**Paralysis of one third nerve from haemorrhagic neuritis, with extra-vasation of blood over the opposite frontal lobe / by G. A. Gibson and W. Aldren Turner.**

# PARALYSIS OF ONE THIRD NERVE FROM HÆMORRHAGIC NEURITIS, WITH EXTRAVASATION OF BLOOD OVER THE OPPOSITE FRONTAL LOBE.

By G. A. GIBSON, M.D., F.R.C.P.Ed., and W. ALDREN TURNER, M.D., F.R.C.P.

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(Plate XVII.)

There are two special structures of the body, whose muscles are rarely, if ever, paralysed by a unilateral cortical lesion, owing to the essentially bilateral representation of their movements in the cerebral cortex. These are the eye and the vocal cords. It has been shown experimentally that unilateral cortical excitation of the so-called laryngeal area is productive of movements, chiefly of adduction, of both vocal cords; but there is no thoroughly authentic case on record, in which a unilateral cortical or subcortical lesion has given rise to paralysis of one or other vocal cord.

It will be especially interesting to look with greater detail into what takes place in connection with ocular movements and ocular palsies of cortical origin, in view of the case which is here recorded. It was long ago pointed out, experimentally, that electrical excitation of the bases of the first and second frontal gyri gave rise to conjugate movement of both eyes to the opposite side, and more recent researches have shown that, if the external and internal recti muscles are thrown out of action by section of their peripheral nerves, other but weaker ocular movements, such as upward and downward inclination of the eyeballs, may be produced by cortical excitation of this region (Russell). Unilateral destruction of this area, or removal of the frontal lobe containing this centre, was followed by a temporary inability to turn the eyes beyond the midocular position to the side of the lesion. Removal of both frontal lobes was not followed by any loss of the power of conjugate movement of the eyes other than temporary. Hence "cortical ophthalmoplegia" has not been experimentally demonstrated after bilateral lesion of the frontal lobes.[1] Nor are the facts obtained from clinical medicine productive of further evidence on this point. We have been unable to find a recorded case, in which a lesion of the frontal lobe occasioned paralysis of the movements of the opposite eye, other than that of loss of conjugate movement with its fellow.

Some Continental observers have been led to place a centre for the ocular movements, more especially of the levator palpebræ

[1] These facts are taken from some unpublished experiments recently performed by Professor Ferrier and Dr. Aldren Turner.

superioris muscle, in the angular gyrus. Experimentally this has not been found to be the case; but several clinical observations have been recorded, indicating the existence of a "cortical blepharo-ptosis." Such are the cases of Chauffaud,[1] Lemoine,[2] Surmont,[3] Grasset,[4] and Herter.[5]

There is reason, however, to believe that in many of these cases the lesion was not limited to the angular gyrus, as hemiplegia and conjugate deviation of the eyes was frequently observed, nor does a microscopical examination appear to have been made of the oculomotor nerves. In support of the above view also is the fact that Surmont found only eleven cases of blepharo-ptosis against fifty in which this symptom did not occur with lesion of the angular gyrus.

In view of these considerations, the clinical and pathological details of the following case are of interest :—

E. N., a girl æt. 11 months; was admitted to the Deaconess Hospital, Edinburgh, on 14th May 1895, on account of frequent vomiting and rapid wasting; it was observed on admission that there was complete ptosis of the right eye. It was somewhat difficult to obtain any clear account of the patient's history, but it was ascertained that the child, during the three weeks before admission, had been constantly giving utterance to "a wearied dwining cry." For this she was seen by Dr. Robertson of the Royal Public Dispensary, who thought it was probably connected with teething, and ordered appropriate remedies. The patient's mother stated that the right eye was open on the Wednesday morning before admission, but by Saturday it was closed.

On examination, the patient was found to be pale, but by no means badly nourished. Her weight was 14 lbs. The tongue was somewhat furred, and diarrhœa was present. The temperature was 101°, the pulse 140, and the respirations 70. The child could move her limbs perfectly, the knee-jerks were normal, there was no obvious affection of cutaneous sensation; in fact, there were no detectable nervous symptoms, excepting those connected with the right eye. Ptosis was complete on the right side, as is shown in Fig. 1; and on elevating the lid the pupil was found to be widely dilated and insensible to light. The left pupil was moderately contracted and reacted perfectly to light. The left eye followed an object pretty well, the right eye remaining slightly everted. The anterior fontanelle was widely opened, but there was no enlargement of joints; rickets therefore was probably not present.

It was difficult in this case to formulate a diagnosis; any lesion causing the paralysis of the third nerve must of necessity be localised. The explanation which appeared to be most probable was that of a commencing tubercular mass involving the right third nerve.

The patient was fed on peptonised milk, and, in order to get rid of the diarrhœa, small doses of the liquor of the perchloride of mercury

[1] *Rev. de méd.*, Paris, 1881, p. 490. [2] *Ibid.*, Paris, 1887, p. 579.
[3] *Arch. clin. de Bordeaux*, 1894, quoted by Charcot and Pitres.
[4] *Progrès méd.*, Paris, 1876. [5] *Journ. Nerv. and Ment. Dis.*, N. Y., 1894.

were also administered. The temperature oscillated between 97°·6 and 103°·6, the pulse varied from 96 to 180, and the respiration fluctuated between 52 and 84. Upon the morning of the 19th the patient died.

The post-mortem examination, which was made next day by Dr. Cattanach, the Resident Medical Officer, revealed no lesion observable by the naked eye in connection with the third nerve, but there was a large hæmorrhage, involving the Sylvian region on the left side of the brain. This hæmorrhage spread forwards so as to involve the frontal lobe, and it was therefore matter for debate whether this lesion could not account for the ocular paralysis (Fig. 1).

Fig. 1.

The case appeared at first sight to be one of great clinical value, viz. unilateral ophthalmoplegia, following a destructive lesion of the opposite frontal lobe. Before, however, stating such a proposition, it was necessary to establish—(1) The absence of any other cortical or subcortical lesion; (2) an intact condition of the cortico-peduncular fibres; (3) the integrity of the grey matter of the Sylvian aqueduct, containing the nucleus of the third nerve; and (4) the freedom from disease of the third nerve passing to the paralysed eye. A microscopic examination of the brain and nerves was therefore made, and an answer in the affirmative given to all these factors except the last. In the trunk of the third nerve there was found a condition of *hæmorrhagic neuritis*, between its exit from the crus cerebri and its entrance into the orbit. This examination showed conclusively that the palsy of the eye was due to the pathological condition of the nerve, and not to the hæmorrhage over the opposite frontal lobe, as a superficial examination would have indicated.

The following is the detailed pathological report:—

1. The third cranial nerves.

*The right nerve.*—Sections were made both longitudinally and transversely through the intracranial portion, to which the pia-arachnoid remained attached, and were stained in logwood, carmine, and logwood with eosin.

The section thus tested showed—

(*a*) An abnormal dilatation of the blood vessels, both in the nerve sheath and in the adjacent pia arachnoid membrane. These vessels were engorged with blood (Fig. 2).

(*b*) The fascicular and interfascicular capillaries showed a similar distension and engorgement. In several places, both in the

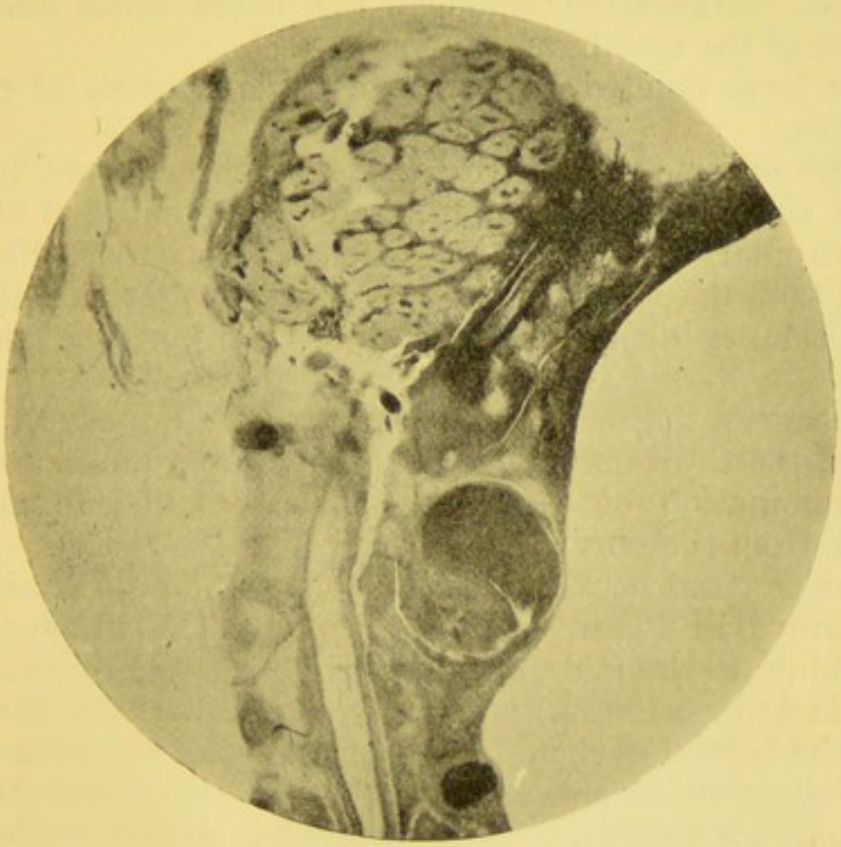

FIG. 2.—Section of Right Third Nerve.

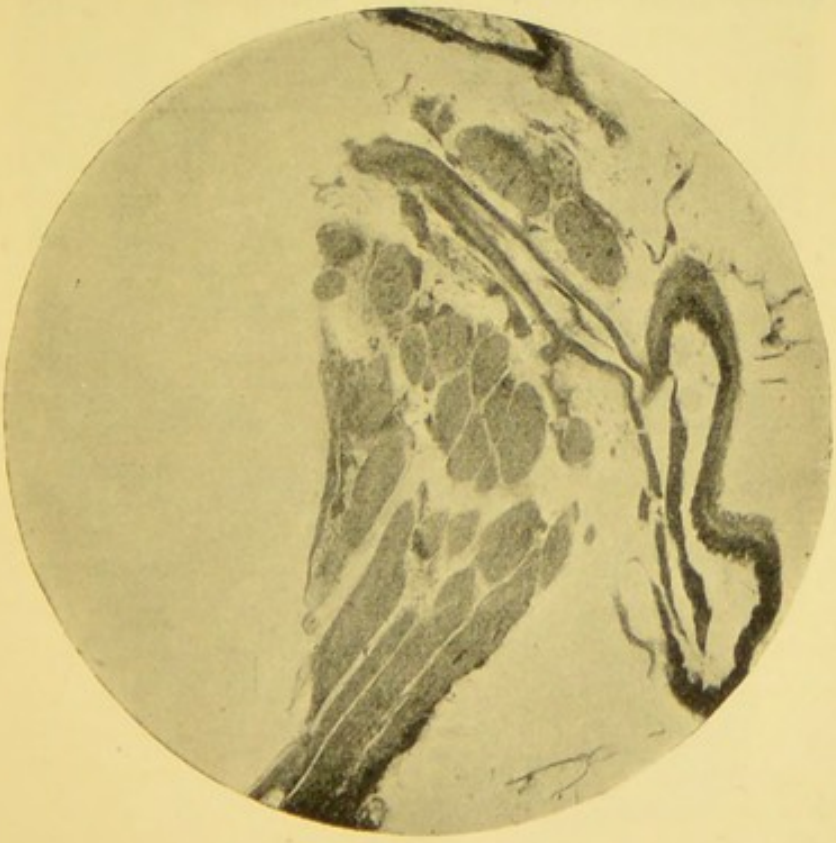

FIG. 3.—Section of Left Third Nerve.

nerve and in the membrane, the capillary walls had ruptured, and blood was extravasated amongst the nerve fibres and in the interstices of the membrane.

These facts pointed to a hæmorrhagic neuritis of the right third nerve.

*The left nerve.*—This nerve and its membrane were treated in a manner similar to the last. In one of the bundles of fibres, two or more capillary blood vessels were seen rather more dilated and engorged than normal, and approaching in appearance, though to a much smaller degree, the condition seen on the right side (Fig. 3).

2. The grey matter around the Sylvian aqueduct and the nucleus of the third nerve was of healthy appearance.

3. Examination of the centrum ovale failed to show any departure from the normal.

4. The cerebral cortex.—The distribution of the hæmorrhage is represented in Plate XVII. This is seen to occupy an area corresponding to the middle third of the fissure of Sylvius, with a well-marked extension upwards and forwards, so as to involve the bases of the frontal gyri, and more especially of the second frontal convolution. Microscopic examination of the cortex from this region showed a distension of the arterioles, similar to that which has been described in connection with the right third nerve, and the grey matter was ploughed up over the area of hæmorrhage. The extravasation, moreover, showed no tendency to pass into the subcortical white matter, which was in all respects normal.

The dark area shows the position and extent of the hæmorrhages.