

# Accuracy of Malignant Melanoma Detection in the Community

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**SUMMARY** Malignant melanoma (MM) has increased profoundly in the past three-four decades in white populations worldwide. Early diagnosis is crucial for successful treatment. We aimed to assess the accuracy rate of diagnosing MM in the community by the surgeon and referring physicians. We prospectively collected data on all patients with preoperatively suspected or histologically proven MM, treated by a single plastic surgeon, between October 2001 and April 2005. Data were statistically analyzed using Excel software. Of the 50 patients with histopathologically proven MM, 74% were referred by dermatologists, 16% by primary caregivers, and 10% came independently or were under supervision of the operating plastic surgeon. Eighty percent MM lesions were early-stage, under 1 mm. Forty lesions were diagnosed clinically as MM by the plastic surgeon prior to surgery. Dermatologists diagnosed MM in only 30% of cases; the other 70% were referred for removal of suspect lesions. Dermatologists referred most MM cases. The high number of patients diagnosed with early stage MM (80%) reflects the efficiency of medical care in our community. We conclude that the diagnosis of MM in our community is efficient and derives from the balanced partnership between surgeons, dermatologists, primary caregivers, and patient awareness.

**KEY WORDS:** malignant melanoma, diagnosis, detection, community

## INTRODUCTION

Malignant melanoma (MM) has increased profoundly in the past three to four decades in white populations worldwide, especially in "sunbelt" countries like Australia, New Zealand and Israel (1-3), and is apparently related to the destruction of the ozone layer (4). In Israel, where exposure to sun is very high, there has been an increase of more than 300% in MM

during the last 40 years (5). Early diagnosis of MM is crucial for successful treatment because when MM is diagnosed in its early stages, the cure rate is extremely high with a five-year survival rate of about 96% (6). In our prospective study, we assessed the following: who referred the patients with proven MM; the pre-operative clinical accuracy rate of diagnosing MM in

the community by the referring physicians; the sensitivity, specificity and positive predictive value of MM detection by the plastic surgeon removing the MM; and the effectiveness of MM detection in the community according to the percentage of superficial MM.

### MATERIALS AND METHODS

Institutional Review Board approval was received for this study. We collected preoperative data on patients undergoing surgical removal of skin lesions, done by a single plastic surgeon, between October 2001 and April 2005. Diagnosis was made by clinical examination alone without the use of dermatoscopy, which is now being used. Information collected included the relevant epidemiological data, suspected diagnosis of the referring physician, the referring physician's specialty and the preoperative clinical diagnosis of the surgeon. Depth and location were recorded for each histologically confirmed MM. The percentages of different MM depths were calculated according to four groups: *in situ* MM, thin MM up to 1 mm in depth, intermediate MM 1 mm to 4 mm, and MM depth over 4 mm of invasion. The sensitivity, specificity, positive predictive value and negative predictive value of MM detection by the surgeon were also calculated.

Data were statistically analyzed using the Excel program.

### RESULTS

During the study period, 4200 patients had 4400 skin lesions removed and 50 of these patients had histopathologically proven MM. The incidence of MM removed was one out of every 88 biopsies taken (1.1%).

The mean age of the MM group was 61.4 years. There were 32 males, mean age 64.4, and 18 females, mean age 56.3. The age difference between men and women was not statistically significant ( $P=0.08$ ).

The depth of invasion of the MM detected in our study was as follows: 25 (50%) lesions MM *in situ*, 15 (30%) lesions 0-1 mm in depth, 5 (10%) lesions 1-4

**Table 1.** Characteristics of malignant melanoma removed: depth of invasion, anatomic location and referral for excision

Malignant melanoma depth	No. of patients
In situ	25 (50%)
0-1 mm	15 (30%)
0-4mm	5 (10%)
>4 mm	5 (10%)
Malignant melanoma location	No. of patients
Back	20 (40%)
Scalp and face	13 (24%)
Lower extremity	9 (18%)
Upper extremity	9 (18%)
Malignant melanoma referral	No. of patients
Dermatologist	37 (74%)
Primary caregiver	8 (16%)
Self-referred	5 (10%)

mm in depth, and 5 (10%) lesions with depths of invasion greater than 4 mm. Overall, 40 (80%) patients had MM less than 1 mm of invasion (Table 1).

The distribution of locations was as follows: 20 (40%) on the back, 12 (24%) on the scalp and face, and 9 (18%) on the upper limbs and lower limbs each (Table 1).

Dermatologists referred 37 (74%) patients, 8 (16%) patients were referred by their primary caregivers, and 5 (10%) patients either came on their own or were already under the supervision of the plastic surgeon doing the procedure (Table 1). In patients referred by dermatologists, MM was listed as the diagnosis in 11 (30%) cases, with the remainder of 26 (70%) being referred for the removal of either a suspect nevus or basal cell carcinoma (BCC). Among patients referred by their primary care physicians, only 1 (12.5%) lesion had a listed diagnosis of MM, while other lesions were referred to as a pigmented lesion, nevus or BCC.

Of the 50 cases of MM, the plastic surgeon preoperatively diagnosed MM correctly in 40 (80%) cases. Among the 10 lesions preoperatively misdiagnosed,

**Table 2.** Accuracy of plastic surgeon in malignant melanoma detection

	No. of melanomas	Melanomas	
Clinical examination			
Positive for melanoma	40	40	Positive predictive value 0.5
Negative for melanoma	4320	10	Negative predictive value 0.997
	Specificity	Sensitivity	
	0.99	0.8	

7 (70%) lesions were diagnosed as dysplastic nevi and all these lesions were found to be MM *in situ* by histology. Another 3 (30%) lesions were clinically suspected to be BCC, but were found to be non-melanotic MM on histopathology. Among all 4400 biopsies taken, the plastic surgeon made the clinical diagnosis of MM in 80 cases and it was correct in 40 (50%) of them. The rest of lesions were found to be dysplastic nevi, BCC, hemangioma, blue nevi, seborrheic keratosis and lentigo simplex. The plastic surgeon sensitivity for detection of MM was 0.8, specificity 0.99 and positive predictive value 0.5 (Table 2).

## DISCUSSION

In the United States, MM is the fifth most common malignancy in men and the sixth most common in women (7). It is estimated that MM will afflict approximately one in 52 men and one in 77 women in the United States during their lifetime (7). The incidence of MM in the world is increasing more rapidly than of other malignancies and is estimated to rise by 3% to 8% each year (1). Local excision results in a cure rate that is higher than 90% for thin melanomas (Breslow thickness <1 mm), while metastatic disease is resistant to both surgery and chemotherapy and is associated with 5-year survival rates of less than 20% (8). There is a global effort to: 1) prevent MM of the skin by restricting sun exposure; and 2) educate the public to seek medical advice for all suspect pigmented lesions to allow for early detection and increase cure rates.

In Israel, patients may seek consultation for skin lesions by approaching their primary caregiver or visiting directly a dermatologist without referral. Usually, the waiting time for surgical removal is relatively short.

In our study, we reviewed the MM patients in the clinical practice of a single plastic surgeon in the community. Of these, 50% of the MMs were *in situ* and an additional 30% were up to 1 mm in depth, so that 80% of our patients were stage I or less and only a small portion of patients (20%) were in a higher stage. In the study by Pennie *et al.* (9), dermatologists and non dermatologists diagnosed MM in stage 0 in 18.1% and 15.6% of the patients, respectively. In the study by Crocetti and Carli (10), the overall percentage of thin tumors ( $\leq 1$  mm) was 58.7% (in 53.7% of males and 62.2% of females). Another study that included over 35,000 cases of melanoma found that thin tumors (0-0.99 mm) comprised 66% to 68% of their cases (11).

Geller *et al.* (12) report that in the United States, women have a slightly higher incidence of MM before

age 40, while after age 40, men have a higher incidence and this difference increases with age. In our study, 64% of MM were found in men, which is consistent with the findings of Geller *et al.* (12), since their mean age at MM diagnosis was 52, while the mean age in our study was 61.4.

It has been noted that primary care physicians are less skilled in the early diagnosis of skin cancer compared with dermatologists (13-15), and that patients with MM detected by dermatologists had a preponderance of early stage melanoma and therefore higher survival rates compared with those detected by non dermatologists (9). Thorough physical examination by a well-trained dermatologist or plastic surgeon on a regular basis (at least annually) increases the chance of early diagnosis (16).

Patients with suspect skin lesions may delay medical examination due to the lack of knowledge, fear, or denial. An important reason for delayed diagnosis of MM is that patients often think that the lesions are insignificant or that they are transient and will heal without medical intervention (17). It has been shown that the major reason for the delay in the diagnosis of MM is patient-related (18,19). A recent study demonstrated that earlier diagnosis of second primary cutaneous melanomas was the result of patient education and careful follow up (20). Higher socioeconomic status goes along with early presentation of the disease and prolonged survival (21).

Clinical accuracy in diagnosing MM ranges from 47% to 97%, depending on the skills and experience of the examiner (16). For example, Graells *et al.* (22) found 78.02% concordance rate between the initial clinical diagnosis of skin lesions and histologic result for the dermatologist and 64.83% for the family physician. Since amelanotic melanomas are difficult for all practitioners to diagnose, it is important to be highly suspicious of every fast growing lesion (19).

In our study, dermatologists diagnosed MM preoperatively in only 30% of cases. The other 70% were thought to be suspect lesions such as dysplastic nevi or BCC. It must be remembered that the dermatologists were not asked to make clinical assessment as to the possibility of MM in all suspect lesions they referred for removal, so this study does not indicate that they have a lower capability to diagnose malignancy.

The high incidence of patients that were diagnosed with early stages of MM in our group reflects the efficiency of patient referrals to the plastic surgeon. In Israel, patients can see a dermatologist without the need for a referral from a primary physician.



In addition, primary caregivers show growing awareness of the disease and its treatment. A prior study has shown that most family physicians (85%) immediately refer patients with suspect lesions to a dermatologist or plastic surgeon (17).

## CONCLUSION

In our study, we reviewed diagnostic accuracy of a plastic surgeon in 50 cases of MM. Of these, 50% were *in situ*, 30% were up to 1 mm in depth, and 20% were at a more advanced stage. Thus 80% of cases were in stage I or less, which greatly increases the chance for curative surgery in these patients. We found the diagnosis of MM in our community setting to be efficient and resulting from successful partnership between the dermatologists, primary caregivers and patient awareness.

In order to improve the rate of early diagnosis, patient education should explain the dangers of unprotected sun exposure, especially at an early age. It should also stress the importance of self-examination and when indicated consultations with skin cancer specialists.

Cooperation and communication between referring physicians and surgeons should be encouraged. It is also recommended to integrate and implement advanced technologies such as dermoscopy and digital dermoscopy in order to improve the accuracy of clinical examination.

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