ACCURATE DIAGNOSIS AND MANAGEMENT OF MALIGNANT MELANOMA OF THE LOWER EXTREMITY

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Malignant melanoma is an often fatal neoplastic lesion involving epidermal melanocytes. The neoplasm frequently involves the lower extremities, and for this reason podiatrists must be well versed in accurate diagnosis and treatment. Podiatric literature contains many case reports and several review articles regarding malignant melanoma (1,2).

Patient Population

Symptomatic malignant melanomas of the foot are usually diagnosed in the elderly patient (3). The incidence ratio between males and females appears to vary with anatomic location as well as geographic region. Malignant melanoma more commonly affects the foot than does either basal or squamous cell carcinoma (4). Furthermore, atypical melanocyte activity occurs more commonly in whites than in members of the more darkly pigmented races (5).

Etiology

There are many suggested etiological factors for the development of atypical melanocytic neoplasia, including:

1. UV radiation from sunlight
   A. Direct (5)
   B. Indirect (solar circulating factor) (7)
2. Trauma (8-10)
3. Hormonal activity (11)
4. Development in association with melanocytic nevi (5)

Clinicohistologic Typing

Generally speaking melanocytic atypia originating in the epidermis grows in a horizontal direction (radial growth phase) throughout the epidermis. Lesions in this phase of development are usually asymptomatic and rarely metastatic. After a variable amount of time, ranging from months to decades, the atypical melanocytes begin to invade the underlying dermis and subcutaneous tissues (vertical growth phase). Lesions in the vertical phase of development frequently become symptomatic and are likely to metastasize. Regional metastases involve spread of atypical melanocytes from the primary lesion to the draining lymphatics and nodes or skin en route to the regional nodes. Spread of malignant melanoma beyond the regional nodes is known as extra-regional spread.

There are four basic types of primary cutaneous malignant melanoma that affect the foot and leg. These include:

1. Lentigo maligna and lentigo malignant melanoma
2. Superficial spreading malignant melanoma
3. Nodular malignant melanoma
4. Acral lentiginous malignant melanoma

Lentigo Maligna (LM) and Lentigo Maligna Melanoma (LMM)

This lesion is also known as Hutchinson's melanotic freckle, and usually affects older individuals. LM and LMM strongly correlate with exposure to UV radiation and may be seen on the calf or pretibial regions. The lesion typically begins as a light brown or tan macule (LM) that develops irregular margins and color variations (tan, brown, black) over years of slow horizontal growth. Areas of regression may appear pinkish. The lesion becomes darker and papular as invasive vertical growth develops (LMM). Histologically, LM displays atypical melanocytes in the basal layer of the epidermis and epithelium of cutaneous adnexae. LMM reveals spindle-shaped atypical melanocytes invading the dermis and subcutaneous layers.

Superficial Spreading Malignant Melanoma (SSMM)

This is the most common of all types of malignant melanoma. SSMM affects a younger patient population (usually middle-aged) than does LM or LMM. The lesion typically affects the torso in both males and females, and the legs in females. SSMM begins as a tan, brown, or black smooth bordered or notched macule. With the progression of vertical growth, the lesion becomes papular and/or nodular. Moreover, the play of colors includes tan, brown, and black as well as red, white, blue, and

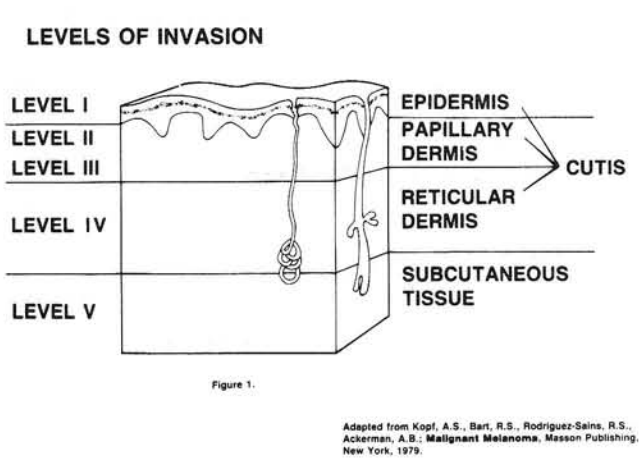

Figure 1.

Adapted from Kopf, A.S., Bart, R.S., Rodriguez-Sains, R.S., Ackerman, A.B.: **Malignant Melanoma**, Masson Publishing, New York, 1979.

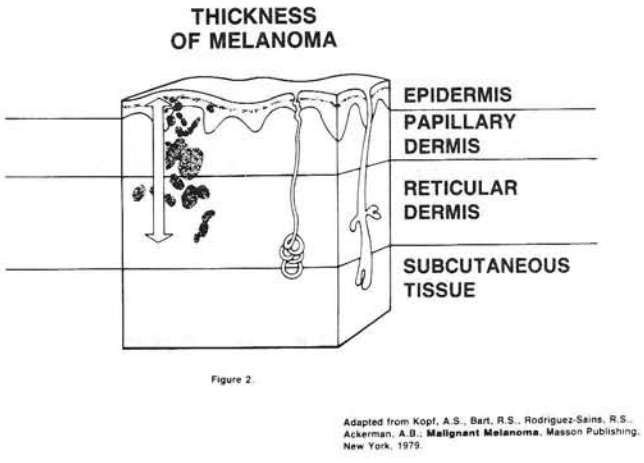

Figure 2.

Adapted from Kopf, A.S., Bart, R.S., Rodriguez-Sains, R.S., Ackerman, A.B.: **Malignant Melanoma**, Masson Publishing, New York, 1979.

C. Recurrent nevus following partial excision

2. Other benign lesions
   A. Pyogenic granuloma
   B. Seborrheic keratosis
   C. Dermatofibroma
   D. Contusion (bruise)
   E. Subungual hematoma
   F. Paranychia

3. Premalignant and malignant lesions
   A. Actinic keratosis
   B. Basal cell carcinoma
   C. Squamous cell carcinoma
   D. Kaposi sarcoma

Management of Suspected Malignant Melanoma

Malignant melanoma is often curable in the early stages. Therefore, a high index of suspicion and rapid intervention can be of great consequence. Definitive surgical treatment of the disease is based on a diagnostic biopsy, combined with clinical findings.

Excisional biopsy using a scalpel is the preferred method for histological diagnosis of malignant melanoma. This can be performed in the office or hospital setting on lesions small enough (generally less than 2 mm diameter) to close primarily or by means of a simple skin plasty. The specimen should be fusiform in shape, rimmed with normal appearing skin, and include subcutaneous fat. Moreover, the long axis of the specimen should be directed toward the regional lymph nodes. Lesions that are too large, or anatomically located such that they are not amenable to excision, are evaluated by means of incisional biopsy. There is no evidence that incisional biopsy when followed by appropriate definitive treatment decreases survival rate (19). It is crucial that what clinically appears to be the thickest part of the lesion be included, along with subcutaneous fat, in the subtotal specimen. Biopsies of suspected peri- or subungual malignant melanoma are obtained following nail plate avulsion, and must include representative portions of hyponychium, nail bed and matrix, and proximal nail fold with eponychium.

Definitive Surgical Management

The decision to undertake the care of a patient with suspected malignant melanoma depends on the individual podiatrist's ability, and the relationship of the podiatrist with other medical personnel skilled in the treatment of these patients. Following histological diagnosis, the podiatrist must once again decide his or her role in the management of the patient. Many podiatrists choose not to perform definitive surgical procedures once a histological diagnosis has been made. In these cases, the patient should be referred to an appropriate melanoma center for definitive care by a team well versed in the management of the disease.

It is now known that not all cases of histologically diagnosed malignant melanoma require radical surgical excision. Based on clinicohistologic staging, certain lesions have a very good prognosis. Ideally, a cure will be effected following excisional biopsy in the absence of any form of metastatic disease. Nonetheless, any patient that currently has or has had malignant melanoma requires thorough evaluation including stringent physical exam and appropriate ancillary testing to rule out metastases. Moreover, rigorous followup care is necessary to detect possible recurrence anywhere in the body. Thorough care, therefore, extends beyond the scope of podiatric medicine and surgery. Taking these facts into consideration, it is the individual podiatrist's duty to decide his or her role in the overall management of the patient with malignant melanoma. Ideally, a podiatrist who is interested and qualified should be part of the team which provides treatment for this disease.

Surgical intervention is the only definitive treatment for malignant melanoma of the lower extremity. Much has been written about definitive surgical techniques (4, 11, 18, 20, 21). Nonetheless, controversy exists regarding: 1) appropriate margin of clinically normal skin beyond the lesion or biopsy scar, 2) the need to resect deep fascia, and 3) lymph node resection. The following guidelines have been recommended (21):

1. Lentigo Maligna Melanoma (LMM)
   A. Levels I and II: 1-3 cm
   B. Level II: 3-5 cm

2. Superficial Spreading Malignant Melanoma (SSMM)
   A. Level I: 1-3 cm
   B. Level II: 3-5 cm, without elective node dissection for tumor thickness less than 0.76 mm
   C. Levels III, IV, V: 5 cm; with elective node dissection for tumor thickness greater than 1.5 mm, node dissection questionable for tumor thickness 0.76-1.5 mm

3. Nodular Malignant Melanoma (NMM)
   A. All levels: 5 cm; with elective node dissection

ALMM of the foot requires aggressive definitive treatment. Peri- and subungual malignant melanomas require digital and partial metatarsal amputation (4, 11). Plantar malignant melanomas should be widely excised (3-5 cm) including deep fascia, and elective regional lymph node dissection is recommended (4, 11, 20). Split-thickness skin grafts have proven useful even on weight-bearing areas of the sole (4, 11).

In all cases, deep fascia is resected when present, primary closure is preferred when appropriate, skin grafting is used when necessary, and aggressive margins (radical excisions, 5 cm margins) may be limited by anatomic feasibility. Moreover, clinically involved nodes are therapeutically removed, and elective lymph node dissection is performed, preferably in continuity, for highly suggestive lesions. Cytotoxic wound lavage using 1:5 buffered sodium hypochlorite at the time of surgery may be useful (20). Furthermore, adjunctive treatment in the form of isolated limb perfusion with a cytotoxic agent (cisplatinum) as well as immunotherapy with perilesional BCG innoculation may be helpful (4, 11).

Summary

Malignant melanoma of the lower extremity is a particularly aggressive neoplasm. Every podiatrist should become familiar with the signs and symptoms of this tumor, adept with appropriate biopsy techniques, and understand the clinicohistological factors that mandate proper management. Finally, definitive surgery is necessary for eradication of the malignancy.

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