Invasion of neighbouring structures was of fairly frequent occurrence. The optic nerve, nerve head, retina, choroid, sclera, orbital fat, and ocular muscles; nasal fossae (1 case). Recurrence was recorded in three, in one of which it was as late as 25 years after operation. Freedom from recurrence was only recorded in 6 cases, with an interval of from 7 months to 4 years after operation. *Treatment*: Removal of the tumour with the eyeball was reported in 17 cases, and without eyeball in 5 cases.

Differential diagnosis of endothelioma from gliomatosis depends upon the following factors:—

In endothelioma (1) the age is greater; (2) exophthalmos more often precedes visual disturbance; (3) limitation of movement; (4) circulatory obstruction in lids and conjunctiva; (5) pain; (6) intraocular extension.

In the case described by the writer the sex was female, age 79, vision was completely abolished and had, as far as could be estimated, been absent for a long period before proptosis was noticed. The exophthalmos, however, was of uncertain duration. Movement was slightly limited. This is in accord with the fact that the growth was situated at the posterior pole of the eyeball and extended into the coats of the same. Invasion of sclerotic and retina was present.

The above-described investigation leads to the conclusion that of two cases of primary intradural tumour of the optic nerve, one is an example of the group of gliomatosis of the optic nerve, the other of endothelioma which had its origin in the endothelium of the arachnoid sheath.

REFERENCES

1. Hudson, A. C.—"Primary Tumours of the Optic Nerve." *Roy. Lond. Ophthalm. Hosp. Rep.*, Vol. XVIII, p. 317, 1912.
2. Kettle, E. H., and Ross, J. M.—"A Contribution to the Study of Endotheliomata." *Lancet*, Vol. I. p. 1012, 1921.
3. Parsons, J. H.—"The Pathology of the Eye," Vol. II, p. 693.

ENDOTHELIOMA OF THE ORBIT*

BY

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DURING the last two years at the Central London Ophthalmic Hospital there have been two cases of orbital tumour. Although the subject of these tumours is one which has been discussed at length by many writers, it is worth while describing these cases, as they both present some points of interest.

*Read in the Section of Ophthalmology of the Royal Society of Medicine, on March 9, 1923.

The first case M. W., a girl aged 15, was seen by A. Levy in March of last year. The history was advancement of right internal rectus, tenotomy of right external rectus in 1913. Proptosis of R.E. for two months, movement out and down very limited, up and in slightly limited.

The pupil was inactive, the disc a little pale and vision fingers at 4 feet. The eye was enucleated and the orbital growth removed piecemeal.*

Taking the growth first:—Portions were embedded in paraffin and a typical section (Fig. 1) shows at first sight a structure

FIG. 1.

resembling a carcinoma of the breast. This section is stained with iron haematoxylin and van Gieson. There is a large amount of fibrous tissue, enclosing spaces which contain numbers of large endothelial cells with round nuclei.

The arrangement of these cells is interesting. In the first place they show in part a slight tendency to form spaces, which is a characteristic of endotheliomata; and, secondly, there is a very marked tendency to the formation of whorls.

In the small whorls the cells are intact, but in the larger ones,

*A fortnight after operation M. W. had a course of radium treatment lasting a week, and up to date has had no sign of recurrence. On April 11, 1923, her doctor stated "she is quite all right."

i.e., those which have existed for a longer period, they have undergone complete degeneration and present themselves as a plaque of fibrous tissue, which stains a uniform red with van Gieson's stain and shows no evidence of cellular structure. These masses constitute the psammoma bodies found in some meningeal growths.

These two characteristics may be taken to place the tumour definitely within the category of endotheliomata. It is of scirrhus character and closely resembles the type shown by M. S. Mayou to arise from the proliferation of the endothelial lining of blood-vessels rather than of lymphatics.

It closely invested the optic nerve and by contraction of the fibrous tissue exerted considerable pressure on it.

Fig. 2 shows the vacuolation which has occurred in the nerve as

FIG. 2.

a result of this pressure, and Fig. 3 the papilloedema which has resulted. An interesting feature of this is, that although the swelling is very marked, it has affected only the nasal side of the nerve head, where the vessels can be seen in section.

As regards the site of origin of the tumour—it is possible that in this case it has arisen from the endothelial cells wrapped round the strands of the pia arachnoid. The next section, Fig. 4, shows the dura on one side and the nerve on the other. The space between them is occupied by cells arranged in whorls similar to those already seen in other parts.

If the section be examined under a high power one can trace a definite continuity between the endothelioma cells and the endothelial cells on the inner surface of the dura.

This section, however, cannot be regarded as conclusive, as the

FIG. 3.

FIG. 4.

same appearance might conceivably be produced by infiltration from without of the subdural space. The anterior part of the eye, when examined macroscopically, presented the swelling shown in

the next section, Fig. 5. At first sight I took it for an extension forwards of the growth; microscopically, however, it presented the

FIG. 5.

appearance in Fig. 6. It is covered with a fairly thick epithelium resembling that of the conjunctiva, but differing markedly from

FIG. 6.

it in containing sebaceous glands and hair follicles. The swelling is just behind the limbus and in the horizontal plane on the nasal side of the eye. It is probably a dermoid, as this is a very common situation for these growths. Another interpretation is that during

a somewhat vigorous tenotomy by an operator unknown, some epilated lashes and skin from the lid margin have found their way into the conjunctival wound where they have taken root and grown. This is an attractive hypothesis, as the growth occupies the probable site of the tenotomy wound, but the presence of sebaceous glands favours the diagnosis of a dermoid, as the glands could not have been implanted with an epilated cilium.

The second case, M. S., was that of an orbital tumour occurring in a boy aged $3\frac{1}{2}$ years, who was admitted under A. Levy. There were the usual signs of chemosis, dilated inactive pupil, some swelling of the disc and proptosis, in this case straight forward. There was no perception of light and no movements were possible.

FIG. 7.

After enucleation of the eye, the orbit was found to be occupied by a solid mass and a periosteal elevator was used to clear it out. It was thought at the operation that the mass passed through the sphenoidal fissure.

The boy died a few months later with signs suggesting the presence of an intracranial growth, but unfortunately permission for an autopsy could not be obtained.

Fig. 7 shows the condition of the nerve head. There is a good deal of swelling present, but in this case it affects both sides of the disc and not the nasal portion only. The physiological pit is still present. In the swollen part the nuclei are separated and thinned out and on one side the nerve has bulged laterally, separating the retina from its attachment to the choroid. On the other

side the inner nuclear layer has been thrown into three folds. A few haemorrhages are also present. These changes are, of course, characteristic of papilloedema, and are well shown in this specimen.

The tumour itself was received in pieces. It was not possible to recognize the several portions of it apart from microscopical examination. They were therefore embedded *en masse* in celloidin, and portions requiring further examination were removed and re-embedded.

At first sight the tumour appears very complex. Some portions of it contain bone, others apparently normal cartilage; there are numerous deeply staining cells occurring in some parts, while they are not so numerous in others.

FIG. 8.

At first, considering its complexity, I thought it might be a mixed tumour arising from the lacrimal gland in a fashion analogous to the formation of mixed salivary gland tumours. The gland was present in the pieces removed from the orbit; a section of it is shown in Fig. 8. Some haemorrhage has occurred into its substance, and on one side there are numerous darkly stained cells, but the gland cells appear normal and there is no evidence of their having taken on any neoplastic activity. No evidence of new growth was found in any of the sections examined.

The age of the patient is also against this diagnosis.

The next section, Fig. 9, shows a characteristic portion of the growth. There are some trabeculae of cartilage, and numerous small darkly staining cells. These cells do not actually invade the cartilage, and in many places can be seen to form spaces filled with blood. It seems probable, therefore, that they are endothelial cells, especially when examined under a higher power. Fig. 10.

FIG. 9.

FIG. 10.

I have already mentioned that this tumour was of singularly complex type, and that parts of it contained bone.

The next section, Fig. 11, shows such a portion. There are several bony trabeculae enclosing spaces which contain red blood cells. A few of the typical endotheliomatous cells are present on one side.

I have examined sections of the optic nerve, but have been unable to find any evidence of its involvement in the growth, or of the involvement of the dura or pia. The nerve showed some evidence of compression, and there were haemorrhages between the nerve bundles.

Summing up then, we have a complex tumour filling up the orbit and consisting of endothelial cells forming blood spaces,

FIG. 11.

and of fibrous tissue, cartilage, and bone. The diagnosis would seem to rest between sarcoma, teratoma, and endothelioma. Although the tumour contains a great number of angioplastic cells, which are of endothelial origin, yet it is not conceivable that these cells would form cartilage and bone in the way that has occurred.

The tumour is not, therefore, a typical endothelioma, and it cannot owe the formation of a large part of its substance to the activity of these cells.

On the other hand, one is loth to label a tumour—where there has been such marked and prolific activity of endothelial cells—a sarcoma.

A truer conception of its formation is to go back to the stage in which the embryo consisted of a mass of pluripotential cells, to

assume that some of these cells were cut off during development, and later, resumed activity. In this way one can account for the formation of the various types of tissue present. In other words the growth would appear to be a teratoma of the orbit.

Careful search was made for evidence of the presence of other structures, e.g., remnants of gut, Lieberkühn's follicles, etc., which have been described in connection with teratomata, but none was found.

THE OPTHALMIC HISTORY OF SAMUEL PEPYS

BY

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In the *Lancet* for June, 1895, appeared an article by Sir D'Arcy Power on the Medical Histories of Samuel Pepys and of his wife, in which the question of Pepys' eyesight and ocular complaints is gone into at some length. It is not possible to add much, if anything, to what Sir D'Arcy sets out in his paper, but, as it is nearly thirty years since it was published, it occurred to me that the ophthalmic history of the Diarist might be reprinted in the pages of the BRITISH JOURNAL OF OPHTHALMOLOGY with advantage to the journal and to its readers.

Pepys was born in 1633; his diary starts January 1, 1659 (O.S.), and is continued until May 31, 1669.

Sir D'Arcy finds the first mention of eyes on May 22, 1660. Pepys had gone over to Holland with the ships which were to bring Charles II back to his throne in England. There was given the usual Royal Salute and much firing of cannon. Pepys records, "The gun over against my cabin I fired myself to the King, which was the first time he had been saluted by his own ships since this change; but, holding my head too much over the gun, I had almost spoiled my right eye." We have no knowledge of what damage, if any, was done, but we find Pepys harping on matters connected with eyesight, when, on May 24 at supper, "I put Dr. Scarborough in mind of what I heard him say, that children do, in every day's experience, look several ways with both their eyes, till custom teaches them otherwise; and that we do now see with but one eye, our eyes looking in parallel lines." On April 25, 1662, when he was at Portsmouth, Pepys "was much troubled in my eyes, by reason of the healths I have this day been forced to drink"; and on his return to London he was let blood, about sixteen ounces, by a Mr. Holliard, who received five shillings for his pains.