BITEMPORAL HEMIANOPIA*†

BY

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HALIFAX

"If you will see a pageant truly play'd, . .
Go hence a little and I shall conduct you,
If you will mark it."
(Shakespeare. As You Like it. III.4.55).

Loss of the outer halves of the fields of vision is a defect which has an interesting background of natural history.

The amphioxus, a primitive vertebrate, has pigment spots which serve for eyes, and to make a ripple in its throat, a ciliated organ which is the forerunner of the anterior lobe of the pituitary. In the sightless larva of the lamprey, a median pore at the top of the head communicates by a duct with the hypophysis. In the fish Bichir, of the Nile, the communication between the hypophysis and the mouth is still patent. Evidently, the anterior lobe of the pituitary was once an exocrine gland.

With regard to the optic chiasma, total decussation is the rule in the non-mammalian vertebrates. In the herring, one optic nerve passes through a hole in the other. The eyes of owls are directed forward, yet decussation is complete. In mammals a proportion of fibres are uncrossed, in accordance with the degree of frontality of vision; thus a few fibres in rabbits, about an eighth in horses, a quarter in dogs, a third in cats, and half in man are uncrossed. In the embryos of primates, the eyes swing forward early in foetal life.

If in the craniopharyngeal duct or Rathke's pouch, aberrant enamel cells or salivary acini persist, and proliferate, only the uncrossed fibres of the optic chiasma survive to tell the tale. Pituitary adenomas is yet a commoner cause of bitemporal hemianopia. Adenomas of the three main types of cell each produce distinctive syndromes. The olivary eminence is a common site for the growth of meningioma of varying grades of malignancy.

Usually the onset of bitemporal hemianopia is insidious, and unaccompanied by papilloedema. Patients seldom complain in so many words of restriction of the visual fields or volunteer other relevant information. More commonly than not, in the various pituitary syndromes, the frequency of which I estimate at 1 in

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FIG. 1

Tranfrontal approach to adamantinoma. The lesser wing of the sphenoid and the falx cerebri are the rallying points.

FIG. 2.

Bilateral paranasal route to intrasellar tumours. Incision between the angular veins. The ethmoidal and optic foramina bound the field of operation superiorly.

10,000 ophthalmic cases, the presenting symptom is defective vision over a long period of time. When a diagnosis has been made, and perhaps established by X-ray examination, the clinical picture is usually clear; for example, of secondary amenorrhoea due to chromophobe adenoma, of acromegaly, infantilism, basophilism or Simond's cachexia.

Pituitary facies depend mainly on skeletal changes, but it is noteworthy that the muscles of the face arise in connection with the hyoid arch and that their adaptation to expression of the emotions is more or less peculiar to the primates. Recognition of subtle changes produced by endocrine disorders should put us on our guard. Familiarity with the age incidence of the various types is helpful, though a tumour anlage may be latent for many years.

Evans and Browder in one case had occasion to split the chiasma in the sagittal plane and divide the anterior communicating artery, in order to gain access to a cystic tumour. Visual acuity of 6/12 was retained. Traquair has doubted the supposed bilateral innervation of the macula. Pressure on the chiasma concerns the post calcarine sulci rather than the eye, which may appear perfectly normal. When present, however, the hemianopic pupillary reaction is in my experience of the utmost value, because it provides objective confirmation.

Let us now consider three individual cases.

Case 1.—A case of adamantinoma

Resumé.—Eunice G., female, aged 15 years, was found to be suffering from bilateral papilloedema and Fröhlich's syndrome. Investigation led to a diagnosis of adamantinoma. The tumour was subsequently removed by a trans-frontal operation.

Eunice G., aged 15 years, was found at a routine school inspection, to be suffering from bilateral papilloedema. She was referred to the Royal Halifax Infirmary on January 19, 1945, as an emergency. The vision had been failing for eighteen months with more rapid deterioration during the past few days (? acute internal hydrocephalus), and there had been headaches and vomiting. Prior to this, she had felt well and was at the top of the class.

On examination, Eunice was adipose and infantile; menstruation had never occurred. Only the inferior nasal quadrants of the fields of vision were intact. The optic discs were swollen and oedematous and surrounded by exudate and flame-shaped haemorrhages. There were no other physical signs in the central nervous system; the Babinski reflex was planti-flexor. The Wassermann reaction was subsequently found to be negative.

X-ray examination showed an enlarged sella turcica. The posterior clinoids were missing. There was abnormal calcification within and around the sella turcica.

On January 24, after pre-medication with 1/100 atropine, 1½ grains of nembutal and 1/150 of hyoscine, anaesthesia was commenced with open ether and continued with nitrous oxide and oxygen only, through an intra-tracheal tube. The trans-frontal approach was facilitated by undeveloped frontal sinuses. After infiltration by 0.75 per cent. procain solution with adrenalin, a coronal incision was made and a temporal osteoplastic flap was reflected on the right side. Haemostasis was secured by diathermy. Before opening the dura, the lateral ventricles were emptied by cisternal puncture. The olfactory bulbs were visible, but owing to the oblique approach, it was not until the falx cerebri was defined that orientation became possible. Presently, the optic chiasma came into view. The anterior cerebral and ophthalmic arteries could be discerned. The chiasma was pre-fixed, but it was possible to elevate it sufficiently to expose the sella turcica, where a coralliform tumour with scintillating crystals embedded in it came into view (see Fig. 1) and was seized with a pair of ring forceps. As the tumour was calcified and could not be crushed, it seemed at first impossible to extricate it without severing one optic nerve, but with perseverance and a kind of "axis traction," it was eventually delivered without that sacrifice. The tumour was the size of a cherry and seemed fully to account for the defective fields of vision. No further calcification was to be seen in the region exposed; it was thought better not to probe towards the infundibulum and third ventricle. The wound was closed in layers, the bone flap being secured in position by a suture passed through special drill holes; the customary stainless steel wire sutures were in this case omitted. Blood plasma was administered intravenously.

After operation, the vision improved, and the patient recovered sufficiently to be shown at a meeting of the Leeds and West Riding Medico-Chirurgical Society, but she succumbed to recurrence of the tumour in June, 1945.

Histology

A microscopic section of the tissue removed is available. It has been decalcified and stained under the direction of Professor M. J. Stewart who reports as follows:—

"The great bulk of this tumour is densely calcified and even ossified, but enough soft tissue is present to show its true nature. It is a typical adamantinoma showing beautifully the characteristic myxoid degeneration of the rete malpighii of the squamous epithelium."

Adamantinoma or ameloblastoma usually occurs in adolescence. Appearing in the cleft between the pituitary lobes, it is of slow growth, but may resemble in behaviour basal celled carcinoma.

Case 2.—Meningioma of Olivary eminence of sphenoid.

Removal. Resumption of work. Death from recurrence twelve months later

J.W., aged 35 years, core maker, was a man of short stature with somewhat leonine features and spatulate fingers. He was the father of three children, the youngest eight years of age. In August, 1941, he complained of failing vision. He had had no headaches and no vomiting.

On examination, vision in the left eye was 6/24 with complete temporal hemianopia, and acuity in the right eye was less than 6/60 owing to a central scotoma, without any peripheral hemianopia. The optic discs were normal except for slight pallor, and nothing abnormal was discovered on examination of the central nervous system.

An X-ray examination showed erosion of the posterior clinoid processes and flattening rather than expansion of the sella turcica.

The patient did not consent to operation until November, 1941. On November 19, 1941, after pre-medication with scopolamine and morphine, the scalp was infiltrated with novocaine and adrenaline. The patient complained of intolerable itching of the nose and face, for which reason nitrous oxide and oxygen was administered. A frontal osteoplastic flap was reflected downwards and outwards. After puncture of the lateral ventricle, the dura mater was opened along the lesser wing of the sphenoid. On lifting up the left frontal lobe of the brain, a tumour with the optic nerves stretched across it became visible. The tumour, which was attached to the olivary eminence, was about the size of a pigeon's egg.

By careful manipulations, it was brought fully into view. With a little coaxing, it almost delivered itself. The wound was closed, using the central drill hole for drainage for the first twenty-four hours.

On the following morning, the patient was restless and the pulse rate 120, but he was conscious, and asked when he would be able to go home. Thanks to efficient nursing, he made a good recovery. By January, 1942, the visual acuity had improved to right 6/60, left 6/6, and he was contemplating resumption of work.

On histological examination by Professor M. J. Stewart, the tumour proved to be a highly cellular meningioma.

The patient made a good recovery and resumed war production work at Chatham dockyard; but he succumbed to a recurrence which caused mental aberration a year later.

Case 3.—A case of chromophobe adenoma

In 1934, Mrs. H., aged 28 years, who had had amenorrhoea for eight years, was found to have bitemporal hemianopia and an

enlarged sella turcica. A paranasal operation was performed and radon inserted, as described in the *Brit. Med. J.*, Vol. II, p. 1,257, 1936.

A temporal island appeared in the right visual field and the left became normal. Mrs. H., who had adopted a baby in 1934, could play tennis.

In 1939 papilloedema developed and bitemporal hemianopia recurred. A modified Chiari operation was performed and the tumour removed; a slide is available showing a chromophobe adenoma, areas of which have undergone atrophy.

When last seen about a year ago, there was not much vision in the right eye, but the left was normal. The patient was able to accompany her husband to London on visits occasionally and lead quite a normal life.

My approach to intrasellar tumours is a modification of the paranasal route of Chiari (1911). Bilateral external rhinotomy is carried out through a median incision between the angular veins, as shown in the accompanying plate (see Fig. 2). When the body of the sphenoid has been distended by a large adenoma, the tumour can be excochleated with less risk, in my opinion, than by the trans-frontal route. In the absence of sinusitis, this bilateral approach through the ethmoidal and sphenoidal sinuses allows manipulation or aspiration through one side and inspection through the other. As the brain is not exposed, it is a comparatively minor operation.

The lateral walls of the orbits are at right angles, the medial walls parallel. Only the lightest retraction of the orbital contents is permissible, however, if retinal thrombosis is to be avoided. Thirty-eight variations in the relationships of the optic nerves to the sphenoidal cells have been described by Onodi. An imaginary line connecting the anterior and posterior ethmoidal foramina, on the inner wall of the orbit, marks the upper boundary of this operation of access. The incision, being well supported, heals with an imperceptible scar, and without any tendency to webbing of the orbital margin.

Conclusions

Casualties at this crossroads—so to speak—between vision and organised life have been discussed. It would seem that the visual pathway is not the major one.

Normally, a hand held up to the forehead as in saluting is in sight of one eye but out of sight of the other; the shadowy monocular image is projected across the chiasma to the anterior third of the lateral geniculate body and thence to the antero-inferior extremity of the post-calcarine sulcus. I trust that this simple preliminary

test will not only reassure the reader, but also be found of service in busy clinics.

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QUININE AMBLYOPIA

BY

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EGYPT

THE two last years which I spent in Kom-Ombo of Upper Egypt, a district infected with a severe epidemic of malignant malaria, had given me one of the most wonderful chances to study the subject of quinine amblyopia, and it would have been very difficult under normal circumstances to give such an account in such a short time. During this period I had seen in my hospital and private practice, seven cases of quinine amblyopia, which is relatively a large number of such cases for an ophthalmologist to see in two years. Dealing with these seven cases, I have observed some very interesting points in examination, diagnosis and treatment, which I am glad to state to my colleagues.

Symptomatology

From the accompanying table we can conclude :—

- (1) The age of the patient does not matter in the case.
- (2) The amount of the drug (quinine) must not necessarily be big as said by de Schweinitz, because out of my seven cases only two took a large dose of the drug, while the other five developed their amblyopia by taking ordinary doses; but the outstanding feature is that all of them took the quinine on an empty stomach. Thus in my opinion due to these observations, it is not only large doses of quinine that lead to amblyopia, but it is some kind of sensitiveness

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