Suspicious melanocytic lesions: number needed to treat to identify a melanoma

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Summary

Background and objectives. The number of biopsies performed to reveal one diagnosis of melanoma can be presented as number needed to treat (NNT). Dermatoscopy as a melanoma-routine screening method led to an improved NNT. A wide range of NNTs is published in different settings, from 2.43 to 83. Objective was to evaluate the accuracy in screening of melanocytic lesions for melanoma and to assess the NNT.

Methods. 381 consecutive patients for melanoma-screening of a private outpatient department in Austria have been included; a digital sequential dermatoscopy-system was used. Suspicious lesions were excised and histologically worked-up. Excisions performed exclusively due to cosmetic reasons have not been included.

Results. 10.356 melanocytic lesions in 381 consecutive patients have been examined prospectively, 98 lesions suspicious for malignancy have been excised (0.95%). Diagnosis of melanoma has been proofed histologically in 13 samples (NNT: 7.54). Most common histological types were invasive superficial spreading melanoma (SSM; n=10; 76.9%) and superficial spreading melanoma in situ (n=3; 23.1%). Ratio of invasive malignant melanomas to melanomas in situ (MM:MMIS) was 3.3.

Conclusion. Reducing the NNT should be ultimate objective of every dermatologist without losing sight of sensitivity.

KEY WORDS: sequential digital dermatoscopy; number needed to treat; melanoma; screening.

Introduction

The number of biopsies needed to be excised to reveal one diagnosis of melanoma can be given as number needed to treat (NNT). This ratio is a useful tool to assess the efficiency of melanoma-detection. It can compare different centers as well as reflect skills and progress in one’s dermatoscopy-competence. A large number of NNTs is published ranging from 2.43 (1) to 83 (2). The ratio of invasive malignant melanomas to melanomas in situ (MM:MMIS) has been published recently appearing to be an indicator of sensitivity (3). Dermatoscopy has enhanced clinical diagnosis in virtually every study; key factors in using this screening method are attention to patient’s age and location of lesion, as well as identification of classic dermatoscopic features. Examiner experience also improves screening results (4, 5).

Dermatoscopy as routine screening method led to an improved NNT and could possibly safe costs as well as reduce number of surgeries to be performed (6). Compared to routine screening by visual examination, dermatoscopy is able to improve specificity and positive-predictive value in diagnosis of melanoma (7). However, sensitivity is limited in melanomas arising in unpigmented skin or from clinical benign naevi initially unphotographed (8).

Objective of this survey was to evaluate the accuracy in screening of melanocytic lesions for melanoma and to assess the NNT.

Material and methods

381 consecutive patients of a private outpatient department in Austria have been included. All underwent melanoma-screening using a digital sequential dermatoscopy-system (Mole Max 2; Derma Medical Systems, Vienna). The same examiner with special training in dermatoscopy and years of experience performed the investigations. Suspicious lesions were excised as agreed upon with the patient and after informed consent was given. The main indications for excision were asymmetrical growth or pigmentation as well as development of dermatoscopic features indicative of melanoma (9). All lesions were examined microscopically by one board-certified dermatopathologist. Excisions performed exclusively due to cosmetic reasons were not included.

All lesions were excised at follow-up dermatoscopic examinations.
Results

A total of 10,356 melanocytic lesions in 381 consecutive patients were documented by digital photography and prospectively included. Mean Age of examined patients was 43.2 years. The mean number of examined melanocytic lesions per patient was 27.12 (min: 1, max: 110). 98 lesions suspicious for malignancy were excised (0.95% of all lesions examined) (for patients characteristics see Table 1). The diagnosis of melanoma confirmed histologically in 13 samples (8 men and 5 women). This yielded a NNT of 7.54. The most common histological type was invasive superficial spreading melanoma (SSM; n=10; 76.9%), followed by superficial spreading melanoma in situ (n=3; 23.1%), revealing a ratio of invasive malignant melanomas to melanomas in situ (MM:MMIS) of 3.3 (for histological subtypes of excised pigmented lesions see Table 2).

Most common benign types of excised lesions were compound naevus (n=27) and junctional naevus (n=16). Median Breslow-thickness was 0.55 mm (min: 0.20mm, max: 1.9mm).

Table 1 - Patient's characteristics.

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>PATIENTS (n=381)</th>
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<tbody>
<tr>
<td>melanocytic lesions examined</td>
<td>10,356</td>
</tr>
<tr>
<td>melanocytic lesions/patient</td>
<td>27.12</td>
</tr>
<tr>
<td>min</td>
<td>1</td>
</tr>
<tr>
<td>max</td>
<td>110</td>
</tr>
<tr>
<td>lesions suspicious for malignancy</td>
<td>98</td>
</tr>
<tr>
<td>histological proofed melanomas</td>
<td>13</td>
</tr>
<tr>
<td>male</td>
<td>8 (61.54%)</td>
</tr>
<tr>
<td>female</td>
<td>5 (38.46%)</td>
</tr>
</tbody>
</table>

Table 2 - Histological subtypes of excised pigmented lesions.

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<table>
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<tbody>
<tr>
<td>compound naevus</td>
<td>27</td>
</tr>
<tr>
<td>melanoma (SSM)</td>
<td>13</td>
</tr>
<tr>
<td>pigmented basal-cell-carcinoma</td>
<td>4</td>
</tr>
<tr>
<td>junctional naevus</td>
<td>16</td>
</tr>
<tr>
<td>squamous cell carcinoma</td>
<td>1</td>
</tr>
<tr>
<td>blue naevus</td>
<td>2</td>
</tr>
<tr>
<td>dermal naevus</td>
<td>12</td>
</tr>
<tr>
<td>Spitz naevus/Reed naevus</td>
<td>11</td>
</tr>
<tr>
<td>naevus-cell naevus, not otherwise specified</td>
<td>2</td>
</tr>
<tr>
<td>Clark naevus</td>
<td>8</td>
</tr>
<tr>
<td>histiocytoma</td>
<td>1</td>
</tr>
<tr>
<td>Sutton naevus</td>
<td>1</td>
</tr>
<tr>
<td>n = 98</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Beside skin type, family history, biographic features (such as sunburns or immunosuppression), melanocytic naevi represent potential precursor lesions. Also the total number of naevi is considered a marker for melanoma but the risk of any single melanocytic lesion being transformed into a melanoma is low (10). Nevertheless the accuracy of routine screening is the most important factor in detection of melanoma as early diagnosis is important to improve survival of melanoma-patients (11, 12). A correct and prompt clinical diagnosis of a suspicious melanocytic lesion can not only reduce mortality and potentially save costs but also save patients from adverse side effects due to further interventions, ranging from further surgery to chemotherapy.

Correct diagnosis must be the ultimate objective, but as every surgical intervention is associated with a certain rate of major and minor complications, reduction of such procedures seems to be necessary; even the National Institute of Health (NIH) recommends to excise any suspicious lesion by excisional biopsy (13). No one wants to miss a melanoma so the degree of suspicion must be high. Nonetheless the variance of NNT seems too great to us. Centers with a higher NNT are putting their patients at unnecessary, albeit minor risk and increasing health care costs.

There are different studies addressing the topic of NNT relating to skin cancer revealing a wide range of NNTs (1, 2, 14). Variability amongst settings like different examiners (specialists in dermatology, general practitioners, etc.), routine in dermatoscopy, and study-design (as most of the studies have been designed to analyze data retrospectively) have to be taken into consideration (6, 15, 16); however, no valid benchmark has been established so far.

A recently published study including more than 300,000 cases of excised melanocytic lesions over a period of ten years showed a number needed to excise (NNE) of 8.7 in specialized clinical settings. This number is a reflection of excellent clinical practice in estimating the NNT and can be seen as a pacemaker-result in this special field. Although our number of excised lesions as well as number of observed patients is much smaller in absolute terms, it parallels the data of Argenziano et al. quite precisely. This NNT extracted from an enormous amount of data as well as data in the published literature compares favourably with our study (6, 14, 16, 17). At the other end of the spectrum also very high NNTs can be found, usually in non-specialist settings and emphasised in specific subgroups (2).

An important point required in melanoma screening beside the NNT is sensitivity. Data showing especially low NNTs carry the risk of underdiagnosing and overlooking clinically suspect lesions (1). In a recently published paper Esdaile et al. found neither NNT nor benign to malignant (B:M) ratio to be sensitive tools as they do not represent the ability of detecting early or in situ melanomas. They established the invasive malignant melanoma to melanoma in situ (MM:MMIS) ratio as a marker of sensitivity and observed a fall of NNT, B:M ratio and MM:MMIS ratio over the time of five years as an indicator for early detection of melanomas (3). The MM:MMIS ratio of 3.3 calculated from this study is performing well compared to the initial MM:MMIS ratio of 3.18 presented by Esdaile et al. (3).
Examiner experience is an important factor influencing clinical diagnostic accuracy and thus NNT. Those clinicians regularly employing dermatoscopy can reduce their NNT in comparison to those who do not use the technique (6). In addition, recent graduates from training programs have a higher NNT than more experienced colleagues (2).

Screening for melanoma can be performed with the naked eye, using a magnifying loupe or dermatoscope or relying on technical auxiliary devices, such as computerized digital dermatoscopy and even in vivo confocal scanning laser microscopy (18-20). In this study, a MoleMax-device has been used for sequential digital dermatoscopy imaging (SDDI). MoleMax offers, like other SDDI systems, algorithms for calculating scores regarding suspicion of a pigmented lesion. Although this might be a useful tool, especially for less experienced clinicians, we refrained from using it on a regular basis.

Addition of dermatoscopy as a second-level examination has shown to be able to reduce the number of false-positive diagnosis and increasing specificity (7). Furthermore it has been shown that digital dermatoscopy is associated with a lower NNT and higher sensitivity of melanoma-detection compared to other diagnostic methods like naked eye or magnifying loupe (1, 12). Combination of conventional dermatoscopy and short-term SDDI (close monitoring of suspicious melanocytic lesions using sequential digital dermatoscopy) proofed to be able to reduce NNT as well as increase sensitivity for diagnosis of melanoma (21).

Beyond the reduction of unnecessary excisions compared to regular dermatoscopy (1), SDDI offers the advantage of looking at the dynamics by comparing potential progress of a suspicious melanocytic lesion over the course of time which is especially important in high risk patients. Furthermore optical magnification (depending on the system and screen used) and exact measuring of a lesions represents a benefit.

Dermatoscopy is based on certain typical findings. As it seems most likely that most individuals feature a predominant dermatoscopic type among their pigmented lesions, it has been shown in different studies that age and site of the naevi lead to variations in classic findings as well as predominant naevi-type (22-24). Dermatoscopic classification is particularly important regarding atypical naevi (Clark naevi) (8, 25). Dermatoscopic classification of these atypical naevi has been shown to represent a useful tool to discriminate benign from malignant lesions and is important for patients presenting with multiple pigmented lesions (26). This is especially important in patients with a familiar or not-familiar dysplastic naevus-syndrome [as an example familiar atypical multiple mole-melanoma (FAMMM)-syndrome].

Any excision performed due to cosmetic reasons have been decidedly excluded from this study, as the aim was not to investigate the NNT of all excised lesions but all clinically suspect melanocytic lesions. This is necessary to emphasis because variety of different study-designs found in literature are representing an important reason for weak comparability in malignant/benign-ratios. This fact makes it even more important to establish not only a standard design but also a valid NNT-benchmark for dermatologists. The more so because it was shown that NNTs presented when general practitioners perform screening examinations are obviously inferior to data presented by dermatologists (1, 2, 5, 16, 27).

As melanoma-screening is one of the key-qualifications of every dermatologist, all patients with suspicious lesions, history of malignant skin tumors, correlating family history as well as (extensive) exposure to sunlight should be referred to a dermatologist for further management. Using digital dermatoscopy has proved to be safe and is associated with a better management of pigmented lesions (1, 12), and most probably malignant-to-benign-ratio could be improved using this technique.

Conflict of interest
All authors state that there is no conflict of interest, especially no financial interest and/or arrangement or affiliation with any organization that could be perceived as a real or apparent conflict of interest in the context of this publication.

References