HEADACHE OF NEUROLOGICAL ORIGIN

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The frequent occurrence of headache which is a presenting symptom and often of a disabling nature makes it of great importance for the physician to identify the underlying cause. Too often, headache is treated symptomatically in the presence of unrecognized grave organic disease. The experimental approach to the study of headache has been difficult because of the absence of objectivity of the symptom and the inability of animals to make us acquainted with the exact nature of their sensations.

Elsberg and Southerland,[1] in their studies on headache, state that sensory impulses may originate within the cranial cavity, or the primary receptors may be outside the cranial cavity. Pathways must consist of (1) afferent tracts from receptors, (2) a central station, and (3) pathways of pain to the cortex and consciousness.

Afferent impulses must travel along either somatic or sympathetic nerves. The nerves supplying the dura and its vessels are derived chiefly from the trigeminal nerve, the vagus nerve, and the sympathetic system. The dura of the anterior fossa of the skull and the falx cerebri are supplied by branches of the first and second divisions of the trigeminal nerve. The dura of the middle fossa is supplied by the third division of the trigeminal nerve, and the dura of the posterior fossa and the tentorium are supplied by the first and second divisions of this nerve, and by meningeal branches of the vagi. The nerve supply of the dura also includes sympathetic fibers to the blood vessels and meningeal branches of the hypoglossal nerve. By way of complex anastomoses with the trigeminal and the vagus nerves, other cranial nerves may act as vehicles for the transmission of afferent impulses. Penfield[2] has called attention to the presence of sympathetic nerve fibers in the walls of the blood vessels of the pia mater which arise from the sympathetic nerve plexus of the internal carotid and vertebral arteries. Foerster[3] considers the central roots of the trigeminal nerve to form a functional unit which can become active upon initiation from any part of the periphery and produce the symptom of headache. According to Head,[4] pain impulses may cause perception of pain in the thalami, without rising to the cortex.

The following are some of the theoretical factors in the initiation of headache:

1. Stretching and torsion of the dura.
2. Alterations of intraventricular pressure which result in headache following lumbar puncture and in obstruction of the ventricular system by tumors, inflammation, etc.
3. Small foramina of the veins leaving the skull.

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4. Toxic or irritative stimuli.
5. Lowered threshold for pain perception in certain persons.

During intracranial operations under local anesthesia, neurosurgeons have observed that incision of the dura causes little or no pain except near the base of the brain and over the middle meningeal artery when it is clipped and divided. The brain itself is insensitive to puncture and to incision.

A few of the organic lesions of the head which may give rise to the symptom of headache are:

1. Diseases of the brain—concussion, tumor, abscess, gumma, cyst, encephalitis, hydrocephalus, pituitary lesions, general paresis.
2. Diseases of intracranial vessels—hemorrhage, thrombosis, embolism, aneurysm, syphilitic endarteritis, arteriosclerosis.
3. Diseases of the meninges—meningitis of all types, including syphilis; and tumors.
4. Diseases of the skull—tumors, tertiary syphilis, sinusitis, pus or tumor in the orbit, diseases of dental origin.
5. Diseases of special sense organs—errors of refraction, iritis, glaucoma, conjunctivitis, melanotic sarcoma, otitis media.
6. Adenoids, nasal polypi, sinusitis.

The numerous types of headache of toxic and of "functional" origin will not be mentioned in this discussion.

In the analysis of headache as a symptom, it is of primary importance to obtain an accurate history which includes the character, location, and duration of the pain, the time of occurrence, and its relation to other factors such as reading, fatigue, and function of the gastrointestinal tract.

The severe paroxysmal attacks of major trigeminal neuralgia must be differentiated from other forms of neuralgia and headache. Recurrent headache which increases in severity and is accompanied by nausea and failure of vision, should suggest the possible presence of brain tumor.

In every case after a careful history has been obtained, rapid orientation may be established by the following procedures:

1. Complete physical and neurological examinations.
2. Examination of the blood and a Wassermann test.
3. Urinalysis.
4. Ophthalmoscopic examination.

The ophthalmoscope should be used in every case of headache to determine at once the presence or absence of papilledema. If this condition is present, investigation may then be directed toward the

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establishment of a cause for increased intracranial pressure. Lumbar puncture and examination of the spinal fluid often will give direct evidence of a pathological condition of the central nervous system, such as increased intracranial pressure, meningitis, encephalitis, or syphilis.

In cases of headache which recurs intermittently for a long period of time, severe headaches of undetermined origin, and headaches which fail to respond to treatment directed toward a supposed cause or toward symptomatic relief, a roentgenogram of the skull should be made. By this means alone, an experienced roentgenologist may be able to reveal absolute evidence of an organic intracranial lesion. In some cases it may be necessary to resort to ventriculography or to encephalography in an attempt to localize a suspected lesion of the brain.

Cooperation of the neurologist, the neurosurgeon, the internist, the ophthalmologist, and the otolaryngologist will result in the revelation of the underlying causes of most headaches. Some patients regard headache as a symptom of minor importance, and in some cases it may be true, but a clear explanation of the reasons for special examinations often procures the cooperation of the patient which leads to a solution of the cause of headache. The keynote should be careful investigation of the case with the object of determining the cause of the headache. In this way only can rational therapy be instituted.

References

1. Elsberg, C. A. and Southerland, R. W.: The etiology of headache. Bull. Neurol. Inst. New York. 3:543-579, March 1934.
2. Penfield, W.: cited by Elsberg and Southerland, op. cit. 1.
3. Foerster, O.: cited by Elsberg and Southerland, op. cit. 1.
4. Head, H.: cited by Elsberg and Southerland, op. cit. 1.

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