Partial sensory trigeminal rhizotomy at the pons for trigeminal neuralgia

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Microvascular decompression is preferred among open procedures for the treatment of trigeminal neuralgia. However, in some cases the decompression cannot be performed, either because no significant vascular compression of the trigeminal nerve is found at surgery or because a patient's vascular anatomy makes it unsafe. Partial sensory rhizotomy is a commonly used alternative in these instances. The outcome after partial sensory rhizotomy was reviewed retrospectively in 83 patients with an average follow-up period of 72 months. Sixty-four (77%) of these patients had no evidence of vascular contact at operation. The remaining 19 patients (23%) had vascular structures in proximity to the trigeminal nerve but still underwent partial sensory rhizotomy in place of or in addition to microvascular decompression either because the offending vessel could not be moved adequately (11 cases) or because the vascular contact was considered insignificant (eight cases). Outcome was classified as: excellent if there was no trigeminal neuralgia postoperatively; good if pain persisted or recurred but was less severe than preoperatively; and poor if persistent or recurrent pain was equal to or greater than the preoperative pain in severity and was refractory to medication, or was severe enough to require additional surgery. The outcome was excellent in 40 patients (48%), good in 18 (22%), and poor in 25 (30%); follow-up durations were similar for the three outcome categories. The failure rate was 17% for the 1st year and averaged 2.6% each year thereafter. Two variables were predictive of a poor outcome: prior surgery and lack of preoperative involvement of the third trigeminal division. Major complications occurred in 4% of cases and minor complications in 11%. The authors conclude that partial sensory rhizotomy is a safe and effective alternative to microvascular decompression when neurovascular compression is not identified at operation or when microvascular decompression cannot be performed for technical reasons.

KEY WORDS • trigeminal neuralgia • partial sensory rhizotomy • microvascular decompression

EUROsurgeons have developed many procedures to alleviate the pain of medically intractable trigeminal neuralgia. Some of the most impressive results have been obtained by microvascular decompression; although it requires a retromastoid craniectomy, this procedure is capable of producing a high degree and long duration of pain relief while sparing facial sensation. However, some patients lack evidence of significant vascular contact at the time of posterior fossa exploration. Moreover, it appears that patients with venous contact or with lesser degrees of arterial contact with the trigeminal nerve root benefit less from microvascular decompression than patients with obvious arterial compression or grooving of the nerve root. Both Kolluri and Heros and Burchiel, et al., found significantly higher failure rates (57% in both series) after microvascular decompression in patients with only venous contact, compared to failure rates of 19% and 24%, respectively, in patients with arterial contact. Szapiro, et al., reported that patients with mere vascular contact with the trigeminal nerve root had a 76% "cure" rate, compared with a 91% "cure" rate in patients found to have vascular distortion or grooving of the nerve root.

One alternative to microvascular decompression in the absence of arterial contact is partial sensory rhizotomy. Platt and Wilkins reported only a 14% failure/recurrence rate in patients who underwent partial sensory rhizotomy in the absence of arterial contact versus a 46% failure/recurrence rate in similar patients after microvascular decompression. However, the duration of follow-up evaluation for the partial sensory rhizotomy group was only 21 months. This report presents more comprehensive results of partial sensory rhizotomy over a longer time period.

Clinical Material and Methods

Patient Population

Between December, 1975, and June, 1991, 254 patients were treated by the senior author (R.H.W.) for trigeminal neuralgia or a related facial pain syndrome.
Partial sensory trigeminal rhizotomy

TABLE 1
Characteristics of 83 patients undergoing partial sensory rhizotomy

<table>
<thead>
<tr>
<th>Factor*</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>no. of cases</td>
<td>83</td>
</tr>
<tr>
<td>gender (M:F)</td>
<td>29:54</td>
</tr>
<tr>
<td>age</td>
<td></td>
</tr>
<tr>
<td>range</td>
<td>19–81 yrs</td>
</tr>
<tr>
<td>average</td>
<td>58 yrs</td>
</tr>
<tr>
<td>laterality of pain (r:t:l)</td>
<td>49:34</td>
</tr>
<tr>
<td>preop pain distribution</td>
<td></td>
</tr>
<tr>
<td>V1</td>
<td>17 (20%)</td>
</tr>
<tr>
<td>V2</td>
<td>23 (28%)</td>
</tr>
<tr>
<td>V3</td>
<td>10 (12%)</td>
</tr>
<tr>
<td>V4, V5, V6</td>
<td>26 (31%)</td>
</tr>
<tr>
<td>duration of preop symptoms</td>
<td></td>
</tr>
<tr>
<td>range</td>
<td>2 wks–41 yrs</td>
</tr>
<tr>
<td>average</td>
<td>73 mos</td>
</tr>
<tr>
<td>prior procedure for TN</td>
<td></td>
</tr>
<tr>
<td>no. of cases</td>
<td>35</td>
</tr>
<tr>
<td>no. of procedures</td>
<td>67</td>
</tr>
<tr>
<td>follow-up period</td>
<td></td>
</tr>
<tr>
<td>range</td>
<td>7–174 mos</td>
</tr>
<tr>
<td>average</td>
<td>72 mos</td>
</tr>
</tbody>
</table>

* V1, V2, and V3 refer to the first, second, and third divisions of the trigeminal nerve, respectively; TN = trigeminal neuralgia.

through a retromastoid craniectomy. All of these patients had failed, initially or eventually, to respond adequately to medical therapy, including the use of carbamazepine and in some cases phenytoin. Many had undergone prior surgical procedures, but this was not a prerequisite for posterior fossa exploration. These procedures were performed at the University of Pittsburgh (through October, 1976) or at Duke University (starting November, 1976). Although microvascular decompression was the procedure of choice, 102 of these 254 patients underwent partial sensory rhizotomy; their records were reviewed for this study.

The partial sensory rhizotomy was performed instead of, or in addition to, microvascular decompression because either it was not clear that significant vascular contact with the trigeminal nerve root was present, or the surgeon was unable to separate the vessel(s) from the neural structures completely or thought that it was unsafe to do so, or the patient had obtained poor results from a prior microvascular decompression and had no significant vascular contact at the time of reoperation. "Significant vascular contact" was defined as arterial contact with or compression of the trigeminal nerve root; venous contact alone was considered insufficient.

Inclusion in the study group required that patients exhibited a pure trigeminal neuralgia syndrome, and that a minimum of 6 months of follow-up monitoring from the date of partial sensory rhizotomy was available. Seven patients were excluded because they suffered from a combination of cluster headache and trigeminal neuralgia. Three patients were eliminated from the study because of an insufficient follow-up period, and an additional nine were lost to follow-up review before the required 6-month follow-up period had elapsed. Thus, 83 patients remained in the study. Information about the study population is presented in Table 1. The average duration of follow-up evaluation was 72 months.

For most of the patients, the initial onset of trigeminal neuralgia was spontaneous and a specific etiology was not identified preoperatively. However, four patients considered the performance of dental procedures or the placement of dental appliances as the initial cause of their trigeminal neuralgia. Two patients had undergone surgery involving the face just prior to developing trigeminal neuralgia, for removal of a parotid tumor in one and for resection of basal-cell carcinomas in the other. Three patients suffered from multiple sclerosis.

Thirty-five (42%) of the 83 patients had undergone 67 prior surgical procedures for trigeminal neuralgia (Table 2). Nineteen operations were posterior fossa procedures, including three partial sensory rhizotomies.

Surgical Technique

Intraoperative monitoring of brain-stem auditory evoked responses and somatosensory evoked potentials was not used for the first 25 patients, but was performed for every patient thereafter. Following a retromastoid craniectomy and a crescentic dural incision, the cerebellum was retracted medially and caudally to allow visualization of the trigeminal nerve root entry zone. A careful search was made for arteries in contact with or compressing the main sensory nerve root adjacent to the pons. If vascular contact was identified, an attempt was made to reroute the offending vessel(s) and to perform microvascular decompression. Otherwise, a partial sensory rhizotomy was performed: in 74 (89%) of the patients, one-third to one-half of the cross-sectional area of the sensory root was cut in its caudo-lateral aspect about 2 to 5 mm from the pons; in the remaining nine patients (11%), the area of sectioning involved approximately two-thirds of the nerve root. No patient had a complete sensory rhizotomy.

Evaluation of Patient Outcome

Patient outcome was assessed by a review of clinical and hospital records and by telephone interviews. Each patient's outcome was assigned to one of three categories: excellent, good, or poor. A patient's outcome was considered excellent if there was immediate pain relief.
without recurrence, transient or otherwise. Outcome was considered good if pain persisted or recurred, but was less severe than the preoperative level, either without or with medications. A poor outcome was defined as persistent or recurrent pain equal to or greater than the preoperative pain in severity and refractory to medical therapy, or recurrent pain severe enough to require additional surgery. Patients frequently progressed through more than one outcome category during the follow-up period. The time spent in each category was recorded in all cases. Follow-up duration was calculated from the date of surgery to the date of last outcome assessment.

Statistical Methods

Trigeminal neuralgia is a disease that often recurs after surgery. For this reason, we chose a method of outcome analysis to address not only whether pain persisted or recurred, but also the time to recurrence. This type of analysis is used most frequently to assess survival data. However, in the present study, failure after therapy was defined by the level of persistent or recurrent pain rather than as the death of a patient, as in survival analysis.

Two separate analyses were performed using different definitions of the endpoint of failure. In the first analysis, failure was defined as major persistence or recurrence of pain (the attainment of a poor outcome status). In the second analysis, failure was defined as any persistence or recurrence of pain (the attainment of either a good or poor outcome status). In both analyses, the variables of interest with respect to prediction of pain relief were: gender, age, laterality of pain, trigeminal division(s) involved, duration of preoperative pain, prior surgery for trigeminal neuralgia, and degree of postoperative sensory loss.

In each analysis, the Cox proportional-hazards model was used first to identify individual variables that seemed to influence time to failure. These potentially predictive variables were then placed for analysis into a multivariable model (with significance of difference defined at the p = 0.05 level). Analyses were performed using the SAS statistical package.* Baseline and outcome information is presented using percentages for discrete data and means or medians for continuous data.

Results

Surgical Findings and Treatment

Sixty-three (76%) of the 83 study patients had no evidence of vascular contact at operation and were treated by partial sensory rhizotomy. In 19 patients (23%), vascular structures in proximity to the trigeminal nerve were noted at surgery. In seven of these 19 patients, one or more arteries were wedged between the nerve and the pons, whereas the other 12 patients had evidence of vascular contact without wedging. All 19 patients underwent partial sensory rhizotomy, nine in place of and 10 in addition to microvascular decompression; in these patients, partial sensory rhizotomy was performed because the offending vessels could not be moved adequately for microsurgical decompression (11 cases), or because the vascular contact was considered insignificant (eight patients, one of whom had had a prior adequately performed microvascular decompression which had failed to resolve the pain). One additional patient, who lacked intraoperative evidence of vascular contact, underwent both microvascular decompression and partial sensory rhizotomy because it was thought that the dissection necessary for exposure of the nerve root might have changed the preoperative neurovascular relationships.

Pain Relief

Partial sensory rhizotomy produced an excellent outcome with no postoperative trigeminal neuralgia in 40 patients (48%); the outcome was good in 18 (22%), but 25 (30%) had a poor outcome. The follow-up periods for the patients with excellent, good, and poor outcome were 65, 67, and 84 months, respectively.

The failure rates over time for the two defined endpoints are plotted as Kaplan-Meier curves in Fig. 1. With failure defined as major persistence or recurrence of pain, the failure rate 1 year after surgery was 17% and yearly failure rates thereafter averaged 2.6%. Using the more stringent criterion of failure as any persistence or recurrence of pain, the failure rate at 1 year was 42%. Yearly failure rates after 1 year for this endpoint averaged 2.0%.

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FIG. 2. Kaplan-Meier plots showing the percentage of 83 patients with pain relief after partial sensory rhizotomy, with failure being defined as major persistence or recurrence of pain. Two factors favorably influenced the time to failure: absence of prior surgery for trigeminal neuralgia and preoperative pain involving the third trigeminal division (V₃) (p = 0.041). The four possible combinations of these two factors formed four patient subgroups whose plots are shown above. The number of cases in each subgroup is given in parentheses. The best subgroup (no prior surgery, V₃ involvement) had a failure rate at 1 year of 6%, followed by yearly failure rates of 0% to 4% in subsequent years. At the other extreme, the group with prior surgery and absence of V₃ involvement suffered a 45% failure rate in the 1st year.

Factors Influencing Major Persistence or Recurrence of Pain

In the first analysis, with failure defined as major persistence or recurrence of trigeminal neuralgia, three variables appeared to influence time to failure independently: prior surgery (any category listed in Table 2), preoperative involvement of the third trigeminal nerve division, and the degree of postoperative sensory loss. When these variables were used to develop a multivariable model, the postoperative sensory loss variable dropped below the level of significance. The remaining two variables of prior surgery and lack of preoperative involvement of the third trigeminal division were found to be significantly associated with earlier failure (p = 0.041).

The Kaplan-Meier curves for the four possible subgroups created by combining these two variables are presented in Fig. 2. Most of the disparities among the groups were produced by different failure rates during the 1st year after surgery. In the group of patients for whom partial sensory rhizotomy was the first procedure and in whom the third division was involved preoperatively, only 6% failed during the 1st year. At the other extreme, the 1-year failure rate was 45% in the group of patients who had undergone prior surgery and lacked preoperative third division involvement. The variables of gender, age, laterality of pain, and preoperative symptom duration did not predict outcome significantly.

Factors Influencing Any Persistence or Recurrence of Pain

In the second analysis, failure was defined as any persistence or recurrence of trigeminal neuralgia. In the univariable analysis, two variables appeared to influence the time to failure: prior posterior fossa surgery for trigeminal neuralgia and the degree of postoperative sensory loss. When these two variables were placed into the multivariable model, all of the predictive power was found to be in the variable of prior posterior fossa procedures for trigeminal neuralgia (p = 0.030). The main effect of this variable was to decrease the likelihood of complete pain relief (that is, an excellent outcome) immediately after surgery (Fig. 3). Ten of the 16 patients with prior posterior fossa surgery for trigeminal neuralgia had residual facial pain in the 1st month, resulting in a failure rate of 62% at 1 month. In contrast, the failure rate was only 24% for the remaining 67 patients at 1 month after surgery. Furthermore, the failure rate was still only 36% after 1 year in this group, with a yearly failure rate of 1% to 2% thereafter. Other variables were not found to influence outcome significantly in this analysis.

Sensory Deficits and Complications

Postoperative sensory deficits in the trigeminal distribution were absent or mild in 82% of the patients. Twenty-seven patients (33%) had no sensory deficit after partial sensory rhizotomy, 41 patients (49%) exhibited a slight decrease in facial sensation, and 15 (18%) were densely numb in one or more of the trigeminal divisions. Of all sensory deficits, 96% occurred in the lower two trigeminal divisions. The peri- and postoperative complications are listed in Table 3. There were no deaths. The most serious complication was a midbrain infarction, which has
TABLE 3
Complications of partial sensory rhizotomy in 83 patients

<table>
<thead>
<tr>
<th>Complication*</th>
<th>No. of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>major</td>
<td></td>
</tr>
<tr>
<td>midbrain infarct†</td>
<td>3 (4%)</td>
</tr>
<tr>
<td>ipsilateral deafness‡</td>
<td>1</td>
</tr>
<tr>
<td>CSF otorhinorrhea requiring reoperation</td>
<td>1</td>
</tr>
<tr>
<td>minor</td>
<td></td>
</tr>
<tr>
<td>scalp laceration from head holder</td>
<td>9 (11%)</td>
</tr>
<tr>
<td>transient diploria</td>
<td>2</td>
</tr>
<tr>
<td>CSF leakage from surgical incision</td>
<td>2</td>
</tr>
<tr>
<td>CSF otorhinorrhea requiring lumbar drain</td>
<td>1</td>
</tr>
<tr>
<td>transient difficulty swallowing</td>
<td>1</td>
</tr>
<tr>
<td>transient temporalis muscle weakness</td>
<td>1</td>
</tr>
</tbody>
</table>

* CSF = cerebrospinal fluid.
† Result of dissecting around a scarred polyvinyl alcohol implant inserted during a previous microvascular decompression.
‡ Before intraoperative monitoring of brain-stem auditory evoked responses.

been reported previously.20 Another patient developed permanent ipsilateral deafness of neural origin, which occurred before intraoperative brain-stem auditory evoked response monitoring was begun at our institution. There was one instance of cerebrospinal fluid (CSF) otorhinorrhea that required reoperation for waxing of the mastoid air cells. The remainder of the complications were transient or resolved after treatment. Two cases of CSF leakage from the surgical incision were treated by oversewing the incision.

Discussion

Microvascular decompression is our procedure of choice for trigeminal neuralgia in otherwise healthy patients. We are convinced by both the clinical and anatomical literature that neurovascular compression exists12,14 and can be responsible for trigeminal neuralgia. Furthermore, the literature and our own results show that microvascular decompression is efficacious and safe in alleviating the effects of neurovascular compression.7,14,16,17,22,28,29,31

On the other hand, some patients suffer from trigeminal neuralgia without evidence of significant vascular contact, and there are instances when vessels are too intimately applied to the nerve root to be completely or safely mobilized by microvascular decompression. When either situation is encountered at operation, we perform a partial sensory rhizotomy in an attempt to relieve the pain without requiring a second procedure such as a percutaneous trigeminal rhizolysis. The resulting sensory deficit is ordinarily acceptable to the patient.

The present data show that this practice is reasonable. After an average follow-up period of 72 months, 70% of our patients still had excellent or good outcomes. These results are especially significant because in most instances they were produced in patients for whom microvascular decompression is less effective, that is, in patients without significant arterial contact with the trigeminal nerve.

Comparison of Results

Previous authors have described the results of partial trigeminal sensory rhizotomy, performed through the posterior fossa, for the treatment of trigeminal neuralgia.20 Dandy8-10 developed the procedure in the 1920's but other surgeons were reluctant to adopt this approach.22 in large part because of the effectiveness and relative safety of the subtemporal operation. However, with the introduction into neurosurgery of the microsurgical technique, there has been renewed interest in the posterior fossa approach to trigeminal neuralgia. The following is a discussion of some of the reported series of partial sensory rhizotomy, with which our results can be compared.

In 1932, Dandy8 presented 250 patients with trigeminal neuralgia who had been operated on through the posterior fossa. There were only four recurrences, but the follow-up period was not stated. He reported no complications or deaths in the last 150 cases. Walker, et al.,28 in 1956, described a series of 77 patients who had undergone partial sensory rhizotomy and had been followed for an average of 4.5 years. Of these, 45 (58%) were completely relieved, nine (12%) had occasional twinges of pain, 15 (19%) had recurrent pain but did not require further surgery, and eight (10%) had recurrent pain that was treated by reoperation for further division of the sensory root.

Olivecrona18 performed a sensory rhizotomy (customarily dividing one-half to two-thirds of the root) through the posterior fossa in 158 patients. The mortality rate was 3.2% and the recurrence rate was 18% (but the follow-up period was not specified). Burchiel, et al.,2 in 1981, reported a series of 42 patients with tic douloureux who were operated on through the posterior fossa. Of the 10 patients who underwent partial sensory rhizotomy, one had immediate return of pain and one had a minor pain recurrence at 16 months postoperatively. At 12 months eight (89%) of nine were pain-free, at 18 months three (60%) of five were pain-free, and at 24 months two (50%) of four were pain-free.

In 1982, van Loveren, et al.,27 presented a similar series of 50 patients, 27 of whom were treated by partial or total sensory rhizotomy. The results after an average follow-up period of 3 years were classified as excellent in 63%, good in 15%, and fair in 7%. The failure rate was 4% and the recurrence rate was 11%. In the same year, Swanson and Farhat25 described 14 patients who underwent simultaneous microvascular decompression and partial sensory rhizotomy and were followed for a period of 10 to 23 months. Twelve of the patients had complete relief and two had occasional minor facial pain requiring little or no medication.

In 1989, Bederson and Wilson1 reported a series of 252 posterior fossa explorations for trigeminal neuralgia. Microvascular decompression was the sole treatment in 166 patients. Thirty patients in whom no vascular contact was identified were treated by sectioning of the inferior one-half to two-thirds of the portio

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major. The remaining group of 56 patients exhibited vascular contact without anatomical distortion of the trigeminal sensory root and were treated by both microvascular decompression and partial sensory rhizotomy. The follow-up period for the three treatment groups averaged just over 5 years. Although there was a trend toward better outcome after combined microvascular decompression and partial sensory rhizotomy, and worse outcome after partial sensory rhizotomy alone, the differences were not significant. As estimated from the authors' Fig. 1, among the 30 patients treated by partial sensory rhizotomy alone, approximately 70% had complete pain relief, 10% had significant improvement, 18% had excellent initial relief followed by recurrence, and 2% had little or no pain relief.

In 1992, Klun13 reported a series of 220 patients with trigeminal neuralgia who underwent posterior fossa surgery. In 42 of these patients there was no clear evidence of vascular compression, and the sectioned one-third or less of the portio major. After an average follow-up period of 5 years, 10 patients had failed to respond to treatment and 12 had partial relief.

Influence of Extent of Rhizotomy

The relatively poor results reported by Klun13 may be related to the amount of nerve root sectioned. White and Sweet40 quoted two of Dandy's residents, who wrote that in his later years Dandy preferred to divide the entire sensory root because of the recurrence rate (estimated to be 10%) after partial rhizotomy. Three other series raise the possibility that better results are obtained if more of the trigeminal sensory root is divided. Pelletier, et al.,19 reported that Schulp divided three-fourths to nine-tenths of the sensory nerve root in 10 patients, who were then followed for 1 to 11 years. None had a recurrence of pain. Hussein, et al.,13 presented the results of partial sensory rhizotomy in 25 patients, 15 of whom had between 75% and 100% of the sensory root cut. All 25 patients experienced immediate pain relief and only one experienced recurrence during the follow-up period of 38 to 109 months.

Adams, et al.,1 presented a series of 57 patients with trigeminal neuralgia who were treated by posterior fossa microsurgery. Fifty-four patients had either partial (35 cases) or total (19 cases) sectioning of the trigeminal sensory root. In contrast to our patients (of whom only nine of 83 had more than 50% of the sensory root divided, and none had more than 75% sectioned), 42 of the 54 patients reported by Adams, et al., had greater than 50% of the nerve root sectioned. After an average follow-up period of 4.5 years, only two patients experienced a major recurrence and four had minor twinges. Twenty-nine (85%) of the 34 patients followed for more than 5 years had no further trigeminal neuralgia.

Influence of Preoperative Pain Distribution

Our findings indicate that patients with preoperative pain involving the distribution of the third trigeminal division respond better to partial sectioning of the caudalateral aspect of the sensory root than do those patients without third division involvement. This is not surprising in light of the anatomy of the trigeminal nerve adjacent to the pons.

Gudmundsson, et al.,11 found that the relationships among the three trigeminal divisions remain constant from the ganglion to the pons, despite the fact that "immediately posterior to the ganglion, many anastomoses were observed between the fibers from each division." By following the three divisions posteriorly from the gasserian ganglion, they found that "the fibers from the third division remained ventrolateral throughout the interval from the ganglion to the pons, the first division dorsomedial, with second division fibers being in an intermediate position." Similarly, Pelletier, et al.,19 found in their study that the three trigeminal divisions "maintain separate but overlapping anatomical territories within the sensory root."

This anatomical orientation of the three trigeminal divisions is supported by clinical data. In the series of Adams, et al.,1 patients who underwent caudalateral nerve root section had impaired sensation in the third and second divisions of the trigeminal nerve postoperatively. Likewise, Hussein, et al.,13 found that caudalateral sectioning was more likely to result in sensory loss in the third and second than in the first division of the trigeminal nerve. Furthermore, in the one patient in whom the postoperative loss of pain sensation was greater in the first division than in the lower divisions, medial rather than lateral sectioning had been performed intentionally. Thus, both anatomical and clinical data indicate that caudalateral sectioning of the main sensory nerve root is most likely to interrupt pain sensations arising in the third distribution.

Influence of Prior Surgery

Prior surgery has been found to be a poor prognostic factor in several reports examining the results of microvascular decompression17,20 or percutaneous glycerol trigeminal rhizolysis.24 For example, Barba and Alksne9 found that the presence of prior destructive procedures for trigeminal neuralgia lowered the microvascular decompression "cure" rate from 91% to 43%. Among our patients treated by partial sensory rhizotomy, the percentage with an excellent or good result dropped from 79% to 57% if one or more procedures had been performed previously. One possible explanation for this effect is that prior procedures directed against the trigeminal nerve may alter the pain pathways in some way, so as to make subsequent surgical therapies less effective. On the other hand, this variable may simply select for those patients who have inherently more refractory trigeminal neuralgia.

Influence of Duration of Symptoms

Some authors have found that the duration of symptoms before microvascular decompression is predictive of the outcome of this type of surgery.2,21 In our series of patients treated by partial sensory rhizotomy, we found no significant influence of preoperative symptom duration on outcome. Indeed, a longer duration of symptoms seemed to be associated with a longer latency to recurrence, although this did not reach a level of
significance (p = 0.263). This discrepancy may be due to
our handling of symptom duration as a continuous
variable rather than a discrete one as in the cited studies.
Also pertinent is the fact that our patient group may be
inherently different from those patients treated by mi-
crovascular decompression in that vascular contact was
largely absent in our patients. Bederson and Wilson1
found that “the duration of symptoms before surgery
was significantly related to outcome.” However, they
qualified the statement by adding “...but separate
analyses showed that the effect occurred only in patients
with nerve root distortion. In patients without nerve
root distortion who underwent partial sensory rhizot-
omy, there was no relationship between outcome and
duration of symptoms.”

Conclusions

Partial sensory rhizotomy offers a valid alternative to
microvascular decompression in patients with trigem-
ninal neuralgia in whom posterior fossa exploration fails
to reveal significant compression of the trigeminal sen-
sory root or in whom microvascular decompression is
technically infeasible. The rate of major persistence or
recurrence of pain among our patients was 17% during
the 1st year after surgery and the recurrence rate aver-
ged 2.6% each year thereafter. Similar to the reported
results of microvascular decompression and glycerol
rhizolysis for trigeminal neuralgia, the success rate of
partial sensory rhizotomy was lower among our patients
who had failed prior operative procedures. In addition,
the absence of involvement of the third trigeminal
division preoperatively was a poor prognostic sign,
probably because the caudalateral portion of the nerve
root was sectioned in our patients. It is possible that
better results could have been achieved by sectioning a
greater proportion of the fibers of the main sensory
root, or by altering the location of the cut to conform
more precisely to the location of the individual patient’s
pain; however, the incidence of painful dysesthesia
would probably have been greater with the former
approach, and the incidence of corneal anesthesia (and
the danger of keratitis) would probably have been
greater with both approaches.

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