CRYOTHERAPY AND CUTANEOUS BIOPSIES FOR SOME COMMON DERMATOLOGIC DIAGNOSES

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Macule and Patch

- Macule
  - Small, flat, non-palpable lesion
  - Smaller than 5 mm in diameter (10 mm for others)
  - Lesion with color or subtle texture change only
  - No elevation above skin surface

- Patch
  - Flat, non-palpable lesion 5 mm in diameter or larger (10 mm for others)
  - Some accept a slight amount of scale as still acceptable in a patch
Papule

- Small, superficial, circumscribed, palpable lesion
- Elevated above the skin surface
- Less than 10 mm in diameter (some use less than 5mm)
Plaque

- Palpable lesion elevated above the skin surface
- 10 mm or greater in diameter
Nodule

- Firm (indurated) lesion that is thicker or deeper than the average papule or plaque
- From the Latin word ‘nodulus’, meaning ‘knot’
- If subcutaneous, may not elevate the skin surface
Vesicle and Bullae

- **Vesicle**
  - Elevated lesion that contains clear fluid
  - Small blister less than 10 mm in diameter

- **Bulla**
  - Elevated lesion that contains clear fluid
  - Blister more than 10 mm in diameter
Pustule

- Superficial elevated lesion
- Contains yellow fluid (pus) within or beneath the epidermis
- Often protein-rich, containing neutrophils
Special Descriptors

- Annular
- Serpiginous
- Comedo
- Cystic
- Violaceous
- Micaceous
- Blah, blah, blah
NOW WHAT?
Cryosurgery (CS)

- Very low temperatures applied to a lesion resulting in local destruction
- Extremely valuable alternative to surgical options
- Cost-effective with excellent aesthetic results
- Proper training → EASY DELIVERY

ADVANTAGES IN THE USE OF CRYOSURGERY

- Versatility for treatment of diverse conditions
- Treatment of any area of body
- Palliative therapy for inoperable tumors
- Excellent cosmetic results
- Suitable for office, nursing home, or outpatient facility
- Low cost
- No general anesthesia; local anesthesia optional
- Operative suite not required
- Safe and relatively simple procedure
- No restriction of work or sports
- Useful in pregnancy
- For patients who are fearful of undergoing surgery
- For poor surgical risk patients
- No age limitations – excellent for the very elderly
- Suitable for wheelchair and stretcher patients
Cryosurgery

- Freeze with subzero temperature
- Sloughing of damaged tissue
- Depth of damage: technique and freezing time
- Structural changes due to heat loss from cell (temperature flow from hot to cold → cell death)
- GOAL: Low temperature in tissue by freezing at a constant velocity with an initial low temperature
Cryosurgery

- Ice crystal formation extracellularly
- Osmosis: water leaves cell
- Intracellular dehydration
- Water leaving cell eventually freezes
- High freezing velocity: osmotic water movements slower (internal crystallization)
- Cell membrane destruction
- If freezing not enough (low freezing velocity) only ice formation extracellularly
- Distortion and damage to cell, but sublethal
Cryosurgery

- Ice crystals damage organelles and membranes
- Slow thawing: extend time tissue at subzero temperature
- Increase probability of intracellular ice formation and solute damage
Cryosurgery

- Total freeze time (30-60 sec), halo thaw time, total thaw time
- Useful indicators for measuring if freeze adequate
- Total freeze time < total thaw time
- Golden cryosurgery rule: freeze fast, thaw slowly
- Freeze/thaw repeat → cell is further damaged because ice formation faster
Cryosurgery

- General Rules of Thumb
  - 1 freeze-thaw cycle: flat, benign
  - >1 freeze-thaw cycle: bulky benign or malignant
Cryosurgery: Preoperative

- MINIMAL
  - Useful and practical for treatment of older patients
  - Difficulty lying down on table
  - Wheelchair
  - Can’t leave home or nursing home
  - Safe for variety of medical conditions (bleeding issues, pacemaker, etc.)
Cryosurgery: Preoperative

- KNOW WHAT YOU ARE TREATING!
- Skin biopsy to confirm, diagnose type of lesion, and depth of lesion
- Guide treatment plan
Cryosurgery: Preoperative

- Protect vital areas
- Avoid metal coverings
- Plastic, wood, or cotton
Cryosurgery: Technique

- Open
- Chamber
- Closed technique

- Open
- Cryogen released through tips
- Tip diameter
- Intermittent use of cryogen
- Distance from tip to target
- Determine amount of cryogen to lesion
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Cryosurgery

- DIFFICULT to establish duration of treatment! (APPROXIMATE)
- Thicker lesions need to be treated longer
- Keratin poor conductor
Cryosurgery

- Cotton swabs should not be used!
- Temperature control lost
- Poor thermal capacity → increase risk of suboptimal temperature
Cryosurgery

- Liquid nitrogen
- Ideal cryogen
- Safely transported, low cost, easy storage, low temperature (-196°C)
- Ideal temperature to destroy malignancies
  - -50°C to -60°C at periphery
- Academic interest: tissue temperature monitoring
Cryosurgery

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Cryosurgery: What can be treated?

<table>
<thead>
<tr>
<th>Benign lesions</th>
<th>Premalignant lesions</th>
<th>Malignant lesions</th>
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</thead>
<tbody>
<tr>
<td>Infectious diseases: warts, molluscum contagiosum, larva migrans, leishmaniasis, chromomycosis</td>
<td>Leukoplakia, actinic cheilitis</td>
<td>Basal cell carcinomas</td>
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<tr>
<td>Seborrheic keratosis</td>
<td>Keratoacanthoma</td>
<td>Bowen’s disease</td>
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<td>Pigmentary lesions: lentigines, lentigo simplex, solar lentigo, ephelides</td>
<td>Actinic keratoses</td>
<td>Kaposi’s sarcoma</td>
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<tr>
<td>Cystic acne, rosacea</td>
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<td>Lentigo maligna</td>
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<tr>
<td>Hypertrophic lichen planus, lichen sclerosis et atrophicus</td>
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<td>Squamous cell carcinomas</td>
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<td>Keloids</td>
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<td>Palliative treatment</td>
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<td>Prurigo nodularis</td>
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<td>Dermatofibroma, chondrodermatitis nodularis helicis chronica</td>
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<td>Mucocele, myxoid cyst</td>
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<tr>
<td>Vascular lesions: hemangiomas, vascular malformations, venous lake, angiokeratoma, cherry and spider angiomas, angiolympoid hyperplasia, pyogenic granuloma</td>
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<tr>
<td>Alopecia areata</td>
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<tr>
<td>Sebaceous hyperplasia, steatocystoma multiplex, syringomas, xanthelasma</td>
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<tr>
<td>Granuloma annulare</td>
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<tr>
<td>Lymphocytoma cutis</td>
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<tr>
<td>Trigeminal neuralgia</td>
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<td>Pearly penile papules</td>
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Cryosurgery

- Papillomavirus
- Keratin: poor cold conductor
- Reduce lesion (keratolytic or shave off)
- Freeze to several mm outside periphery
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Cryosurgery Video
Cryosurgery

- Molluscum
- HIV - avoid bleeding
- Aim at central dell
Cryosurgery

- Seborrheic keratosis
- Freeze: cover entire lesion plus 1-2mm
- Thaw few seconds and then curette off
Cryosurgery

- Seborrheic keratosis

- Freeze: cover entire lesion plus 1-2mm

- Thaw few seconds and then curette off
Cryosurgery

- Lentigines and ephelides
- Very cold sensitive
- 3-5 seconds from far away
- Freeze halo barely advance outside edge
- If not treated entirely → residual pigment
Cryosurgery

- Actinic keratoses
- 5-10 seconds of intermittent freeze
- Freeze: spread several mm past edge
- Hyperkeratotic: increase freeze time
- 2 cycles!
Cryosurgery

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Cryosurgery

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- 2 cycles!
Cryosurgery

- Postoperative Care

- MANAGE EXPECTATIONS
  - Edema (can be worse around apertures)
  - Pain: 45-60 minutes
  - Bacterial infection rare

- Soap and water
- Remove bullae/vesicle in several days
- Exudate: may need gauze
- 3-10 days: dry eschar
Cryosurgery

Postoperative Care

MANAGE EXPECTATIONS

- Erythema can last weeks
- Sun protection: avoid hyperpigmentation

- Hypopigmentation can develop
- Weeks-years
Questions on Cryosurgery?
Skin Biopsy

- Simple
- Can confirm diagnosis
- Remove cosmetically concerning lesions
- Provide definitive treatment for number of diagnoses
- Choice of technique
- Location, depth, size, malignant potential
Skin Biopsy

- Risk of blood borne infections
- Hepatitis B vaccination
- Universal precautions
- Gloves
- Eye guard
- Used sharp objects: OSHA-approved containers
Skin Biopsy: Where to Biopsy?

- Choosing site important
- If generalized, avoid lower extremities, palms, soles
- Chest and back: hypertrophic scars
- Groin and axillae: secondary infection
- Best: arms, upper legs, trunk
- Choose most representative lesion
Skin Biopsy

- **When to Biopsy What?**
- Epidermal: shave
- Dermal: punch, deep saucerization
Skin Biopsy: Bleeding Control

- Minimal
- Pressure
- Chemical hemostasis (20% aluminum chloride)
- Monsel’s solution (ferric subsulfate)
- TCA
- Silver nitrate
Skin Biopsy

- Light: 10% buffered formalin
- Electron: glutaraldehyde
- Frozen: immunohistochemistry, monoclonal Ab, IF studies
- Culture: normal saline (immediate lab transport)
Skin Biopsy: Type and Infection Risk

- Shave, punch, scissor
- Gowns, face masks, sterile field not strictly needed
- Clean gloves
- <1% risk of infection (poor technique)
Skin Biopsy: Infection Control

- Preparation of site
- Hand washing
- Alcohols, chlorhexidine, iodophors

- Prophylactic antibiotics usually not needed (uncontrolled DM, alcoholism, morbid obesity, and malnutrition)
Skin Biopsy: Anesthesia

- Lidocaine +/- epinephrine (1:100,000)
- Affect hemostasis, absorption, duration
- Buffered with 8.4% sodium bicarbonate (1:10 volume)
- 30 gauge needles
- 45° angle
- Inject slowly
- BE SAFE AND IN CONTROL
- Alternatives
Shave Biopsy

- Limited to epidermis and papillary dermis
- Quick
- Little training
- No sutures

Exophytic benign lesions (warts, skin tags, seborrheic keratoses)
Precancerous actinic keratoses
Superficial neoplasms (basal cell carcinoma, squamous cell carcinoma)
Superficial noduloulcerative processes
Shave Biopsy

- Fingers from non-dominant hand: taut skin
- Intradermal injection: wheal
- Double-edge razor blade parallel to base
- Gripped between thumb and index finger
- Cutting/sawing motion
- Horizontal through mid-dermis
- Depth controlled by blade concavity
Shave Biopsy

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Shave Biopsy Hemostasis

- Bleeding minimal
- Pressure, aluminum chloride, electrodesiccation
- Wounds heal in less than a week
Shave Biopsy Video
Saucerization Biopsy

- Skin lesion plus portion of surrounding skin
- Includes subcutaneous fat
- Lesions in epidermis and dermis
- Nevi, BCC, SCC, melanoma, etc.
Saucerization Biopsy

- Skin lesion plus portion of surrounding skin
- Includes subcutaneous fat
- Lesions in epidermis and dermis
- Nevi, BCC, SCC, melanoma, etc.
Scissor Biopsy

- Pedunculated lesions
- Nevi, filiform warts, skin tags
- Cosmesis, itching, irritation, catching on clothing
- Iris or gradle scissor
- Pressure or chemical hemostasis
Scissor Biopsy

- Pedunculated lesions
- Nevi, filiform warts, skin tags
- Cosmesis, itching, irritation, catching on clothing
- Iris or gradle scissor
- Pressure or chemical hemostasis
Punch Biopsy

- Very common alternative
- Sharp cylinders: punch or trephines
- Disposable or reusable (2-8mm)
- Easily mastered, quick, low incidence for infection, minimal scarring
- Dermal pathology

Processes involving deep dermis, adnexal structures or superficial subcutis
Inflammatory dermatoses
Direct immunofluorescence
Bullous disorders
Deep noduloulcerative processes
Diffuse eruptions
Small-vessel vasculitis
Infections (tissue culture)
Punch Biopsy

- \( \leq 3\text{mm} \): second intention possible
- \( \geq 4\text{mm} \) and face: sutures

- Alcohol pad, local anesthesia, gloves, punch instrument, forceps, scissors, gauze
Punch Biopsy

- Non-dominant hand: apply pressure
- Punch perpendicular to skin
- Press down and twist → bore out
- Forceps and scissor for removal
- Special sites: scalp, mucosa, nail
Punch Biopsy

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PRACTICE SESSIONS

Peraza Dermatology Group
THANK YOU

- Please do not hesitate to email with questions
  - dan@perazaderm.com

- Most images from Peraza Dermatology Group

- Content, tables, and some images: