Side of facial pain in trigeminal neuralgia

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The side of facial pain was studied in 508 patients with unilateral trigeminal neuralgia. The pain was left-sided in 38%. There was no association between the side of facial pain and handedness, or in a smaller group between the side of facial pain and an elevated ipsilateral petrous apex. The apparent right-sided predominance of trigeminal neuralgia remains unexplained.

**Key Words** · trigeminal neuralgia · epidemiology

TRIGEMINAL neuralgia has been observed to occur more frequently on the right side of the face.6 Gardner, et al.,3,4 reported that the apex of the petrous ridge, on which the trigeminal sensory root rests, is usually higher on the right side than the left. They found that among the 80% of 115 cases in which one apex was higher than the other, the pain was on the same side as the higher apex in 75%, and suggested that elevation of the petrous apex increases the probability of trigeminal neuralgia occurring on that side of the face.

Our study evaluates the relationship between laterality of the pain in trigeminal neuralgia and specific clinical characteristics including age, sex, handedness, and the hypothesized significance of an elevated petrous apex.

**Clinical Material and Methods**

Of all patients hospitalized for treatment of trigeminal neuralgia from 1955 to 1970 in the Massachusetts General Hospital and the Lahey Clinic, 526 had an unequivocal diagnosis of trigeminal neuralgia. Eighteen of these were excluded because the trigeminal neuralgia was bilateral, leaving 508 cases of unilateral trigeminal neuralgia. Patient characteristics were determined from the clinic record and a postal questionnaire.

To evaluate the hypothesis advanced by Gardner that an elevated petrous apex is a factor in trigeminal neuralgia, we took sagittal skull radiographs of 46 patients with trigeminal neuralgia who had received selective intracranial radiofrequency treatment for the pain. A radiologist who had no knowledge of the side of the patient's disease measured the height of each apex above a line drawn through the roof of the orbits, as described by Gardner.9 If the distances of the two apices from this line differed by 1 mm or less, the apices were considered to be of equal height.

**Results**

Facial pain was left-sided in 37.8% of the 508 patients. Left-sided trigeminal pain was slightly more common among males (42.0%) than among females (34.9%), but this difference could be attributed to sam-
Side of facial pain in trigeminal neuralgia

### TABLE 1

<table>
<thead>
<tr>
<th>Sex</th>
<th>Side of Facial Pain</th>
<th>No. of Cases</th>
<th>Age (yrs)</th>
<th>&lt;45</th>
<th>45-54</th>
<th>55-64</th>
<th>65-74</th>
<th>75+</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>left</td>
<td>87</td>
<td></td>
<td>10</td>
<td>15</td>
<td>35</td>
<td>20</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>right</td>
<td>120</td>
<td></td>
<td>20</td>
<td>28</td>
<td>36</td>
<td>23</td>
<td>13</td>
</tr>
<tr>
<td>F</td>
<td>left</td>
<td>105</td>
<td></td>
<td>12</td>
<td>16</td>
<td>43</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>right</td>
<td>196</td>
<td></td>
<td>35</td>
<td>35</td>
<td>52</td>
<td>52</td>
<td>22</td>
</tr>
</tbody>
</table>

Omitting variability ($p = 0.12$). The proportion of patients with left-sided facial pain was also grouped by age and sex (Table 1), and summarized by statistical methods applicable to stratified data. The side of facial pain did not appear associated with age or any particular subcategory of age and sex.

Handedness was ascertained in 385 patients; 140 of the 369 right-handed (38.0%), and 5 of the 16 left-handed (31.2%) had left-sided facial pain. Thus there was no association between handedness and side of facial pain ($p > 0.5$). In addition, the difference was unrelated to age and sex.

Of the 46 skull radiographs assessed 23 showed no unilateral elevation of either petrous apex; in 14 instances the apex was higher on the same side as the facial pain, and in 9 it was higher on the contralateral side (Table 2).

### Discussion

The proportion of trigeminal neuralgia patients with left-sided facial pain was estimated at 39% by Harris; this is in close agreement with our estimate of 38%. The constancy of this finding for different ages, times and sexes is remarkable.

Gardner and Bourgoyne have hypothesized that handedness is positively correlated with the side of facial pain; Gardner felt this association, if it exists, would be related to an association of side of facial pain with an elevated petrous apex on the same side. The present results, revealing lack of correlation between the side of pain and handedness, indicate that laterality of the disease is determined by something other than handedness. This finding in itself does not bear on Gardner's central idea that an elevated petrous apex is related to trigeminal neuralgia.

Gardner, et al., also found that only 23 patients of 115 with trigeminal neuralgia had equally high petrous apices on either side. In contrast, among 46 skull films we found 23 had petrous apices of equal height. These two proportions are significantly different, with $p < 0.001$.

The present data can be analyzed two ways. Fourteen of 46 or 30% of patients with trigeminal neuralgia had an elevated petrous apex on the same side; thus, 70% do not have such ipsilateral elevation. Alternatively, 14 of 23 or 60% of those with an elevated petrous apex on one side exhibit ipsilateral trigeminal pain, leaving 40% in which the pain occurs on the side with the lower ridge. Neither result offers strong support for the conclusion that an elevated petrous apex is causally related to the development of trigeminal neuralgia in that side of the face. It should be noted that even in the series of Gardner, et al., only 60% of the 115 cases were potentially related to an elevated ipsilateral petrous

### TABLE 2

<table>
<thead>
<tr>
<th>Side of Higher Petrous Apex</th>
<th>No. of Cases</th>
<th>Side of Pain</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>left</td>
<td>11</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>right</td>
<td>12</td>
<td>3</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>neither</td>
<td>23</td>
<td>12</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>total</td>
<td>46</td>
<td>20</td>
<td>26</td>
<td></td>
</tr>
</tbody>
</table>
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apex. Data from a third series\(^1\) seem to support the basic findings of Gardner, \textit{et al.}, but the criteria used to evaluate the relative height of the petrous apices were not the same.

The height of the petrous apices has been measured in healthy subjects by Gardner, \textit{et al.},\(^4\) and Bjerrum and Thornval.\(^1\) In both control series, approximately the same proportion of controls had apices of equal height as did cases of trigeminal neuralgia. Thus, if an elevated petrous ridge is a risk factor in trigeminal neuralgia, it must be a weak one, highly dependent on other influences. This conclusion is consistent with our results, which indicate that the right-sided predominance of the pain in trigeminal neuralgia is a constant finding, not strongly associated with any factor yet identified.

Acknowledgments

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