TRIGEMINAL NEURALGIA

Dr J Keaveny
BEUAMONT HOSPITAL
SPORTS SURGERY CLINIC
TRIGEMINAL NEURALGIA
PAIN

Sensory and emotional experience with or without physical damage or the potential for such damage
Facial Pain

regular attendee at pain clinic

PHN  BURNING

TGN  SHOOTING
Facial Pain

regular attendee at pain clinic

CONSTANT

INTERMITTENT
Causes of Facial Pain

- Sinus
- Nose
- Ear
- Mastoid
- Teeth
- Soft Tissue Infection

- Neurological
- Parotid
- Eye
- Headaches
- Tumours
- Bone
- Atypical Facial Pain
Facial Pain
Musculoskeletal Origin

- TMJ Disorders
- Myofascial Pain Syndromes
- Bony Lesions: infection/trauma/degeneration
- Metastatic lesions
Atypical Facial Pain

- Constant Pain
- Rarely pain-free
- Burning
- Entire face
- Paraesthesia
- No trigger points
- non-tender
- 30 years old
- Female 75-90%
TRIGEMINAL NEURALGIA

• SHARP SHOOTING PAIN
• VERY SEVERE
• FEW SECONDS to MINUTES
• PAINFREE INTERVALS
• NO NUMBNESS
• TRIGGERS
  – HOT/COLD/TOUCH/WIND/EATING/TALKING
TRIGEMINAL NEURALGIA
TRIGEMINAL NEURALGIA

• ALL DIVISIONS
  • 1  1%
  • 2  17%
  • 3  15%
  • 1 & 2  16%
  • 2 & 3  42%
  • 1, 2 & 3  9%
TRIGEMINAL NEURALGIA
TRIGEMINAL NEURALGIA

• UNCOMMON
• CAUSE RARELY FOUND
  – VASCULAR
  – MS
  – METASTATIC DISEASE
• MAINLY FEMALE 65%
• OVER 40s median 57yrs
TRIGEMINAL NEURALGIA
Trigeminal Neuralgia

• Jannetta
  – Mechanical compression TGN in Pons
  – Cross compression by major artery
    • superior cerebellar
    • posterior inferior cerebellar
    • vertebral
    • anterior inferior cerebellar
  – Vein
  – AVM or Tumor
Trigeminal Neuralgia

- 16th century stone carvings
- Johannes Bausch 1672
- Andre “tic doloureux” 1756
- Fothergill 1773
Trigeminal Neuralgia

• Poor early medical therapies
  – trichloroethylene 1920s
• Surgical procedures early 18th century
• Bell & Magendie early 19th
  – anatomy & functions 5th & 7th nerves
Trigeminal Neuralgia

• Mears 1884
  – surgery gasserian gnaglion
• Sir Victor Horsley 1891
  – Subtemporal retrobasserian neurectomy
• Fraser 1901
  – Suboccipital retrogasserian neurectomy
• Sjoqvist 1937
  – Trigeminal medullary tractotomy
Trigeminal Neuralgia
Trigeminal Neuralgia

INVESTIGATIONS

• MRI
• MR ANGIOGRAPHY

• IF OTHER SYMPTOMS or < 40 yrs FULL NEUROLOGICAL INVESTIGATION
TRIGEMINAL NEURALGIA
TREATMENTS

- MEDICAL
  - 70% successful
- NERVE BLOCKS
- PERCUTANEOUS LESIONS
- SURGERY
- PSYCHOLOGICAL SUPPORT
TRIGEMINAL NEURALGIA
MEDICAL TREATMENT

• ANTICONVULSANTS
  – Na channel blockers
  – Ca channel blockers

• ANTISPASMODICS

• ANTIDEPRESSANTS
  – Tricyclics

• OPIATES
Trigeminal Neuralgia

- Carbamazepine
- Gabapentin
- Pregabalin
- Lamotrigine
- Clonazepam
- Oxcarbazepine
- Topiramate
MEDICATIONS TGN

• AMITRIPTYLINE
• DULOXETINE
• VALAFAXINE
• FLUOXETINE
Anticonvulsants

- Somnolence
- Dizziness
- Fatigue/tiredness
- GI upset
- Ataxia
- Skin rash
- Weight gain
TRIGEMINAL NEURALGIA
NERVE BLOCKS

• SUPRA-ORBITAL 6% phenol 1-2cc
• INFRA-ORBITAL 6% phenol 1-2cc
• MAXILLARY
• GASSERIAN GANGLION BLOCK
TRIGEMINAL NEURALGIA
SURGERY

• MICROVASCULAR DECOMPRESSSION
• PARTIAL TRIGEMINAL RHIZOTOMY
TRIGEMINAL NEURALGIA
PERCUTANEOUS TECHNIQUES

• RADIOFREQUENCY RHIZOTOMY
• GLYCEROL RHIZOTOMY
• BALLOON COMPRESSSION
• GAMMA KNIFE RADIATION
• CYBER KNIFE
• PROTON BEAM THERAPY
PAIN DISTRIBUTION

- Mandibular 35%
- Maxillary 28%
- Ophthalmic 1%
- Mand & Max 22%
- Ophth & Max 13%
- All divisions 1%
RF Lesioning
D Buggy et al

- COMPLICATIONS
  - None 77%
  - Corneal Reflex damage 10%
  - Facial Dysesthesia 8%
  - Minor oral bleeding 2%
  - Masseter malocclusion 2%
  - Retro-orbital bleed 0.67%
# Review of RF lesioning

<table>
<thead>
<tr>
<th></th>
<th>Brisman</th>
<th>Moraci</th>
<th>Beaumont</th>
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<tbody>
<tr>
<td><strong>Zak</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>No</strong></td>
<td>157</td>
<td>607</td>
<td>150</td>
</tr>
<tr>
<td><strong>%female</strong></td>
<td>60.5%</td>
<td>62%</td>
<td>61%</td>
</tr>
<tr>
<td><strong>%right</strong></td>
<td>58%</td>
<td>55%</td>
<td>52%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>64%</td>
<td>65%</td>
<td>67%</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>7.2ys</td>
<td>5ys</td>
<td>6.5ys</td>
</tr>
<tr>
<td><strong>%success</strong></td>
<td>97%</td>
<td>96%</td>
<td>97%</td>
</tr>
<tr>
<td><strong>Recurrence</strong></td>
<td>24%</td>
<td>16%</td>
<td>15%</td>
</tr>
<tr>
<td><strong>Relief</strong></td>
<td>1.6ys</td>
<td>2.5ys</td>
<td>1.9ys</td>
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Comparison of Surgical Treatments for Trigeminal Neuralgia: Reevaluation of Radiofrequency Rhizotomy

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College of Medicine and Mayfield Clinic, Cincinnati, Ohio
TABLE 1. Characteristics of 500 Patients Who Underwent Radiofrequency Rhizotomy with the Use of a Curved Electrode to Create Dense Hypalgesia in the Painful Trigger Zone

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Characteristic</th>
<th>%</th>
</tr>
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<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>65</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>Side of coagulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td></td>
<td>63</td>
</tr>
<tr>
<td>Left</td>
<td></td>
<td>37</td>
</tr>
<tr>
<td>Division of trigeminal nerve involved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V₁</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>V₂</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>V₃</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>V₁ and V₂</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>V₂ and V₃</td>
<td></td>
<td>42</td>
</tr>
<tr>
<td>V₁, V₂, and V₃</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

*a V₁, first ophthalmic branch of the trigeminal nerve; V₂, maxillary branch of the trigeminal nerve; V₃, mandibular branch of the trigeminal nerve.*
TRIGEMINAL ABLATION
TRIGEMINAL ABLATION

- 70° x 90 SECONDS x 2
- EACH DIVISION
<table>
<thead>
<tr>
<th>Radiofrequency Rhizotomy</th>
<th>Glycerol Rhizotomy</th>
<th>Balloon Decompression</th>
<th>Posterior Fossa Exploration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Series (Ref. No.)</strong></td>
<td><strong>No. of Patients</strong></td>
<td><strong>No. of Patients</strong></td>
<td><strong>No. of Patients</strong></td>
</tr>
<tr>
<td>Sieglfried, 1981 (21)</td>
<td>1000</td>
<td>Lunsford and Bennett, 1984 (15)</td>
<td>112</td>
</tr>
<tr>
<td>Fraioli et al., 1989 (7)</td>
<td>533</td>
<td>Arias, 1986 (2)</td>
<td>100</td>
</tr>
<tr>
<td>Broggi et al., 1990 (4)</td>
<td>1000</td>
<td>Dieckmann et al., 1987 (6)</td>
<td>252</td>
</tr>
<tr>
<td>Sweet, 1990 (22)</td>
<td>702</td>
<td>Saini, 1987 (20)</td>
<td>469</td>
</tr>
<tr>
<td>Frank and Fabrizi, 1989 (8)</td>
<td>700</td>
<td>Fujimaki et al., 1990 (9)</td>
<td>122</td>
</tr>
</tbody>
</table>

*MVD, microvascular decompression.*
<table>
<thead>
<tr>
<th>Procedure</th>
<th>Radiofrequency Rhizotomy (Curved Electrode) (n = 500)</th>
<th>Radiofrequency Rhizotomy (n = 6205)</th>
<th>Glycerol Rhizotomy (n = 1217)</th>
<th>Balloon Compression (n = 759)</th>
<th>Microvascular Decompression (n = 1417)</th>
<th>Partial Trigeminal Rhizotomy (n = 250)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure completed</td>
<td>100</td>
<td>100</td>
<td>94</td>
<td>99</td>
<td>85</td>
<td>100</td>
</tr>
<tr>
<td>Initial pain relief</td>
<td>98</td>
<td>98</td>
<td>91</td>
<td>93</td>
<td>98</td>
<td>92</td>
</tr>
<tr>
<td>Success of procedure</td>
<td>98</td>
<td>98</td>
<td>85</td>
<td>92</td>
<td>83</td>
<td>92</td>
</tr>
<tr>
<td>Pain recurrence</td>
<td>20</td>
<td>23</td>
<td>54</td>
<td>21</td>
<td>15</td>
<td>18</td>
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<tr>
<td>Facial numbness</td>
<td>98</td>
<td>98</td>
<td>60</td>
<td>72</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>Minor dysesthesia</td>
<td>9</td>
<td>14</td>
<td>11</td>
<td>14</td>
<td>0.2</td>
<td>5</td>
</tr>
<tr>
<td>Major dysesthesia</td>
<td>2</td>
<td>10</td>
<td>5</td>
<td>5</td>
<td>0.3</td>
<td>5</td>
</tr>
<tr>
<td>Anesthesia dolorosa</td>
<td>0.2</td>
<td>1.5</td>
<td>1.8</td>
<td>0.1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Corneal anesthesia</td>
<td>3</td>
<td>7</td>
<td>3.7</td>
<td>1.5</td>
<td>0.05</td>
<td>3</td>
</tr>
<tr>
<td>Keratitis</td>
<td>0.6</td>
<td>1</td>
<td>1.8</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Trigeminal motor dysfunction</td>
<td>7</td>
<td>24</td>
<td>1.7</td>
<td>66</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Permanent cranial nerve deficit</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Perioperative morbidity</td>
<td>0.6</td>
<td>1.2</td>
<td>1</td>
<td>1.7</td>
<td>10&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Intracranial hemorrhage or infarction</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Perioperative mortality</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.6&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup> Combined values for microvascular decompression and partial trigeminal rhizotomy.
TRIGEMINAL NEUROPATHY
ATYPICAL FACIAL PAIN

- Constant Pain
- Rarely pain-free
- Burning
- Entire face
- Paraesthesia
- No trigger points
- non-tender
- 30 years old
- Female 75-90%

Cause unknown

Associated conditions
fibromyalgia
headaches
backpain
dysmenorrhea
ATYPICAL FACIAL PAIN TREATMENT

• ASSESSMENT
• MINIMAL INVESTIGATIONS
• ANTI-DEPRESSANTS
  • TRICYCLICS
• PSYCHOLOGICAL SUPPORT
• SYMPATHETIC GANGLION BLOCKS
SUNCT

- SHORT LASTING
- UNILATERAL
- NEURALGIFORM HEADACHE
- CONJUNCTIVAL INJECTION
- TEARING

- ORBITAL/SUPRAORBITAL/TEMPORAL
SUNCT

- STABBING PAIN
- 5-240 SECS
- 3-200 ATTACKS/DAY
SUNA

• SHORT LASTING
• UNILATERAL
• NEURALGIFORM HEADACHE
• CRANIAL AUTONOMIC FEATURE
  – NASAL CONGESTION
  – RHINORRHOEA
  – EYELID OEDEMA
• ORBITAL/SUPRAORBITAL/TEMPORAL
SUNA

• STABBING
• LAST 2-10 MINS
ATYPICAL FACIAL PAIN
TREATMENT

• ASSESSMENT
• MINIMAL INVESTIGATIONS
• ANTI-DEPRESSANTS
  • TRICYCLICS
• PSYCHOLOGICAL SUPPORT
• SYMPATHETIC GANGLION BLOCKS
POST HERPETIC NEURALGIA

• COMMON
• CAN BE DEBILITATING/SUICIDAL
• ANTIVIRAL AGENTS EARLY
  – synthetic purine analogues
  – inhibit activity against human herpes viruses
• NEUROGENIC PAIN
  • TRICYCLIC ANTIDEPRESSANTS
  • ANTICONVULSANTS
  • ?CAPSACIN
  • SYMPATHETIC GANGLION INJECTIONS