Ocular palsy occurring with pituitary tumors

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Pituitary tumors caused ocular paresis in nine of 64 patients studied. Most commonly affected of the ocular motor nerves was the third cranial nerve. The third nerve defect was total in three patients and partial in four. The levator palpebral superioris was the most commonly affected, causing either a partial or complete ptosis. Four of the seven patients with third cranial nerve paresis had normal pupillary function, two had sixth nerve paresis; one fourth nerve involvement, and in one, all three nerves to the ocular muscles were affected. Two patients had isolated sixth cranial nerve paralysis without involvement of the third cranial nerve. Seven of the nine patients reviewed had full return of eye movement after intracranial surgical removal of the pituitary tumor.

Key Words: pituitary tumor, ocular palsy, cranial nerves

Pituitary tumors produce a variety of symptoms, depending on their direction of growth. The most commonly disturbed structure, the optic chiasm, has received much attention since the earliest days of pituitary tumor study. Less well described have been ocular movement disorders resulting from encroachment upon the cavernous sinus. Past reports have varied considerably in the stated frequency of paralysis of ocular muscles. In 1910, de Laperronsonne and Cantonnet reported ocular complications in 27% of a series of patients with pituitary tumors. Since then, other investigators have published similar findings ranging from 8% to 25%, although Davidoff in 1926 reported no instance of ocular palsy in his series of 100 patients. However, adequate pre- and postoperative data were lacking in many of these reports, and thus details concerning which cranial nerve defects were present are difficult to ascertain.

Methods
A review of records at the University of California at Los Angeles (UCLA) Hospital disclosed that 64 patients with pituitary tumors were admitted to the neurosurgical service between 1957 and 1968; in nine of these (14%), the tumor had caused some defect of ocular movement. The nine patients, five females and four males, ranged in age from 33 to 51 years, with a mean age of 42 years. Total intracranial removal of the pituitary tumor was possible in all but two patients who had a subtotal removal.

Results of Review
Effects of third, fourth, fifth, and sixth cranial nerve involvement by the pituitary tumor and resultant paresis of the individual muscle groups are shown in Table 1. Most commonly affected was the third cranial nerve (seven of nine patients); the defect was total in three patients and partial in
four. Of all of the muscles supplied by the third nerve, the levator palpebral superioris was the most commonly affected, as manifested by partial or complete ptosis. In four of the seven patients with third cranial nerve paresis, pupillary function was normal.

Of the seven patients with third cranial nerve involvement, three had no evidence of other cranial nerve involvement, whereas in two the sixth cranial nerve was also affected (one on the contralateral side). In one patient the fourth cranial nerve was affected as well, and in another all three nerves to the ocular muscles were involved. Two patients had isolated sixth cranial nerve paralysis.

Only one patient had involvement of the trigeminal nerve, and the abnormality was limited to the ophthalmic division of that nerve.

Visual field abnormalities were noted in six of the nine patients and usually consisted of a bitemporal defect; three patients had completely normal visual fields. The fundi were normal in seven patients; optic atrophy was present in one patient, and papilledema was noted in another. None of the patients had exophthalmos.

Two patients had had previous bilateral adrenalectomies for Cushing’s syndrome, three had decreased pituitary function, one was acromegalic, and three had normal endocrinologic evaluations.

Histological examination of tumor specimens demonstrated chromophobe adenomas in all but one, which proved to be a mixed eosinophilic and chromophobe adenoma. No tumor showed evidence of malignancy. All patients experienced a full return of ocular muscle function within six months of operation except for two, Cases 3 and 7, which have been followed for 4 and 5 years, respectively.

Discussion

Our results agree with those of Weinberger, et al., with regard to the frequency of third cranial nerve involvement and concomitant partial nerve paralysis. They found third cranial nerve involvement in 10 of 14 patients, with partial paralysis in six. Exactly why pupillary fibers are spared more frequently than they are involved is unclear. Clinical application of this fact is obvious, especially when one considers that visual fields were normal in one-third of our patients. A pituitary tumor could present initially as a third nerve paresis without involvement of the pupillary fibers and could thus be mistaken for a diabetic third nerve palsy.

The mechanism producing ocular paresis is unknown. Walsh believes that simple pressure on the walls of the cavernous sinus produces paresis of the nerves in question. Symonds believed that the third cranial nerve is most commonly compressed at the point of entry into the cavernous sinus, being nipped off between the tumor and the interclinoid ligament; he further stated that an
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isolated sixth cranial nerve paresis seems to indicate extension of tumor tissue backwards along Dorello's canal which contains this nerve together with the inferior petrosal sinus. Jefferson\(^9\) considered that involvement of the trigeminal nerve indicated actual breakthrough of the wall of the cavernous sinus and never was a result of simple pressure on the walls. Certainly the frequent x-ray evidence of erosion of the petrous bone when the trigeminal nerve is impaired is consistent with this concept.

References

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