Treatment of skin cancer with Mohs micrographic surgery

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Goals

- Recognize and identify the main types of skin cancer
- Understand how and why Mohs surgery is utilized for the treatment of skin cancer
Skin Cancer

- Increasing incidence w/ more than 1Mil cases per/yr in US
- **Basal Cell Carcinoma** 85%-90%
- **Squamous Cell Carcinoma** 10%-15%
- At least 30% of white men in southern USA get skin cancer at some point in their lives
- **Melanoma** 1/45 lifetime, Rapid increase
Sun Damage

- Photoaging: Wrinkling, mottled pigment and onset of actinic keratoses and skin cancer

- UVB (290-320 nm)
  - Acute sunburn, mutations

- UVA (320-400 nm)
  - Photoaging, promotion
Actinic Keratosis (AK)

- Premalignant sun induced gritty erythematous macules and keratotic papules - No invasion of dermis
- May progress to squamous carcinoma
- Often require destruction with liquid nitrogen or 5-fluorouracil
- A marker for the potential development of cutaneous malignancy
- Commonly harbor mutations in p53
Basal Cell Carcinoma

- **Majority of Skin Cancer**
  - Arises from follicular (basal) germ
  - Well over one million cases annually US

- **Indolent but Destructive**
  - Doubling time 1 year
  - Rarely metastasizes
  - Locally highly destructive
Squamous Cell Carcinoma

- 250,000 Cases in USA Annually
  - Arises from squamous epithelium
- Most cutaneous SCC are indolent
- Rapid Growth Potential
- Metastasis
  - High risk sites: Ear, Lower Lip
  - High risk lesions: > 2 cm diam.
- Main risk factor: Sun exposure
Treatment: Basal Cell and Squamous Cell Carcinoma

- Imiquimod
- Curettage and Electrodesiccation
- Tangential excision (shave)
- Standard excision
- Excision with frozen sections
- Mohs microscopically-controlled excision
- Radiation therapy
Disadvantages of Conventional Sections: A missed margin

Positive margin missed
What is MOHS SURGERY?

- Invented by Frederick Mohs, MD
- **Key Concept:**
  - Tissue prepared to show view of all margins
- Surgeon is pathologist
  - **Early Efforts:** Tissue fixed on patient
  - **Modern:** Fresh tissue / Frozen section
  - Almost uniformly w/local anesthesia
How is Mohs surgery done?

- Tumor excision or “STAGE”
- Disc of tissue is divided & inked by surgeon at deep margins
- Tissue is flattened so that all deep & lateral margins lie in the same plane
- Margin face cut en face
- ALL deep & lateral margins are viewed simultaneously
Advantages of Mohs surgery

- All margins evaluated
- Highest cure rate
- Tissue Sparing
- Surgeon as pathologist
  - Surgeon has precise knowledge of tumor location
Mohs surgery: Indications

Literature:

- Recurrent BCC or SCC, some MIS
- Morpheaform or micronodular basal cell carcinoma (Aggressive growth)
- Lesions in the “T” zone of the face
- Lesions greater than 2 cm in diameter
- Facial lesions requiring tissue sparing

In practice:

Facial skin cancer
Mohs margins explained

Epidermal margin laterally

Deep margin centrally

Small tumor focus laterally
Mohs Surgery - Who does it? Who can do it?

- Mainly dermatologists
- Must be board certified to read dermatopathology
- 1 to 2 year surgery fellowship required for certification by Mohs College
- Fellowship includes extensive instruction in reconstructive surgery
Mohs Surgery

- Usually local anesthesia
- No hospital stay
- Extensive surgery without hospitalization
- Moderately expensive, but no hospital fees, no anesthesia fees
- Very low complication rate
Nonmelanoma Skin Cancer
Take-home message

- Basal cell and squamous cell carcinoma should be respected as malignancies.
- Early recognition & definitive treatment provide high cure rate & prevent serious deformity and/or death.
Malignant Melanoma

- Malignant tumor of melanocytes
- Incidence increasing faster than any other malignancy
- Current US lifetime incidence approximately 1 in 90
- Approximately 7500 deaths in US per year
- Curable if treated definitively at an early stage
Recognition of Malignant Melanoma

- **Asymmetry**
- **Border Irregularity**
- **Color variegation** (Multiple shades of brown, black, often red, grey, even blue and white)
- **Diameter** (Greater than 6 mm)
- **Elevation** (Grave prognostic sign)
Lentigo Maligna / Melanoma in situ

- Overtaking superficial spreading as most commonly diagnosed form of melanoma
- Long (many years) preinvasive phase as lentigo maligna (melanoma in situ)
- Peak incidence is in 6th to 7th decade
- By far most common on face
Treatment of melanoma in situ

- Excision with at least 5 mm peripheral margin
- Frequently surgical margins are found to be positive, necessitating further surgery
- Mohs surgery with specialized immunostaining can assist in definitive tumor removal.
Dermatologic Surgery

Immunohistochemical staining of lentigo maligna during Mohs micrographic surgery using MART-1

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Background: Lentigo maligna (LM) often displays extensive subclinical spread. Mohs micrographic surgery (MMS) has been proposed to help delineate the true histologic margin; however, visualizing atypical melanocytes on frozen section is challenging and often requires confirmatory permanent paraffin sections.

Objective: Our aim was to use a monoclonal antibody to rapidly stain frozen sections during MMS to facilitate better visualization of atypical melanocytes.

Methods: Frozen sections of LM during MMS were stained with MART-1 (melanoma antigen recognized by T cells) and compared with paraffin-embedded sections.

Results: We found 100% correlation between frozen sections stained with MART-1 and paraffin-embedded sections.

Conclusions: Atypical melanocytes can be better visualized on frozen sections of LM by using MART-1 rather than hematoxylin and eosin. This allows for easier identification during MMS and better chance of complete removal of LM lesions. (J Am Acad Dermatol 2002;46:78-84.)
MART-1 Antibody

Immunostaining Melanoma Frozen Sections: The 1-Hour Protocol

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BACKGROUND. There is significant debate over the use of frozen section processing in Mohs micrographic surgery (MMS) for melanoma. Opponents argue that individual melanocytes are too subtle to view consistently on frozen sections. On the other hand, proponents state that (1) melanocytes are visible on well-prepared frozen sections and (2) MMS using frozen sections for evaluation of melanoma surgical margins achieves comparable recurrence rates when compared with MMS using paraffin-embedded, permanent sections.

OBJECTIVE. To introduce a new immunohistochemical (IHC) staining protocol that consistently produces melanoma frozen

METHODS. We adapted a polymer-based IHC staining protocol to use with MMS frozen sections for the evaluation of melanoma surgical margins.

RESULTS. When used with antibody directed against MART-1 for frozen section evaluation of melanoma, the section staining is reproducible and specific for melanocytes.

CONCLUSIONS. In contrast to current IHC protocols that are time consuming (2 to 2.5 hours), we present a new frozen section protocol that takes approximately 1 hour to perform. This technique benefits patients, histotechnicians, and surgeons.