CHAPTER 3

SKIN AND SUBCUTANEOUS LESIONS

Lesions can be categorized into benign or malignant types.

I. BENIGN

A. Scars.

1. Hypertrophic scars. These scars are often misdiagnosed as keloid scars (see below). One can distinguish between hypertrophic and keloid scars as follows:
    a. Hypertrophic scars are scars confined to the borders of the original incision or traumatic margins.
    b. Hypertrophic scars may regress spontaneously with time.
    c. Commonly develop in areas of tension (upper/lower extremities, back, chest).
    d. No racial predilection.
    e. Hypertrophic fibroblasts behave as normal fibroblasts in terms of collagen and fibronectin production, as well as in terms of their response to transforming growth factor beta type-1 (TGFb1).
    f. Treatment. Scars generally take 18-24 months to mature (reach their final appearance). Therefore hypertrophic scars can be modulated with either or a combination of:
        i. Constant or intermittent pressure therapy (compression garments or massage)
        ii. Topical silicone sheeting
        iii. Intralesional steroid injections (10mg/ml or 40mg/ml triamcinolone, a.k.a. Kenalog-10 or Kenalog-40)
        iv. Surgical intervention (scar revision) in select cases.
2. Keloid scars. As opposed to hypertrophic scars, keloid scars have the following characteristics:
    a. Keloid scars are scars that grow beyond the borders of the original incision or traumatic margins.
    b. Keloid scars do not regress spontaneously with time, and have a high recurrence rate.
    c. Keloid scars can develop in areas of tension and nontension.
    d. A racial predilection exists, as keloid scars appear more frequently in Asians and African-Americans compared to Caucasians.
    e. Keloid fibroblasts produce higher levels of collagen, fibronectin, and are hyperresponsive to TGFb1.
    f. Treatment. Keloid scars are difficult to treat, and are often refractory to nonsurgical and surgical therapies. Furthermore, these scars have a high recurrence rate in the setting of the various modalities of treatment
        i. Intralesional steroids alone (9-50% recurrence rate)
        ii. Surgery alone (45-100% recurrence rate)
        iii. Surgery and intralesional steroids (50% recurrence rate)
        iv. Surgery and radiotherapy (25% recurrence rate).

B. Benign Neoplasms and Hyperplasias.
    1. Seborrheic Keratosis
        a. Most common of the benign epithelial tumors
        b. Usually hereditary (questionable autosomal dominant pattern)
        c. Clinically manifest after age 30
        d. More common in male population
        e. Progresses from macule (skin-colored or tan lesion in Caucasians), then progresses to plaque ("stuck-on" appearance) that is more pigmented in color. The surface may become "warty" and horn cysts, resulting from plugged hair follicles, arise. These cysts are pathognomonic for this keratosis.
        f. Treatment
            i. Electrocautery, cryosurgery with liquid nitrogen spray (high recurrence rate)
            ii. curettage with cryosurgery (optimal modality as this does not destroy cytoarchitecture and permits histopathologic analysis).
    2. Keratoacanthoma
        a. Often confused or misdiagnosed with squamous cell carcinoma
        b. Clinically manifests in middle years (20-50 years)
        c. Male: female ratio 2:1
        d. Caucasians more likely to be affected; rare in Asians and African-Americans
        e. Isolated nodule that rapidly grows, achieving a size on average of 2.5cm within weeks. Nodule is dome-shaped, firm, red-tan in color, and has a central keratosis that sometimes gives it an umbilicated appearance.
        f. Anatomical areas of predilection: exposed skin
        g. DDx: SCC, hypertrophic actinic keratosis, verruca vulgaris
        h. Lesions often spontaneously regress within 2-12 months.
        i. Treatment:
            i. Single lesion: Surgical excision is often recommended (to rule out SCC).
            ii. Multiple lesions: Retinoids and methotrexate. If no improvement, must excise.
    3. Dermatofibroma
        a. A.k.a. Solitary histiocytoma, sclerosing hemangioma
        b. Females>males
        c. Clinically manifests in adulthood
        d. Button-like dermal nodule, usually develops on the extremities, variable in color. Borders ill-defined. Occasionally tender.
        e. Lesions may persist or spontaneously regress.
        f. Treatment: Surgical excision rarely indicated; cryosurgery with liquid nitrogen spray often effective.
    4. Skin Tag (a.k.a. Acrochordon, or cutaneous papilla)
        a. Common; most often present in middle aged or elderly
        b. Intertriginous areas (axillae, groin, inframammary fold) common sites; also eyelid, neck
        c. Clinically manifest as soft, skin-colored, pedunculated papilloma or polyp; range in size between 1-10mm. May increase in number and size during pregnancy.
        d. DDx: Pedunculated seborrheic keratosis, dermal or compound nevus, neurofibroma, or molluscum contagiosum.

e. Treatment: Simple excision or cryosurgery.

5. Trichoepithelioma
   a. Common during puberty.
   b. Anatomical sites: face, scalp, neck
   c. Clinically manifest as small skin-colored or pearl-like lesions, that increase in number and size
   d. Can be confused with BCC (sclerosing or morpheaform-type0.
   e. Treatment: Surgical excision for concerning lesions
6. Syringoma
   a. Benign adenoma of intraepidermal eccrine ducts.
   b. May be familial.
   c. Anatomical sites: face (eyelids), axillae, umbilicus, upper chest, and vulva.
   d. Most often multiple, skin-colored or yellow firm papules occurring in primarily in pubertal women.
   e. Treatment: Electrosurgery.
7. Lipoma
   a. Single or multiple benign fatty tumor(s)
   b. Neck and trunk common sites.
   c. Clinically manifest as soft, mobile, almost fluctuant masses that are not adherent to the skin
   d. Treatment: Surgical excision (esp. > 5cm).
8. Verruca (wart)
   a. Usual viral etiology (i.e., HPV).
   b. May disappear spontaneously or respond to medical treatment.
   c. Do not excise as recurrence is likely; use cautery or liquid nitrogen.
   d. Do use pulsed dye laser for recalcitrant warts
9. Miscellaneous
   a. Pyogenic granuloma
      i. Ulcerating, tumor-like growth of granulation tissue, the result of chronic infection, may resemble malignant tumor
      ii. Treat by topical silver nitrate, excision, curettage, laser
   b. Xanthoma (xanthelasma)
      i. Small deposits of lipid-laden histiocytes, most common in eyelids, sometimes associated with systemic disorders (hyperlipidemia, diabetes)
      ii. Treat by excision
   c. Rhinophyma
      i. Severe acne rosacea of the nose, overgrowth of sebaceous glands causing bulbous nose
      ii. Treat by surgical planing (shaving) with dermabrasion or laser
   d. Epidermoid (often misnamed sebaceous)
      i. Almost always attached to overlying skin, frequently acutely inflamed if not excised
      ii. Excise with fusiform-shaped island of overlying skin attachment (including puncture) when not inflamed
      iii. Acutely inflamed cyst may require incision and drainage with subsequent excision

e. Hidradenitis suppurativa
    i. A chronic, recurrent inflammatory disease of hair follicles (folliculitis)
    ii. Occurs in axilla, groin and perineum and breast (intertriginous areas)
    iii. Treatment
        (a) In early stages, antibiotics (topical clindamycin or oral minocycline) and local care including incision and drainage of abcesses
        (b) Later stages require excision of all involved tissue, and primary closure (associated with local recurrence) or closure by secondary intention (preferred method) or skin grafting

C. Congenital Lesions
1. Dermoid Cyst
    a. Congenital lesion usually occurring in lines of embryonic fusion (lateral 1/3 of eyebrow, midline nose, under tongue, under chin)
    b. CT scan of midline dermoid to rule out intracranial extension
2. Nevi
    a. Classification
        i. Intradermal (dermal)
            (a) Most common, usually raised, brown, may have hair
            (b) Essentially no potential for malignant change to melanoma
            (c) Treatment: Surgical excision necessary if concerning changes arise, or if lesion is aesthetically displeasing to patient
        ii. Junctional
            (a) Flat, smooth, hairless, various shades of brown
            (b) Nevus cells most likely at basement membrane
            (c) Low malignant potential
            (d) Treatment: Surgical excision necessary if concerning changes arise, or if lesion is aesthetically displeasing to patient
        iii. Compound
            (a) Often elevated, smooth or finely nodular, may have hair
            (b) Low malignant potential
            (c) Treatment: Surgical excision necessary if concerning changes arise, or if lesion is aesthetically displeasing to patient
        iv. Large pigmented (bathing trunk nevus)
            (a) Congenital lesion commonly occurring in dermatome distribution
            (b) Defined as a lesion >20 sq. cm in size
            (c) Potential for malignant transformations (2-32% lifetime risk reported in literature)
            (d) Treatment: Surgical excision usually indicated. Due to large surface area, tissue expanders are required to recruit locoregional, unaffected skin via expanded flap transposition. Alternatives include skin grafting, laser resurfacing, or staged excision. It should be noted, however, with laser treatment only part of the nevus cells are ablated, which leads to destruction of local architecture. This may subvert clinical monitoring and pathologic analysis of tissue biopsies.
        v. Dysplastic nevus
            (a) Irregular border

(b) Variegated in color
(c) Often familial
(d) Most likely nevus to become malignant melanoma
(e) Treatment: Surgical excision

vi. Nevus sebaceous
(a) Most often seen on scalp and face
(b) 15-20% incidence of basal cell
(c) carcinoma
(d) Yellowish orange, salmon-colored, greasy elevated plaque
(e) Treatment: Surgical excision. This can either be performed in infancy/early childhood or adolescence, as the incidence of malignancy rises after puberty.

b. Summary: Treatment of Congenital Nevi
i. Excision and histological examination of all suspicious pigmented lesions based on:
(a) Clinical appearance
(b) History of recent change in:
(i) Surface area (enlarging)
(i) Elevation (raised, palpable, nodular, thickened)
(i) Color (especially brown to black)
(i) Surface characteristics (scaly, serous discharge, bleeding and ulceration)
(i) Sensation (itching or tingling)

ii. Excision of unsightly or constantly irritated nevus (beltline, under bra or beard area)

iii. Careful follow-up of very large pigmented nevus, with excision of any area of change (nodularity) or staged excision of as much lesion as possible (tissue expanders and primary closure, or skin grafts when necessary)

3. Vascular Lesions — Most common benign tumor of infancy
a. Hemangioma
i. Hemangioma (a.k.a, strawberry nevi)
(a) Most common benign vascular tumor, appearing at or shortly after birth
(b) Three clinical phases evident: proliferative (tumor increases in size for up to 6-7 months), involutional (stops growing, becomes gray/white in areas and then begins to regress over several or more years), and fibrotic.
(c) Treatment: Need for treatment rare, and depends on anatomical site and symptoms (see below). Observe frequently at first and reassure parents
(d) Indications for treatment: Obstructive symptoms (airway, visual), or bleeding. Systemic therapy (corticosteroids, 2mg/kg) is first line option; laser therapy may be indicated early. Interferon may be indicated for uncontrolled lesions. Surgery may eventually be indicated for removal of any disfiguring fibrofatty remnant, or in situations when bleeding is refractory to conservative measures.

b. Malformations
i. Capillary malformations (port-wine stain)

(a) Pink-red-purple stain in skin, usually flat, but may be elevated above skin surface. Does not regress
(b) Treatment: Laser therapy best (flashlamp-pumped, pulsed dye laser, 585nm); multiple (>3) laser sessions may be necessary; surgical excision not indicated

ii. Arterio-venous malformation
(a) Large blood-filled venous sinuses beneath skin and mucous membranes. Low flow. No bruit
(b) Treatment: Angiography for larger and progressive lesions. Embolization with (2-3 days prior to) surgery is beneficial. Excision may be indicated

iii. Arterio-venous
(a) Progressive increase in size and extent, multiple arteriovenous fistulas, bruit
(b) A-V shunts or angiography
(c) Treatment is embolization under angiographic control by itself or prior to surgical excision

iv. Lymphatic
(a) Subcutaneous cystic tumor (cystic hygroma) of dilated vessels which can be massive and disfiguring
(b) May cause respiratory obstruction, may become infected
(c) Spontaneous regression can occur, but surgical excision is often indicated
(d) Lymphatic malformation can occur with arteriovenous malformation

v. Mixed

D. Premalignant and Malignant Lesions of the Skin and Subcutaneous Tissue

1. Actinic or Senile Keratosis
   a. Crusted, inflamed, history of exposed areas of face and scalp, chronic sun exposure or history of x-irradiation
   b. Premalignant, biopsy of suspicious lesions, especially when nodular (excision), liquid nitrogen, topical chemotherapy (5-fluorouracil)
2. Squamous cell carcinoma in situ (Bowen's Disease)
   a. Scaly brown, tan or pink patch
   b. Frequently associated with chronic arsenic medication
   c. May be associated with internal malignancy
   d. May develop into invasive squamous carcinoma
   e. Treat by excision
3. Squamous cell carcinoma
   a. Rapidly growing (months) nodular or ulcerated lesion with usually distinct borders
   b. Occurs on exposed areas of body and x-irradiated areas and in chronic non-healing wounds (Marjolin's ulcer). Can metastasize to regional lymph nodes (10%)
   c. Treatment is surgical excision with adequate margins or with histologic frozen section or with Moh's micrographic surgery followed by reconstruction
4. Basal cell carcinoma
   a. Most common skin cancer
   b. Types — all types may show ulceration, with rolled smooth pearly borders

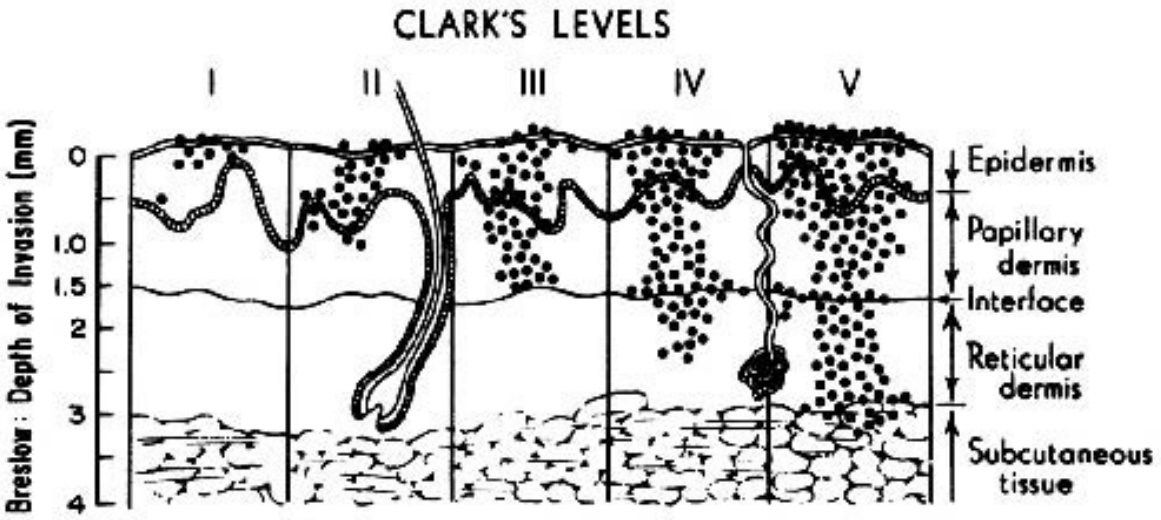
i. Nodular — well-defined "rodent ulcer"
ii. Superficial
iii. Pigmented — resembles melanoma
iv. Morphea Type — sclerosing — poorly defined borders, high recurrence rates

c. Usually seen on face or other sun-exposed areas of body, caused by UVB ultraviolet radiation
d. Slow-growing (years), destroys by local invasion, particularly hazardous around eyes, ears, nose
e. Very rarely metastasizes
f. Treatment: Surgical excision with adequate margins or with frozen section or with Mohs micrographic surgical excision followed by reconstruction

5. Melanoma
   a. Cause of great majority of skin cancer deaths
   b. Early lymph node and systemic blood-borne metastases — frequently considered a systemic disease
   c. Usually appears as black, slightly raised, nonulcerative lesion arising de novo or from a preexisting nevus
   d. Early recognition of changes in color, size or consistency of a pigmented nevus is critical (ABCD's = asymmetry, irregular borders, variegated color, diameter > 6mm).
   e. Classification
      i. Pre-malignant: Lentigo maligna (Hutchinson's freckle)
         (a) Flat, varied shades of brown pigmentation, larger than most nevi, irregular borders, smooth
         (b) Usually slow-growing, most often on face, more frequently in elderly
         (c) High incidence of development of invasive melanoma
         (d) Treat by excision, with graft or flap reconstruction if necessary
      ii. Invasive
         (a) Lentigo maligna melanoma (10%)
            (i) Develops in a Hutchinson's Freckle, usually as a thickened, elevated nodule
         (b) Superficial spreading melanoma (70%)
            (i) Flat to slightly elevated, may have a great variety of colors
            (i) Lesion initially spreads horizontally
         (c) Nodular melanoma (15%)
            (i) Characteristically blue/black in color
            (i) May be unpigmented (amelanotic)
            (i) Grows vertically, often with early surface ulceration
         (d) Acral lentiginous melanoma (5%)
            (i) On mucous membranes, palms, soles and subungual
            (i) May be amelanotic in African-Americans
   f. Histologic staging and correlation with metastases
      i. Breslow's depth of invasion — more reliable indicator of prognosis than Clark's level (Fig. 3-1)
         (a) Less than 0.76 mm — metastases virtually 0%
         (b) 1.50-3.99 mm — metastases 50%

(c) Greater than 4 mm — metastases 66%

ii. Clark's levels of cutaneous invasion (Fig. 3-1)
   (a) Level I (in situ) above the basement membrane — node metastases extremely rare
   (b) Level II — in the papillary dermis — metastases in 2-5%
   (c) Level III — to the junction of papillary and reticular dermis — metastases in up to 20%
   (d) Level IV — into the reticular dermis — metastases in 40%
   (e) Level V — into the subcutaneous tissue — metastases in 70%



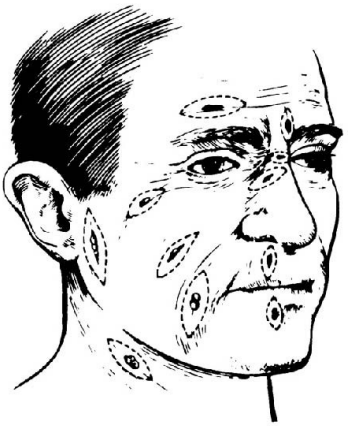
(FIGURE 3-1)

iii. Staging
   (a) Stage I: lesions less than 2 mm thick without ulceration
   (b) Stage II: 1-2 mm thick with ulceration or greater than 2 mm thick with or without ulceration
   (c) Stage III: regional node metastasis
   (d) Stage IV: distant metastasis

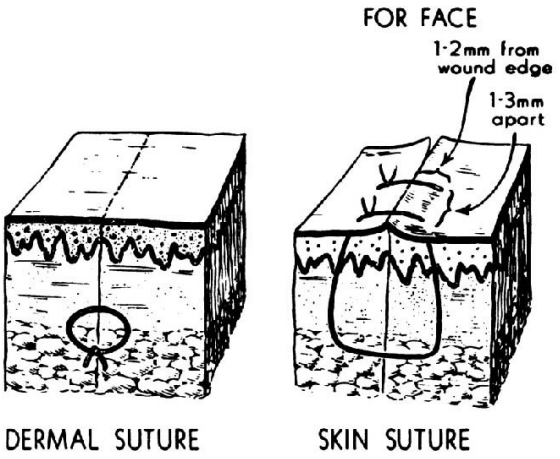
g. Treatment
   i. Most important is the manner in which the primary lesion is removed
   ii. ii. Complete excisional biopsy is necessary to determine level and thickness
   iii. Treated by "wide" excision with primary closure, split-thickness skin graft, or flap closure. Please note that permanent sections are often required to determine clear margins, and that frozen sections may not be reliable for this purpose.
      (a) Thin lesions (less than 1 mm) = 1 cm margin
      (b) Thick lesions (greater than 1 mm) = 2 cm margin
      (c) Note that margin also depends on location and may be compromised in critical areas
   iv. Sentinel node biopsy is used to determine regional metastases. Generally indicated for intermediate thickness lesions.

v. Regional node dissection indicated for positive sentinel nodes
vi. Node dissection performed for palpable nodes
vii. Extremity perfusion may be helpful for selected cases
viii. Radiotherapy, chemotherapy, and immunotherapy (i.e. Interferon) have not been proven curative but may have some palliative effect

6. Dermatofibrosarcoma protuberans (DFSP)
   a. Rare tumor
   b. Frequently occurs in head and neck, and genitalia (vulvar) regions.
   c. Treatment: Chemo- and radioresistant tumor. Requires wide excision to avoid recurrence (3-6cm). High recurrence rate in cases where wide local excision <3cm. Moh's surgery can also be indicated for these tumors.



(FIGURE 3-2)



(FIGURE 3-3)

CHAPTER 3 — BIBLIOGRAPHY

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