Diagnosis of Cutaneous Melanoma

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A malignancy arising from pigment producing cells.

**Overview**

**DEFINITION**

- Internal: retina and intestines
- Cutaneous: The tumor resulting from malignant growth of the cells invades locally and has a relatively high risk of metastases beyond the skin.
- Skin: melanocytes and nevus cells
Overview

- Intermittent intense exposure, particularly early in life, also places individuals at risk for melanoma.

ETIOLOGY

- Increased CM with:
  - Increased latitude of residence
  - Location in sun-exposed anatomic sites
  - Migration from countries of low to high sun exposure

Ultraviolet Radiation

Melanoma, Cutaneous
**Overview**

- Type I & II higher CM risk
- CM linked to sunburn, due to skin type

**Skin Type**

- Type I
- Type II
- Type III
- Type IV
- Type V

**Cutaneous Melanoma**

- Fair skin is at increase CM risk
Genetic Factors

SKIN TYPE

Genetic Determinations

- 22% CM associated w/ DN
- DN in CM prone families (32,000/US)
- DN in isolated individual (millions)
- Min. risk any DN becoming CM

Dysplastic Nevi

Overview

DN indicator of CM risk
Genetic defects have localized to chromosomes 1, 6, 7, 9 and 10.

Inheritance is autosomal dominant; multiple genes contribute.

1% w/ living relative w/ CM
8-12% MM pt have 1 relative w/ hx CM

Genetic Defects
• Loss of growth control allows cells to grow uncontrollably.
• Occurs locally, in a horizontal fashion.
• Malignant melanocytes assume a vertical growth pattern invading across the dermal-epidermal junction.
• If the malignant cells enter the dermis they can then leave the skin via blood vessels and lymphatics.
Lymphatic metastases commonly lead to regional lymph node enlargement but occasionally regional nodes may be skipped and metastases appear in distant nodal areas. Hematogenous metastases allow cells to spread rapidly throughout the body. Studies have shown that less than 1% of cells remain viable in the bloodstream and therefore hematogenous spread is likely to be more clinically important in patients with large tumor burdens.
The degree of vertical growth or thickness of the tumor in the skin is consistently the most reliable predictor. Thickness and bad prognosis are directly related.

Overview

• The degree of vertical growth or thickness of the tumor in the skin is consistently the most reliable predictor.
Since 1980 the number of melanomas diagnosed annually in the USA has doubled. During the same period the population has increased by only 11%.

Lifetime risk for melanoma in 1980 was 1 in 250 and now it is 1 in 75.
SKIN CANCER DEATHS IN THE US

- Approximately **7200** deaths are attributable to melanoma each year.

- The mortality rate for melanoma has also increased but not as dramatically.

- Approximately **7200** deaths are attributable to melanoma each year.

**Melanoma**

75% due to melanoma
Cutaneous Melanoma

Overview

Risk Factors

- fair complexion (skin types I and II)
- sun exposure
- family/personal history of dysplastic nevi or melanoma
- blistering sun burns, particularly multiple and earlier in life
- family/personal history of dysplastic nevi or melanoma

Type I

Type II

Type III

Type IV

Type V
• Any pigmented lesion that has changed in size, color or shape
• or become an irritation to the patient for any reason
• should be evaluated for the possibility of malignancy
Cutaneous Melanoma

Abnormal Patterns of Pigmentation

Assessment

CLINICAL EVALUATION

Cutaneous Melanoma

Abnormal Patterns of Pigmentation

- Asymmetry: nonidentical halves divided by a line drawn through lesion
- Border: scalloped, coast of Maine
- Color: nonhomogeneous, varying shades of brown, black, red, white, blue
- Diameter: > 6 mm, > pencil eraser
Cutaneous Melanoma

Assessment

PET DETECTIVE: "George," an award-winning Schnauzer trained in bomb detection, sniffs out a tube containing cancer cells.

Future cancer fighters might have four legs

Dog has nose for deadly melanoma

TALLAHASSEE — The dermatologist and the dog trainer watched as George, the award-winning Schnauzer, circled a patient, sniffing until he came to a suspected cancerous mole. The dog sniffed hard, then sat down. "He knows he's supposed to snuffle and bite at it," said the dermatologist.

Doctor's assistant, who has trained dogs for 33 years, including eight as a sergeant in Vietnam and 22 as the head of the K-9 unit of the Tallahassee police department, removed the mole after the dog kept sniffing and biting at it.
**Serial photographs:** Total skin surface; one copy for home & one for clinic; used as a reference.

**Mole mapping devices:** Computer programs allow the clinician to store digital images in a computer data base for easy comparative reference.

**White light:** scattered at surface

**Wood’s lamp:** accentuates slight differences in color
Cutaneous Melanoma

**Assessment**

- Malignant growth patterns have a characteristic pigmentation pattern.
- **Dermatoscope**: 10x lens; halogen bulb; battery power.
- **Mole Max machine** - digital camera that captures epiluminescent images; stores images; compares images to a library of pigmented lesions to assist in decisions.

**Exam Aids**

- Visualization into pigmented lesions by passage of intense white light through a thin layer of mineral oil and a glass.

**EPILUMINESCENCE**

- Melanoma
- Cutaneous
- Glass
Level II Melanoma

Clinical view

Epiluminescent view
Clinical view

Epiluminescent view

Lentigo
• **Nevoscope** by Translite, www.tlite.com

**Transillumination**

• “**back lighting**” of lesion by angling the light to enter skin at the periphery of the lesion; light penetrates underneath the lesion reflecting back through lesions.

**Assessment**

- Characteristic pigmentary patterns are seen for both benign and malignant lesions.

- **Nevoscope**: camera lens; by Translite, www.tlite.com
Cutaneous Melanoma

Assessment

GOAL:
- diagnosis
- depth

BIOPSY

- PUNCH
- EXCISION
- SAUCERIZATION

- SHAVE
Cutaneous Melanoma

**PATHOLOGICAL EVALUATION**

**Morphology:**
- Pagetoid spread - cells in base of epidermis.
- In situ - cells confined to epidermis.
- Horizontal or Radial Growth Phase - cells spread through the epidermis.
- Vertical Growth Phase - cells penetrate into the dermis.
- Round or oval cells vs. spindle shapes.

**Special stains:**
- Silver stains (Fontana - Masson stain) for detection of melanin.
- Immunohistochemical (antibodies such as S - 100, HMB - 45, MART1, and Vimentin)
- Electron microscopy (detect melanosomes)
Prognosis and therapeutic considerations are based on the depth of penetration of malignant cells.

- **Breslow depth**: thickness measured in millimeters.
- **Clark’s Levels**: depth classified by cell penetration into different compartments of the skin.
  - Clark Level I - cells confined to the epidermis
  - Clark’s Levels V - deep penetration into subcutaneous fat
Hyperpigmented lesions
- Commonly progress from flat (childhood) to pedunculated (adulthood)
- Include the following:
  - **Junctional nevi**: macular to slightly elevated; uniform brown to black; measure 0.1 to 0.6 cm; often confused w/ CM; rarely go to CM.
  - **Compound nevi**: slightly elevated, dome shaped, smooth or verrucoid papules; low risk of CM.
  - **Intradermal nevi**: dome shaped, smooth verrucoid pedunculated nodules; tend to be benign.

**Acquired Melanocytic Nevi**
Congenital Melanocytic Nevi

Clinical Presentation

- Detected at or shortly after birth.
- Macular or plaque
- Vary greatly in size (mm to many cm).
- May be mixed with other components of the skin including hair.
- Risk of CM increases w/ size.

PRECURSOR LESIONS

Cutaneous Melanoma
Melanocytic nevi which develop a hypo or depigmented ring around them.

- Associated with vitiligo.
- Commonly seen in teenagers.
- Thought to be an immune response; often halo nevi will regress leaving normal skin.
- Asymmetry suggests CM

Halo Nevi
Cutaneous Melanoma

Dysplastic Nevi

PRECURSOR LESIONS

- Differ from common melanocytic nevi:
  - marked size variability.
  - irregular shape.
  - larger in size (5 - 12 mm).
  - angulated or indistinct borders.
  - non sun-exposed areas.
  - large numbers (75 - greater than 100).
  - continue to develop over the patient's lifetime.
  - CM risk 10x > for whites w/ DN.
  - CM risk 100% if DN pt. has >2 first degree relatives w/ CM.
Cutaneous Melanoma

Clinical Presentation

► Nevus cells that reside within the dermis
► SMALL BN (<0.5 cm)
  ▪ appear in childhood
  ▪ exts. and dorsum of hand
  ▪ no assoc. w/ melanoma
► LARGE CELLULAR BN (>1 cm)
  ▪ nodular; trunk
  ▪ assoc. w/ melanoma

Blue Nevi
FIGURE 43. Malignant melanoma of the skin pictured as one pathological process. Virtually all primary cutaneous malignant melanomas begin in the epidermis with extension of melanocytes horizontally. The four common types of malignant melanoma illustrated, namely, nodular, superficial spreading, acral lentigous, and lentigo maligna, differ mostly in the duration of proliferation of atypical melanocytes horizontally within the epidermis, i.e., shortest for nodular malignant melanoma, longest for lentigo maligna melanoma.
Clinical Presentation

Superficial Spreading

Superficial Spreading
Is this melanoma?

- 48 yo female
- 2 yr hx of pigmented plaque
- no personal or family hx of CM
- PE otherwise normal
Is this melanoma?

- 52 yo hispanic male
- 4.5 yr hx of pigmented plaque
- no personal or family hx of CM
- PE otherwise normal

Pigmented Basal Cell Carcinoma
Is this melanoma?

- 76 yo male
- >1 yr hx of pigmented macular lesion
- sister w/ hx of CM
- PE otherwise normal
Melanoma

Cutaneous

Nodular
Lentigo Maligna
Melanoma

Cutaneous

Acral Lentiginous
Is this melanoma?

- 71 yo white male
- >1.5 yr hx of a darkening pigmented streak in nail
- no family or personal hx of CM
- PE otherwise normal

Acral Lentiginous
Is this melanoma?

- 26 yo male
- 6 week hx of pigmented nail
- mother w/ hx of CM
- PE otherwise normal

Subungual Hematoma
Is this melanoma?

- 56 yo female
- <1 yr hx of nodular lesion; recent rapid growth
- no hx of trauma
- no family or personal hx of CM
- PE otherwise normal

Acral Nodular CM
Pyogenic Granuloma
Cutaneous Melanoma

Clinical Presentation

Amelanotic CM

CLINICOPATHOLOGIC TYPES
Contact Dermatitis
Is this melanoma?

- 57 yo male executive
- 9 month hx of erythematous scaly plaque
- cousin w/ hx of CM
- PE otherwise normal

Amelanotic CM
Is this melanoma?

**HISTORY**

- Determine if the patient has a personal or family history of:
  - melanoma
  - or melanoma precursor lesions
- Careful documentation of lesions previously biopsied on patients.
- If a biopsy is in question a re-evaluation of the specimen should be performed by a recognized expert in melanoma histology.
Any patient with melanoma or at risk for melanoma:

- A total body skin exam using good direct light.
- Examination aids (e.g., dermatoscope)
- All suspicious lesions should be carefully visualized, measured, and documented in the patient's medical record.
Cutaneous Melanoma

Role of the patient

- Self exams (skin & lymph nodes) twice a month
- Follow up with physicians
- Education of family members

SUNWISE BEHAVIORS

- Hat w/ broad brim
- Longsleeve shirt
- Long pants
- Sunscreen on noncovered areas
- Restrict outdoor activities to early AM or late afternoon

UNWISE BEHAVIORS

- Hat w/ broad brim
- Longsleeve shirt
- Long pants
- Sunscreen on noncovered areas
- Restrict outdoor activities to early AM or late afternoon