ARACHNOIDAL PROLIFERATIONS WITH CYST FORMATION IN HUMAN SPINAL NERVE ROOTS AT THEIR ENTRY INTO THE INTERVERTEBRAL FORAMINA

PRELIMINARY REPORT

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During the study of a fairly large material of microscopical sections of human spinal nerves and nerve roots, the author noted in some of them certain remarkable alterations of the structures. The alterations consisted of a more or less intense proliferation of the root arachnoidea. As is well known, the dural and arachnoideal sheaths are restricted to the entrance into the intervertebral foramina. In some roots these arachnoideal proliferations were connected with cysts in the roots themselves.

Since a search through the current literature revealed no description of this condition, the author decided to investigate it. The present paper is a report of the findings so far made.

MATERIAL AND METHODS

The material always consisted of the lumbar spinal cord with its nerve roots and the first stretch of the spinal nerves enclosed in the dural sac. It was taken at post mortem, 6–36 hours after death. The patients were aged from 30 to 80 years. They all died from illnesses not affecting the nervous system. The cord and nerves had been fixed in 10 per cent formaldehyde solution for more than a year previous to the histological examination. Spinal nerves and roots from 44 segments of the spinal cord of 17 cases were studied.

Parts of the nerve roots near the spinal cord from all the segments were stained according to the Alzheimer-Mann-Häggqvist (AMH) method (see Rexed) or impregnated with silver according to Bodian. The nerve roots near the spinal ganglion, the ganglion and the first stretch of the spinal nerve from each segment were sectioned serially. Series from alternating segments were stained by the AMH and the Bodian technique. In the Bodian stained series sections were spared at regular intervals and stained with the Azan or the hematoxylin-Weigert-Hansen stain.

The above material was originally assembled for the study of the effects of lateral disc protrusions on nerve roots and spinal nerves and will be more fully accounted for in a paper to be published shortly on this subject by Lindblom and Rexed.

RESULTS

When the spinal nerve roots entering the intervertebral foramen converge, they are enclosed for a short stretch by tubular sheaths of the dura mater. These sheaths come in contact with the nerve roots and fuse with their connective tissue just above the spinal ganglion. Thus a small, funnel-shaped space is formed around each root on its entry into the intervertebral foramen (Fig. 1). The arachnoidea dips into this space and surrounds the root with a loose cover.
Normally the arachnoidal folds around the roots in this space are very sparse and loose, and they fill only part of the space, leaving the rest as an empty room between the root and the dura mater. Microscopically the space is seen as a thin slit around the root, occupied only by a very loose and thin fold of arachnoidea.

In a certain number of cases, however, the picture is quite different. The change when least developed consists of a moderate thickening and increase in amount of arachnoidal tissue around the roots. In some other cases the arachnoidal folds are still thicker and at circumscribed areas have the appearance of definite proliferations, pressing on the roots and deforming them seriously. In certain places the arachnoidal proliferations invade the interior of the root fascicles and form cyst-like cavities which stand in open connection with the space around the root. The tissue inside the cyst is in direct continuity with the thickened arachnoidal folds outside. In most cysts only the wall of the cyst is coated with the proliferated tissue while the center of the cyst is empty (Figs. 7, 15 and 16).

There thus exist all gradations from a just perceptible increase in the volume of the arachnoidea in the dura-surrounded space around the roots to intense proliferations with strong deformations and cyst formation in the roots. A full report of these findings will follow in the final publication,