Cryosurgery and Electrosurgery

Practical Applications

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The content of my material/presentation in this CME activity will not include discussion of unapproved or investigational uses of products or devices.

Objectives

• At the end of lecture, learner will be able to:
  » Identify the uses, risks, benefits, and complications of cryosurgery and electrosurgery
  » Learn the methods and techniques of cryosurgery and electrosurgery for destroying benign and malignant cutaneous lesions
  » Utilize standardized terminology, coding, and documentation to accurately code for cryosurgery and electrosurgery

Case #1

• 65 year-old male
• 4mm recurrent erythematous, gritty macule w/ scale
• Location: R helix

Diagnosis:
• Actinic keratosis

Cryosurgery

• Mechanism of Action:
  » Cellular fluid crystallization
  » Tissue destruction

• Indications:
  » Treat benign lesions
  » Treat vascular lesions
  » Treat premalignant and malignant skin cancer (ie, NMSC)

• Contraindications:
  » Melanoma
  » Nevus
  » Recurrent NMSC
  » Aggressive NMSC
  » Skin cancer along areas where Mohs surgery is indicated

Advantages:
  » Ease and speed
  » Multiple lesions
  » No anesthetic
  » No skin prep
  » Low supply cost
  » Effective for AK

Disadvantages:
  » Delivery and storage
  » Diagnosis must be accurate (no tissue for pathology)
  » Cosmetically imprecise
  » Erythema, swelling, blistering, pain
  » Multiple visits possible
  » Hypopigmentation

Case #2
- 45yo immunocompetent patient
- 1mo h/o 1.1 x 0.7 cm verrucous, hyperkeratotic plaque
- Location: L cheek

Diagnosis:
- Verruca vulgaris

Cotton wool bud (CWB) technique
- Advantages:
  - No upfront investment for cryogun
  - May be preferred for low-volume practice

- Disadvantages:
  - Fast LN2 evaporation
  - Imprecise
  - Possibility of viral transmission
  - Medical waste (CWB, cup)

Cryogun

Costs
- Equipment
  - Cryogun, spray tips, 20-liter dewar, cryoplate
  - $2,000

- Liquid nitrogen (LN2)
  - 20-liter dewar – static holding time of 8-12 wks
  - Lasts 2-3 wks in our busy practice
  - Cost: $0.25-0.50 per liter

Benign lesions: freeze times & margins

<table>
<thead>
<tr>
<th>Benign conditions</th>
<th>Average freeze time (s)</th>
<th>Halo diameter (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chondrodermatitis nodularis helicis</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>Condyloma</td>
<td>10</td>
<td>1-2</td>
</tr>
<tr>
<td>Dermatofibroma</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>Digital mucous cyst</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>Freckle</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>Molluscum contagiosum</td>
<td>5</td>
<td>0-1</td>
</tr>
<tr>
<td>Sebaceous hyperplasia</td>
<td>10</td>
<td>0-2</td>
</tr>
<tr>
<td>Seborrheic keratosis</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>Skin tag</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Solar lentigo</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Verruca</td>
<td>&gt;10 x 2 cycles</td>
<td>1-2</td>
</tr>
<tr>
<td>Acanthosis</td>
<td>15</td>
<td>1</td>
</tr>
</tbody>
</table>

Vascular lesions: freeze times & margins

<table>
<thead>
<tr>
<th>Vascular lesion</th>
<th>Average freeze time (s)</th>
<th>Halo diameter (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angiokeratoma</td>
<td>20</td>
<td>0.1</td>
</tr>
<tr>
<td>Angioma</td>
<td>15</td>
<td>0.1</td>
</tr>
<tr>
<td>Pyogenic granuloma</td>
<td>20</td>
<td>0.1</td>
</tr>
<tr>
<td>Vascular malformations (port-wine stain)</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Venous lake</td>
<td>15</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Case #4

- 63yo female w/ advanced dementia
- 1 year h/o 1.3 x 1.0 cm erythematous patch w/ scale & telangiectasia
- Location: L forearm

Diagnosis:
- SCC in situ (Bowen’s disease)

Premalignant and malignant lesions: freeze times & margins

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Average freeze time (s)</th>
<th>Halo diameter (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actinic keratosis</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>Actinic cheilitis</td>
<td>&gt;5</td>
<td>1</td>
</tr>
<tr>
<td>BCC (superficial or very small nodular)</td>
<td>30 x 2 cycles</td>
<td>5</td>
</tr>
<tr>
<td>SCC in situ (Bowen’s disease)</td>
<td>30 x 2 cycles</td>
<td>5</td>
</tr>
<tr>
<td>Keratoacanthoma</td>
<td>30 x 2 cycles</td>
<td>5</td>
</tr>
<tr>
<td>SCC in situ (Bowen’s disease)</td>
<td>30 x 2 cycles</td>
<td>5</td>
</tr>
</tbody>
</table>

Factors that affect cryosurgery

- Rate of freezing – rapid freezing means more tissue damage
- Rate of intermittent spraying – faster rate results in deeper freeze, but narrower edges
- Halo diameter – the wider the halo, the deeper the freeze at the periphery
- Distance of spray tip – the closer the tip, the colder the lesion gets
- Tissue temp – you need to reach -30°C to kill malignant cells
- Duration – longer freeze causes more tissue injury; max cell death occurs at 100 sec
- Rate of thawing – slow thawing causes more cell death
- Number of freeze-thaw cycles – more cycles, more injury

Coding and Billing

| Destruction or removal of skin tags | | Destruction of premalignant lesions (eg. AK) |
|-------------------------------------| |---------------------------------------------|
| 11200                               | Up to 15 skin tags | 17000 1st lesion |
| 11201                               | Each additional 10 skin tags | 17003 x # Each additional lesion (lesion #2 to #14) |
| 17110                               | Up to 14 lesions | 17260 15 or more lesions |
| 17111                               | 15 or more lesions | 17264 15 or more lesions |
| 17106                               | <10 cm² | 17270 Destruction of malignant lesions (eg. BCC, KA, BD, SCC) |
| 17107                               | 10-50 cm² | Location ≤0.5 cm 0.6-1.0 cm |
| 17108                               | >50 cm² | Trunk, arms, legs 17260 17261 |
| | | Scalp, neck, hands, feet, genitals 17270 17271 |
| | | Face, ears, eyelids, nose, lips 17280 17281 |
Case #5
- 44yo male, healthy
- 5mm purplish-red papule that gets irritated and has bled
- Location: L upper back

Diagnosis:
- Cherry angioma (hemangioma)

Electrosurgery
- Mechanism of Action:
  - Hot probes – heat transfer, causing burning
  - Cold electrodes – energy transfer to H₂O molecules, resulting in vaporization
- Indications:
  - Tissue excision
  - Vaporization of tissue
  - Hemostasis (coagulation)
  - Nail matrixectomy
  - Epilation
  - Cosmetic (skin tightening)
- Contraindications:
  - Caution w/ pacemaker
  - Melanocytic lesions if dysplasia or melanoma suspected
  - Recurrent NMSC
  - Aggressive NMSC
  - Skin cancer along areas where Mohs surgery is indicated

Electrosurgical functions
- Fulguration:
  - Electrode away from skin
  - Sparking to the surface
  - Latin: fulgur (lightning)
  - Shallow destruction
- Electrodesiccation:
  - Electrode touches or inserted to skin
  - Deeper destruction
  - Example: epilation
- Electrocoagulation:
  - Used to stop bleeding
  - For superficial & deep surgery
  - Even deeper destruction
- Electrosection:
  - Used to cut tissue
  - High-frequency (HF) electrosurgical units (ESUs) excel in this function
  - Higher frequency means less tissue destruction

Electrosurgical devices & units
- Advantages:
  - Ease and speed
  - Versatility
  - Hemostasis while cutting or destroying tissue
  - For destruction, sterility and sutures not needed
  - HF-ESUs minimize tissue destruction
  - Low infection rates
- Disadvantages:
  - Safety risks (eg, shocks, burns, etc)
  - Hypertrophic scars, if poor technique
  - Smoke may carry viral particles
  - Odor of smoke plume
  - Delayed hemorrhage
  - Slow healing for large areas; unsightly wound
  - No specimen vs artifacts

Case #6
- 53yo male w/ HTN
- Hit his L middle finger with a hammer while woodworking yesterday
- Presents with pain, swelling, & mild numbness

Diagnosis:
- Subungual hematoma
Tips for radiosurgery:

- Activation – activate first before skin contact; use foot pedal for fine procedures
- Cutting – adjust intensity to allow smooth uninterrupted movement (like “hot knife through butter”) – less tissue destruction
- Neutral plate ("antenna") – plate should be under patient, close to operative site (no skin contact necessary)
- Minimize lateral heat when cutting – minimize contact time, intensity of power, electrode size
- Tissue prep – use alcohol or moist 4x4, esp. for highly keratinized (dry) tissue
- Clean reusable electrodes – must be free of carbon (use fine sand paper to keep them shiny)

Coding and Billing

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<th>Description</th>
<th>11200</th>
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<th>17110</th>
<th>17111</th>
<th>17106</th>
<th>17107</th>
<th>17108</th>
</tr>
</thead>
<tbody>
<tr>
<td>Destruction or removal of skin tags</td>
<td>Up to 15 skin tags</td>
<td>Each additional 10 skin tags</td>
<td>Up to 14 lesions</td>
<td>15 or more lesions</td>
<td>&lt;10 cm²</td>
<td>10-50 cm²</td>
<td>&gt;50 cm²</td>
</tr>
<tr>
<td>Destruction of warts, molluscum, milia, or SK</td>
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<tr>
<td>Destruction of cutaneous vascular lesions (eg, angiomata)</td>
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<tr>
<td>Destruction of premalignant lesions (eg, AK)</td>
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<td>Destruction of malignant lesions (eg, BCC, KA, BD, SCC)</td>
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Location:
- Trunk, arms, legs: 17260, 17261
- Scalp, neck, hands, feet, genitalia: 17270, 17271
- Face, ears, eyelids, nose, lips: 17280, 17281

Practice Recommendations

- Use cryotherapy or electrosurgery for benign, premalignant, malignant and vascular skin lesions. Both surgical techniques are easy to learn and quick to perform, but are not indicated for lesions suspicious for melanoma, recurrent or aggressive NMSC, when the diagnosis is unclear or a tissue sample is imperative, and in areas where Mohs surgery is optimal. (SORT C)
- Complications of cryosurgery include pain, swelling, blistering, and hypopigmentation. Complications of electrosurgery include excessive tissue damage, electric shocks, interference with other medical devices, and hypertrophic scars. (SORT C)
- Radiosurgery is a precise surgical technique that can be used for fulguration, desiccation, coagulation, and cutting. Some of these functions can be performed simultaneously. (SORT C)
- Understanding documentation, coding and billing is key to appropriate reimbursement of cryosurgery and electrosurgery. (SORT C)