CRANIOPHARYNGIOMA (PITUITARY ADAMANTINOMA) IN PATIENTS MORE THAN 60 YEARS OF AGE

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CRANIOPHARYNGIOMAS are thought to arise from embryonic cell rests and, therefore, to be congenital in origin. The majority of these tumors occur in childhood or early adult life, and it is unusual for one to occur in a person more than 60 years of age. In 10 different series assembled from the literature, we were able to find reports of 454 craniopharyngiomas, only 5 of which were in persons more than 60 years of age (Table 1).

We wish to report on two patients with craniopharyngioma who were more than 60 years of age and who were operated on at the Mayo Clinic in the last 2 years. One was 70 years of age at the time of operation, and is, to the best of our knowledge, the oldest person ever reported as having this type of tumor.

REPORT OF CASES

Case 1. A 70-year-old white woman, referred to the Mayo Clinic because of failing vision, said that she had been in good health until 3 months prior to admission on January 8, 1954, when she first noticed difficulty in seeing to thread needles and in doing close work such as required in sewing. She thought that she could see better when looking straight ahead than when looking to the sides. This difficulty in vision steadily increased until at the time of admission she could distinguish only large objects with the right eye and had difficulty in seeing objects to the side with the left one. In recent months she had experienced occasional headaches localized to the vertex. These came on early in the morning and lasted a short time; they had not incapacitated her.

The past history was uninformative. She had been in excellent health all her life. She had been pregnant nine times and had seven living children. There were no symptoms suggestive of pituitary insufficiency or diabetes insipidus. She had weighed 190 lbs. (86.2 kg.). Twenty years ago and at the time of admission she weighed 200 lbs. (90.7 kg.).

Physical examination disclosed an obese white woman. The blood pressure measured 168 mm. of mercury systolic and 88 mm. diastolic. The pulse rate was 92 beats per min. and the temperature was normal. The distribution of hair was

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CRANIOPHARYNGIOMA IN PATIENTS AGED OVER 60 YEARS

TABLE 1
Cases of craniopharyngioma reported in the literature: total patients and patients more than 60 years of age

<table>
<thead>
<tr>
<th>Author</th>
<th>Total</th>
<th>More than 60 Years of Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duffy 5 (1920)</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Critchley and Ironside 3 (1926)</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Beckmann and Kubie 1 (1929)</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Frazier and Alpers 8 (1931)</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Cushing 4 (1932)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Carpenter et al. 2 (1937)</td>
<td>82</td>
<td>2</td>
</tr>
<tr>
<td>Globus and Gang 7 (1945)</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Grant 9 (1948)</td>
<td>48</td>
<td>7</td>
</tr>
<tr>
<td>Mueller and Wohlfart 11 (1950) (Olivecrona series)</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Love and Marshall 12 (1950)</td>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>454</strong></td>
<td><strong>5</strong></td>
</tr>
</tbody>
</table>

normal, and there was no abnormal pigmentation of the skin. General examination gave negative results except for the visual-field changes shown in Fig. 1a.

Roentgenograms of the thorax showed pleural thickening in the left base. A

![Fig. 1. Visual fields in Case 1 before operation (a) and 6½ months postoperatively (b).](image-url)
roentgenogram of the skull disclosed decalcification of the posterior clinoid processes. The pineal calcification was in normal position.

Urinalysis disclosed a specific gravity of 1.017, albuminuria, grade 1 (on a basis of 1 to 4), and pyuria, grade 3. The hemoglobin measured 13.2 gm. per 100 cc. of blood, and the leukocyte count was 9,600 per c.mm. The urinary 17-ketosteroids measured 3.1 mg. and the urinary corticosteroids 0.55 mg. per 24 hours. The basal metabolic rate was +7 per cent.

The patient was given 200 mg. of cortisone intramuscularly 48, 24 and 2 hours before operation. On January 18, 1954, a frontal craniotomy was done. The chiasm was approached over the right frontal lobe. A solid, microcystic adamantinoma was found presenting between the optic nerves. The tumor was extensive, but could be delivered from under each optic nerve and from the intact pituitary body without difficulty. The apex of the tumor was adherent to the hypothalamus; after debate it was decided to leave this portion of the tumor for fear of hypothalamic damage if attempts were made to remove it. The wound was closed without drainage.

The postoperative course was uneventful. Since the patient had shown no evidence of pituitary insufficiency, either before or after operation, the daily dose of cortisone was gradually decreased, being discontinued on the 4th postoperative day. The wound healed without incident and the patient was permitted to go home on the 13th postoperative day.

Twenty-four days later (37 days after operation) she was readmitted to the hospital because of anorexia, nausea, vomiting and weakness. She had felt well for the first 2 weeks after returning home, but then began to notice anorexia and easy fatigue. One week prior to readmission she had begun to have periods of nausea and vomiting, beginning about an hour after eating. She also had had hiccoughs for short intervals two or three times per day for the past week. She denied salt-craving, excessive thirst or urinary frequency, and had no episodes of fainting or collapse, but had lost 16 lbs. (7.3 kg.) since returning home.

Examination revealed a blood pressure of 140 mm. of mercury systolic and 70 mm. diastolic. The pulse rate was 90 beats per min. The skin was dry and there was slight pigmentation in the axillary folds and inguinal regions. The carbon dioxide-combining power measured 26 mEq. per liter of plasma; serum chlorides, 100.3 mEq. per liter; urinary 17-ketosteroids, 0.5 mg. per 24 hours; urinary corticosteroids, 0.20 mg. per 24 hours; hemoglobin, 12.7 gm. per 100 cc. of blood; erythrocytes, 4,050,000 per c. mm.; and basal metabolic rate, −4 per cent.

The patient was started on treatment with fluids by vein and cortisone in doses of 10 mg. every 8 hours. She quickly regained her appetite and after the first 2 days had no further nausea or vomiting. She had no signs or symptoms of myxedema at any time and, with marked improvement, was dismissed after 12 days to return home, taking cortisone in maintenance doses of 5 mg. three times a day.

Re-examination 3 months later, on June 28, 1954, revealed excellent progress. She had an excellent appetite, was able to be up and about all day, and was able to work about the house. The basal metabolic rate was −13 per cent on this occasion. The urinary 17-ketosteroids measured 0.4 mg., and the urinary corticosteroids 0.54 mg., per 24 hours. There were no stigmata of myxedema. Examination of the perimetric visual fields (Fig. 1b) showed gratifying return of vision.

Case 2. A 63-year-old white woman first visited the Mayo Clinic early in September, 1952, because of failing vision in the left eye. This had first appeared about
9 months previously. She had had several brief headaches during the past 9 months, but these had never been severe enough to require aspirin for relief. One month previously, she experienced two short episodes of diplopia. She consulted her local physician, who referred her here for further study.

She had been in excellent health all her life. She had four living children and had had three miscarriages. She had undergone surgical repair for procidentia 14 years previously.

Physical examination gave normal results in all respects, with the exception of a small cystocele. She was 5 ft. and 5 in. (165.1 cm.) tall, and weighed 150 lbs. (68 kg.). The blood pressure measured 132 mm. of mercury systolic and 78 mm. diastolic. The pulse rate was 64 beats per min., and the temperature was 98.2°F.

The visual fields are shown in Fig. 2a. There were no clinical signs of pituitary insufficiency.

The hemoglobin measured 12.6 gm. per 100 cc., and the white blood count was 5,200. The urine had a specific gravity of 1.017, but was otherwise entirely normal. The urinary 17-ketosteroids measured 1.9 mg. per 24 hours. The basal metabolic rate was –11 per cent. A roentgenogram of the thorax did not disclose any abnormality. A roentgenogram of the skull revealed thinning and decalcification of the dorsum and floor of the sella. The patient was given 200 mg. of cortisone intramuscularly 48, 24 and 2 hours preceding operation.

On September 24, 1952, a left frontal craniotomy was done. The chiasm was exposed through an intradural approach and a cyst was encountered lying under the
optic nerves and the optic chiasm. Aspiration disclosed that the cyst was filled with clear cerebrospinal fluid. This aspiration seemed to decompress the chiasm. Further exploration revealed a solid tumor underlying the hypothalamus. This was resected and proved to be a solid pituitary adamantinoma. A small portion of the capsule of the tumor, which was adherent to the carotid arteries, was not removed as it was thought that the risk was too great in view of the age of the patient. The wound was closed without drainage.

The postoperative course was uneventful, and since there were no signs of pituitary insufficiency either preoperatively or postoperatively, the dosage of cortisone was decreased gradually and administration was discontinued on the 7th postoperative day. Mild diabetes insipidus developed, but this was easily controlled with nasal insufflation of posterior pituitary powder three or four times a day. The patient was dismissed to return home on the 12th postoperative day, without medication other than the posterior pituitary powder.

Sixty-five days after operation, the patient was readmitted, complaining of listlessness, apathy, anorexia, nausea and vomiting. She said that she had felt listless since arriving home from the hospital, and that her skin and mouth had been dry all the time. She was able to be up and about most of the day. One week before readmission, her local physician found her blood count low and gave her blood by transfusion. This was followed by nausea and vomiting once or twice per day, as well as by anorexia. She had also had occasional episodes of hiccupping. She had not fainted or collapsed at any time.

Physical examination revealed a blood pressure of 117 mm. of mercury systolic and 70 mm. diastolic. The pulse rate was 80 beats per min. The temperature was normal and the skin was dry. The distribution of hair was normal, and there was no abnormal pigmentation. The value for hemoglobin was 13.8 gm. The erythrocyte count was 5,040,000, and the leukocyte count 5,100. Urinalysis gave normal results. The value for plasma chlorides was 97.0 mEq. per liter; carbon dioxide-combining power, 17.9 mEq. per liter; serum sodium, 128 mEq. per liter; serum potassium, 3.7 mEq. per liter; urinary 17-ketosteroids, 0.2 mg. per 24 hours; and urinary corticosteroids, 0.24 mg. per 24 hours.

Cortisone, 12.5 mg. by mouth every 8 hours, was prescribed and, in addition, the intravenous administration of fluids was started. The condition of the patient improved rapidly, and after the 2nd day she had no further nausea or vomiting. Her appetite was good. The amount of cortisone was gradually decreased to a maintenance dose of 5 mg. given three times a day. The diabetes insipidus continued to be mild and was readily controlled with three to four nasal insufflations of posterior pituitary extract per day. The basal metabolic rate was -5 per cent, and there was no clinical evidence of myxedema. Accordingly, desiccated thyroid was not prescribed.

When the patient was examined, 20 months after operation, she was in excellent health. She was able to do all her housework without undue fatigue, and lived a normal life. She continued to take cortisone in doses of 5 mg. three times a day, and nasal insufflations of posterior pituitary powder three times a day. There were no signs or symptoms of thyroid deficiency. Examination of the perimetric or visual fields on May 13, 1954, showed gratifying return of vision (Fig. 2b).

**COMMENT**

It is always difficult to decide whether complete removal of these tumors should be attempted. Complete removal is the only certain way of pre-
venting recurrence, but technically it is exceedingly difficult and at times impossible without causing death of the patient. Aspiration of the cyst and subtotal removal of the capsule is frequently followed by early recurrence of symptoms, although some surprisingly long survivals have been reported. In both of the present cases it seemed impossible to remove the last vestige of the tumor without inviting disaster by injuring the carotid arteries in one instance, or the hypothalamus in the other.

To date, 10 months and 24 months respectively after operation, there has been no evidence of recurrence, and the striking return of vision has been very gratifying in our cases.

The evaluation of the endocrine status in patients with this type of tumor may be difficult. A considerable proportion of such patients appear clinically to be quite well, and without evidence of adrenal, pituitary, thyroid or gonadal disorder, yet it is possible that many of them may have some minor degree of impaired glandular function. A minority of the patients present, when first examined, clear-cut pictures of panhypopituitarism with a characteristic pale, waxy color, scantiness of the axillary and pubic hair, absence of hair or the presence of very fine body hair, dryness and thinness of the skin, thinness and weakness of the muscles, and asthenia, with or without signs of pituitary myxedema. In all cases in which pituitary tumor is found, whether or not such symptoms are observed, it is well to evaluate thyroid, adrenal and, if possible, gonadal function with such laboratory aids as are available.

In recent years it has been our practice, however, to prepare with adrenal substitution therapy all patients who are to undergo an operation for pituitary tumor, regardless of whether physical examination or laboratory study shows any evidence of pituitary or adrenal insufficiency. This program is difficult to evaluate objectively since many patients have tolerated pituitary operations uneventfully without such prophylactic adrenal replacement therapy. It is nevertheless our impression that this regimen has resulted in substantial improvement in the postoperative course and subsequent results in this group of patients. One reason, of course, why such treatment might be helpful, even in the absence of presurgical pituitary or adrenal insufficiency, is related to the fact that manipulation of the pituitary at operation may impair its ability to elaborate corticotropin (ACTH).

While theoretically either cortisol or ACTH might be satisfactory for use as a prophylactic agent for such patients before operation, we have generally preferred to use the former. It is our practice to prepare all patients with intrasellar or suprasellar tumors, regardless of the presence or absence of pituitary insufficiency, with cortisol in doses of 200 mg, always given intramuscularly 48, 24, and 2 to 4 hours before operation. The object of this treatment is to provide the patient with several large depots of adrenal steroid on which he or she may draw during and after operation, when stress is likely to be a serious factor. The dose indicated was chosen because

* An analysis of our results with this program is being made by Troen and Rynearson and will be published elsewhere.
it was considered very likely to be maximal and probably more than the largest dose that was really needed.

Neither of the two patients presented in this report exhibited preoperative pituitary or adrenal insufficiency. The postoperative treatment in such cases is gauged by the patient’s response. The dosage of cortisone is usually reduced rapidly unless a demonstrated need is observed, and administration is often discontinued within the first week. The fact that this sort of program was followed in our two cases may have contributed in some measure at least to the uneventful course that was observed immediately postoperatively.

The episodes of weakness and collapse that appeared 37 and 65 days respectively after operation are presumed to have been a result of adrenal insufficiency. This presumption is based on the history and presenting symptoms in each case and on the clear-cut response to treatment with cortisone, although the clinical and chemical findings in both episodes were essentially negative. Such occurrences of adrenal insufficiency have been unusual in our experience and are not readily explained. More commonly, such episodes occur abruptly soon after operation and in response to some intermittent stress, but such precipitating factors were not evident in the present instances. These experiences may provide support for the view that some continuous adrenal replacement therapy may be desirable after any operation on the pituitary body, even when objective signs of overt pituitary insufficiency are lacking.

REFERENCES