' Nevis.
- Multiple grey dots _ pepper-like melanophages laden with melanin associated with regression and malignant melanoma.

Specificity: 97 per cent, sensitivity: 30 per cent for melanoma¹

4. Pseudopods

Known as the false foot, pseudopods represent the radial growth phase of

melanoma and are described as bulbous, kinked projections seen at the edge of superficial spreading melanoma. Colour ranges from tan to black and can often be seen at the edge of radial streaming.

Specificity: 97 per cent, sensitivity: 23 per cent for melanoma¹

5. **Radial streaming**

This feature also represents the radial growth phase. It is seen as rays of parallel linear pigmented extension, most clearly at the edge of the tumour. This is a specific feature of melanoma when seen at the edge of the pigmented lesion. Specificity: 96 per cent, sensitivity: 18 per cent for melanoma³

6. **Pigmented network**

This is the background network seen in all melanocytic derived lesions (lentigo, junctional and compound nevi and melanoma). If it is a regular and discrete honeycomb it tends to indicate a benign lesion and if the background is an irregular lattice it is more suggestive of a dysplastic, in-situ or invasive melanotic lesion. Specificity: 92 per cent, sensitivity: 46 per cent for melanoma¹

7. **Negative pigmented network**

This is the reverse of the pigmented network, with light areas making up the grids and dark areas filling the holes. Seen mainly in Spitz' Nevis, this is also highly specific for invasive melanoma and can also occur in dysplastic nevi.

Specificity: 95 per cent, sensitivity: 22 per cent for melanoma³

8. **Lesion edge and shape**

An irregular edge is suggestive of melanoma (94 per cent).

9. **The vasculature**

Described as pool of blood _ red blue areas (lacunes) which are sharply demarcated ovoid structures. Classic of haemangiomas, telengectasia and BCCs.

10. **Symmetry**

The symmetry in two-axis has a major negative correlation with melanoma. Only 3 per cent of melanomas are symmetrical and approximately 50 per cent of non-melanomas are symmetrical.

Summary

The active use of skin surface micro-scopy as an office procedure is of great value in the early and accurate diagnosis of pigmented and some non-pigmented skin lesions. Used in conjunction with an adequate atlas, along with initial training and ongoing experience, the scope improves the accuracy of diagnosis.

Skin cancer is a major issue facing New Zealand. Auckland has the dubious honour of being the melanoma capital of the world, but rates are high throughout the country. No doubt with the 60s generation of bikini toppers and sunbathers now reaching middle age, we will see a continued increase in the incidence of melanoma and other sun-related skin cancers.

The episcopes can add to the armoury that already includes public awareness, early clinical detection and rapid clinical treatment in helping limit the consequences of this deadly cancer - melanoma.

• *References available on request*