EVALUATION OF OPHTHALMODYNAMOMETRIC AND ANGIOGRAPHIC FINDINGS IN PATIENTS WITH INTERNAL CAROTID ARTERY THROMBOSIS

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Since the introduction of ophthalmodynamometry in 1917 by P. Bailliart, several papers have appeared in the literature describing this technic and its value in certain occlusive cerebrovascular diseases. Acute obstruction of the carotid artery in the neck by digital compression causes an unmistakable drop in the retinal artery pressure obtained by the ophthalmodynamometer. In the presence of a significant difference in the levels of pressure on the two sides, the conclusion may be drawn that on the side of the lowered retinal pressure, there may be a partial or complete obstruction of the internal carotid artery or carotid bifurcation in the neck. Wood and Toole reported on 5 cases of proven occlusion of the internal carotid artery with the retinal pressure accurately localizing the lesion. Van Allen et al., in one of their 3 cases, exposed the carotid bifurcation for endarterectomy. In this instance, the clamping of the external carotid artery caused a further drop in the retinal pressure (from 50/32 to 30/14) indicating that this vessel carries significant anastomotic blood flow to the ipsilateral ophthalmic artery.

Thomas and Petrohelos reviewed the literature and found that in 249 control cases the diastolic pressure varied from 0 to 14.0 gm., and the systolic, 0 to 9.0 gm. The average percentage difference for diastolic was 5.2 per cent and for systolic, 3.3 per cent. In their review of 19 cases of carotid artery occlusion, 11 from the literature and 8 of their own cases, they found that 4 patients had no significantly lower pressure on the side of the occlusion (1 out of 8 in their own cases, 3 of 11 from the literature). Among those with carotid artery thrombosis on the one or the other side, the average percentage difference between the two sides for the diastolic pressure was 31.7 per cent, while for the systolic pressure it was 24.1 per cent. The reasons for no significant difference in pressure on the two sides in the presence of an occlusive disease of one internal carotid artery, include a good collateral circulation either through the circle of Willis or between the external and internal carotid systems. Secondly, a possible anatomical

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variation in the vasculature on the one side compared with the other, such as unequal brachial blood pressure and radial pulsations resulting in improper reflection of the occlusive disease in the neck upon the retinal artery pressure. Svien and Hollenhorst, reporting on 4 cases, stated that when the diastolic pressure in both eyes is less than 20 gm., the results of any differences in pressure readings on the two sides is not reliable. Heyman et al. noted that the readings of both the systolic and diastolic pressures are significant, and in some of their patients with impairment of the carotid artery circulation there was a decrease in the systolic readings only. They stated that retinal artery pressures could not be relied upon to distinguish partial from complete occlusion. With an already lowered pressure on one side, if homolateral compression of the common carotid causes further drop in retinal pressure, then a partial occlusion in the neck may be suspected, according to these authors. Several authors have emphasized that repeated readings may give variable results within the limits of normal variation seen among control cases.

The technic of ophthalmodynamometry is well known. Certain aspects are worthy of special mention. The testing should be done by an individual who is versed in the recording of the pressures, both for accuracy and constancy of method. The examination is done with the patient in a supine position, using 0.5 per cent tetracaine for local anesthesia. Dilatation of the pupils with a 10 per cent suspension of Neo-Synephrine is helpful. The procedure is more easily accomplished by the use of an assistant who can check for proper position of the ophthalmodynamometer on the eye globe, as well as take and record the readings. It is important to record the brachial blood pressure on both sides to observe asymmetry which may be reflected in the retinal pressures.

Since, in almost every series, there is a significant number of exceptions to the rule, it is felt that ophthalmodynamometric readings should be correlated with the angiographic findings. The time of the ophthalmodynamometric readings in relation to the time of the onset of the occlusive disease of a given carotid artery should be recorded, since there is collateral circulation established through ophthalmic artery via the external carotid circulation in a certain number of patients. In those patients who have a thrombosis of the internal and external carotid arteries and the bifurcation, the readings should be compared with those who have a thrombosis of only one internal carotid artery.

MATERIAL

The material for presentation in this paper consists of 16 patients with thrombosis of the internal carotid artery in the neck. Two of these patients had partial occlusion of one carotid artery; 2 had partial occlusions in one carotid, and complete occlusions on the opposite side; 1 patient had a thrombosis of the entire carotid bifurcation.

We have tabulated our studies in three tables. In Table 1 are 6 patients