THE OCULAR COMPLICATIONS OF CAROTID ANGIOGRAPHY

THE OCULAR SIGNS OF THROMBOSIS OF THE INTERNAL CAROTID ARTERY*

FRANK B. WALSH, M.D., AND GEORGE W. SMITH, M.D.

Wilmer Institute of the Johns Hopkins Hospital and University, and
The University Hospital, Baltimore, Maryland

(Received for publication June 19, 1952)

Cerebral angiography often is essential to the diagnosis of thrombosis of the internal carotid artery. The ocular symptomatology that may be associated with such angiography is described without the benefit of statistics in Part I of this paper.

Since cerebral angiography has become widely utilized thrombosis of the internal carotid artery has become a generally well known clinical entity. In 1951 Johnson and Walker10 in describing the angiographic diagnosis produced a table of symptomatology which included the ocular signs in 107 verified cases. Part II of this paper concerns the ocular signs of thrombosis of the internal carotid artery.

PART I. CEREBRAL ANGIOGRAPHY—OCULAR SIGNS

Angiography of the Ophthalmic Artery

Up to the present angiography of the ophthalmic artery has had relatively little value in the diagnosis of arterial obstructions. The artery is not constantly visualized when presumably it is functioning normally; within the cranium it is relatively fixed in position; its course in the orbit is variable and abnormalities are difficult to assess; the branches of the artery are small, and although in some instances they may be identified with reasonable certainty, such recognition has little practical value. In our material the ophthalmic artery can be identified in at least half the films taken within 2 seconds after the injection of diodrast.

Schurr16 has described what may ultimately prove to be an important angiographic finding. In lateral angio-

* Presented at the meeting of the Harvey Cushing Society, Victoria, B.C., June 5, 1952.

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grams (Fig. 1) taken about 5½ seconds after injection there is seen to develop a thin crescent of opacity in the outer two-thirds of the orbit. This crescent forms from above downward just as the ophthalmic artery is fading out. According to Schurr the curved opacity represents filling of venous channels (the choroidal plexus) within the eye.

Ecker's textbook contains many arteriograms showing the ophthalmic artery.

Symptomatology Associated with Angiography

Pain. In many cases at the moment diodrast is injected into the common carotid artery a burning sensation, often described as painful, occurs in the homolateral side of the face. Usually in this area there is some degree of flushing and this may be preceded by short-lived pallor. The abnormal sensations in the face are associated with filling of the external carotid system, as might be anticipated from the arterial distribution. Such sensations have been present in individuals whose internal carotid artery was thrombosed.

Pain in and about the eye is described in many instances. This complaint comforts the surgeon because it indicates that the contrast medium has entered the internal carotid artery. Doubtless, such pain may develop occasionally when the internal carotid artery is thrombosed because there is a liberal collateral circulation from the external carotid system to the ophthalmic artery.

In a single case there was complaint of a sensation of a foreign body in the eye only during and for a few moments after each of 6 injections.

In some instances there is complaint of burning pain in the face and behind the eye as well, but rather often one complaint overshadows the other. Almost invariably in such cases both internal and external carotid systems have filled.

The mechanism underlying these symptoms and signs is not known with certainty. In all probability the contrast medium excites spasm of the vessels which are filled and the resultant irritation of sensory nerves in the vessel walls produces pain.

Retinal Irritation. According to Schurr the patient often describes a flash of light as the injection is being made. He has attributed this symptom, with which we have no experience, to retinal irritation.

Pupillary Changes. Changes may be observed in the pupil of the homolateral eye in a minority of cases. Dilatation of the pupil occurs as the injection is being made in possibly 25 per cent of cases. Usually the dilatation is of brief duration, a matter of seconds or minutes, but in occasional instances it may persist for hours. Narrowing of the pupil is said to have been observed in a case with which we are familiar, as also has momentary hippus.

The mechanism responsible for pupillary changes is not known. Possibly stimulation of sympathetic fibers is responsible for the dilatation but at what level would be mere conjecture.

Retinal Vessels. According to Schurr and others there is momentary narrowing of the retinal vessels during angiography. This narrowing is said to