Functional treatment of acromegaly by transsphenoidal microsurgery

JOSÉ GARCÍA-URIÁ, M.D., JOSE M. DEL POZO, M.D., AND GONZALO BRAVO, M.D.

Neurosurgical Service, Clínica Puerta de Hierro, Autonomous University, Madrid, Spain

The authors have analyzed the results from 41 acromegalic patients who underwent transsphenoidal surgery. In 31 patients, postoperative growth hormone (GH) levels fell and remained below 10 ng/ml. This represents an endocrinological "cure" of 78%. In the remaining 10 cases, postoperative GH values have not stabilized below 10 ng/ml, although seven show some clinical improvement. The results were particularly good in those cases of localized adenomas, which allowed a selective removal while maintaining pituitary function within normal limits in 65.5% of cases. The postoperative GH level in this group fell and remained below 10 ng/ml in more than 90% of cases.

Four patients required reoperation to normalize the GH levels which had not been sufficiently modified after the first operation; only one of them remained with plasma GH levels above normal limits. There were no deaths in this series. Rhinorrhea occurred as a postsurgical complication in four cases. In three this disappeared with bed rest and lumbar drainage; in the other, surgical repair was necessary. The occurrence of surgical complications has decreased as our experience has increased, and the need for reoperation has been unusual after the first year of our study.

Key Words • acromegaly • pituitary tumor • transsphenoidal approach

Several different procedures have been proposed for the management of active acromegaly. The ideal treatment aims for a decrease of plasma growth hormone (GH) levels to normal limits while the remaining pituitary functions remain intact. Most authors consider surgical removal of the pathological pituitary tissue the therapy of choice. The transfrontal approach to the pituitary gland still has some proponents, but a majority of authors now favor the transsphenoidal technique, which allows for adequate removal of most eosinophilic adenomas with a minimal surgical risk.

The present paper analyzes the experience of our institution in the treatment of active acromegaly by transsphenoidal surgery.

Clinical Material and Methods

Over a period of 4 years (May, 1972, to May, 1976), 41 acromegalic patients have undergone transsphenoidal surgery in our Service. Following the criteria of Guiot, et al., we have evaluated the operative results in terms of changes in plasma GH levels measured by radioimmunoassay under basal conditions. In all the cases plasma GH was measured preoperatively and 1 week after the operation, with follow-up controls every 3 months. The methodology and results of endocrine studies in some of these patients have already been published.

Our cases have been classified according to the criteria of Vezina and Maltais, in rela-
Transsphenoidal surgery for acromegaly

TABLE 1
Operative results in 41 cases of acromegaly treated by transsphenoidal microsurgery

<table>
<thead>
<tr>
<th>Grade of Tumor</th>
<th>No. of Cases</th>
<th>Surgery*</th>
<th>Postoperative Plasma GH Level</th>
<th>Hypopituitarism</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TNS</td>
<td>SNS</td>
<td>SS</td>
<td>TS</td>
</tr>
<tr>
<td>Grade I</td>
<td>4</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Grade II</td>
<td>14</td>
<td>6†</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>7</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>Grade III</td>
<td>5</td>
<td>2‡</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>—</td>
<td>3</td>
<td>—</td>
</tr>
<tr>
<td>Grade IV</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>total</td>
<td>41</td>
<td>18</td>
<td>8</td>
<td>0</td>
</tr>
</tbody>
</table>

*TNS = total non-selective removal; SNS = subtotal non-selective removal; TS = total selective removal; SS = subtotal selective removal.
†Pituitary function maintained with plasma GH level 10 ng/ml in four cases.
‡Pituitary function maintained with plasma GH level 10 ng/ml in one case.

In our surgical results, we differentiate between a selective removal of the tumor with identification of normal pituitary tissue which is not removed and a non-selective surgery, in which all the sellar contents are removed. This is of course a subjective classification based on the impression of the surgeon. We have also used radiological and surgical classifications previously used by other authors to obtain a double parameter of evaluation.

Summary of Cases

Surgical Results

The surgical results in this series are summarized in Table 1.

Grade I. In four patients, the presence of "microadenomas" allowed a selective tumor removal. The normal pituitary tissue, which was identified because of its different color and consistency, was left intact. Microbiopsy of the apparently normal tissue was taken in two cases to confirm the surgical impression.

Grade II. In eight of 23 cases, a fairly normal although compressed pituitary gland could be identified after total removal of an extensive adenoma. In 13 patients, a radical non-selective removal of the sellar contents was performed. Postoperative evaluation demonstrated a normal pituitary function in four cases, in spite of the apparently radical operation. A subtotal selective removal was the only possible surgery in two cases.

Six patients in this grade had received radiotherapy before the operation and in none of them was a selective removal achieved.

Grade III. Eight patients were classified in Grade III. In three cases without suprasellar expansion, a total selective removal was possible. In another three patients who presented suprasellar expansion, a non-selective subtotal removal was carried out.
Two operations were considered as total non-selective removals, and in one of these patients postoperative follow-up study showed that pituitary function was maintained.

Grade IV. In none of the six patients in Grade IV could we perform a selective tumor removal. Three of these patients had previously received radiotherapy.

Functional Results

The preoperative plasma GH level ranged between 13 and 180 ng/ml, and fell to values below 10 ng/ml in 31 patients (78%) after the operation (Fig. 1). Seven other patients showed an improvement of the clinical picture without normal plasma GH levels.

In those patients who showed a decrease in adrenal and/or thyroid function, there was no change following surgical intervention. Four patients showed different degrees of hypopituitarism due to surgery. Approximately two-thirds of the patients showed improvement of paresthesias and profuse sweating after surgery. The visual field defects, shown by five patients, greatly improved by surgery in all but one case.

Complications

There were no deaths in this series. Four patients suffered from rhinorrhea, which resolved with bed rest and lumbar drainage in three. In the last patient, a second operation was necessary, consisting of tamponade of both the sella and sphenoidal sinus with muscle, fascia, and lyophilized dura. Rhinorrhea disappeared after surgery.

In one patient, rhinorrhea was complicated by meningitis. A pneumococcus was isolated in the cerebrospinal fluid, and the patient was cured with specific antibiotic therapy.
Transsphenoidal surgery for acromegaly

Repeat Operations

Four patients underwent a second operation because plasma GH levels had not fallen to normal levels. Two patients belonged to Grade II without suprasellar expansion and had previously received radiotherapy. A third patient belonged to Grade II with suprasellar expansion. All three first operations had been considered by the surgeon as non-selective total removals and in the second operation adenomatous tissue was found within the sella. After reoperation, all three patients showed plasma GH levels below 10 ng/ml.

A fourth patient belonged to Grade III without suprasellar expansion. The decrease of plasma GH level was insufficient and a second operation was necessary. Recurrent intrasellar adenomatous tissue was removed, but, although this second operation was considered as total non-selective removal, the decrease in plasma GH level was small and the patient showed no clinical improvement. A third operation was undertaken, but we were unable to find any intrasellar tumoral tissue. Other similar cases have been reported in the literature.10

Discussion

Statistics show a decreased life expectancy in patients with acromegaly,19 but this can be improved by active therapy. The probable hypothalamic origin of the increased GH secretion in some acromegalic patients has caused the therapeutic use of drugs blocking different plasma GH levels.4,18 Although these drugs reduce plasma GH levels, they rarely decrease it to normal levels.

The procedures based on destruction of GH-producing pituitary cells have been proved effective. Conventional radiotherapy produces some improvement, but only in a small number of cases does it normalize plasma GH levels.14 Stereotaxic surgery with implantation of radioactive material has had limited success and is not entirely free of risk.9 Cryohypophysectomy2,17 gives good results in about 80% of cases,8 but it is only useful in localized adenomas without suprasellar expansion.

In our experience with 23 cases, adenoma removal under direct vision by the transsphenoidal route offered two advantages: 1) a return to normal GH levels in more than 90% of cases (21 patients), and 2) preservation of normal pituitary tissue in 65.5% of cases (19 patients) with localized micro- or macro-adenomas.

Administration of heavy particles (protons) has given excellent results and complications seen early in its use are now extremely rare.13,18 This is a safe, efficient technique, but like cryohypophysectomy is only useful in those cases without suprasellar expansion. The disadvantages of this procedure are its delayed effects and the scarcity of centers at which it is available.

In our experience, in agreement with previous reports of other authors,7,8,10,11 the transsphenoidal approach proved to be a simple surgical technique with few contraindications.6 It permits excellent results even in those cases with suprasellar expansion, but especially in localized adenomas. The occurrence of surgical complications has decreased as our experience has increased. The need for reoperation has been low since the first year of the series (one case).

References

thérapeutique dans l'acromégalie. Neurochirurgie 17:5–10, 1971


Address reprint requests to: José García-Uría, M.D., Neurosurgical Service, Clínica Puerta de Hierro, San Martin de Porres 4, Madrid, Spain.