Discussion to 55

Clinical Application of Ophthalmophonogram in Carotid-Cavernous Fistula

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There has been outlined a comprehensive plan of surgical attack on the carotid cavernous fistula, namely (1) intracranial carotid and ophthalmic artery clipping, immediately followed by (2) muscle emolization of the internal carotid artery, and (3) ligation and section of the common, internal and external carotid arteries. But there are many problems in these procedures.

We recorded bruit as phonogram over the eye, named it Ophthalmophonogram (O. P. G.) and studied its clinical applications. Bruit is the figure of motor energy generated by turbulence produced by hypoplasticity of laminar flow caused by abnormal hemodynamics, so bruit provides a barometer of activity of fistula.

Case 1. a 64-year-old woman developed spontaneous pulsating exophthalmos. The bruit was heard over the right eye, synchronously with the heart beat. Case 2. a 28-year-old woman had sustained head injury 4 months ago, and developed left exophthalmos and headache. The bruit was heard over the left eye by stethoscope. Case 3. a 31-year-old man developed loss of vision followed by head injury and complained of continuous tinnitus. Carotid angiogram showed right carotid cavernous fistula.

The pathways of drainage of the fistula of three patients were same, and carotid angiogram showed arterial blood supply from the carotid artery into the cavernous sinus and the superior ophthalmic vein, and cross circulation from opposite carotid artery was noticed.

We recorded both bruit and PCG through filter L, M, H, E which had each characteristic frequency, by means of fixed microphone of phonoelectrocardioscope over the eye of three patients and normal adults, in a supine position, in closing both eyes and during temporary stopping respiratory movement.

There were no pathological murmurs in O. P. G. of the normal adults, but characteristic murmurs were recorded in O. P. G. of three patients, namely, high pitched, systolic and diastolic, machinery murmurs. In case 1. high amplitude machinery murmurs in right O. P. G. which had been noticed preoperatively, disappeared following cervical ligation of right common, internal and external carotid artery. In case 2. low amplitude machinery murmurs were recorded on left side and in case 3. high amplitude machinery murmurs were recorded on both sides, especially on right side through filter M. (150 cps) and H. (300 cps.)

Although analysis of murmurs in O. P. G. is difficult problems, we think that if O. P. G. is recorded by smaller microphone which has higher sensitivity, the findings of O. P. G. should be more useful as index of objective data during preoperative and postoperative procedures.