

CLINICAL CASES.

VII.

THE PATHOLOGY OF CHRONIC ALCOHOLISM.

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In very recent years studies of the pathological brain, pathological in the sense of having during life undergone some morbid process that ended in the evolution of an insanity, have been pursued with a vigor and thoroughness before unknown. While the results obtained from these researches have not been altogether constant in their character, large additions to our knowledge of numerous morbid conditions have been obtained, sufficient to place some of the diseases on a comparatively firm anatomical foundation, as well as to separate a few, that have common clinical symptoms, from each other and allow of a differential classification. Thus the arterio-sclerotic atrophy, the diffuse syphilitic processes affecting the brain cortex, the endarteritic lesions ending in local erosions of the cortex, have all been differentiated and distinguished by the aid of the microscope from the true forms of dementia paralytica. Many of the degenerative psychoses begin in vascular alterations, in others proliferation of the neuroglia seems to be an essential factor in the evolution of the alienation, while in still others the brain cells undergo a degeneration apparently caused by the presence in the circulation of an irritant toxine, which destroys the perfection of cellular metabolism. Again two or even all three of the essential component elements of the brain may be involved at the same time, the issue being an alteration of the cerebral tissues, which, while fairly readily recognizable, admits of doubt as to the origin of the primary one involved and, incidentally, which were the ones secondarily implicated.

In respect to the lesions induced by chronic alcoholism; between the ideas of Alzheimer, who believes he is able to detect

the presence of a morbid process in the alcoholic brain before intellectual and moral defects are clinically recognizable, and the majority of pathological investigators, who are unable to find any essential difference in the brain substance of the alcoholic and non-alcoholic subject, there is a deep chasm which seems impossible to bridge at the present time. That comparatively gross histological changes are now and then met with is evidenced by many examinations, such as the present one, in which extensive lesions both of blood-vessels and epiblastic elements are to be found. I am inclined to believe that many observers are too skeptical as to what they see in the brain tissues, and pass by lesions which, because they are fine, and their correlation to mental functions is uncertain, are discarded as of no value, while in truth they are the necessary feature of the process.

J. K., male, æt. 53 years, laborer, was admitted to the City Asylum, December 21, 1897, suffering from chronic alcoholism.

No details could be obtained of his family history. From youth onward he had led a most dissipated life, and in later years had been a constant inmate of almshouses through the drink-habit, which had not lessened as he grew older. When received at the hospital he was very weak, unable to stand, and, above all, suspicious, even to the refusal of food, saying that it was poisoned. These persecutory ideas were accompanied by various hallucinations and delusions. The room was filled with witches, who tormented him by inserting needles and knives into his flesh; there were bayonets stuck upright in the floor to pierce his feet in unguarded moments; negro women were constantly at work removing his white flesh and replacing it with black; and he had other similar paræsthetic delusions. The facial expression was depressed. The articulation was defective, blurred in character. Nutrition poor; sleep fair.

The physical examination showed a very much emaciated man, having every appearance of being upwards of 70 years, with numerous bruises and recent scars about the limbs. The skull was brachycephalic (+ 81). Lungs normal; mitral sounds slightly accentuated, first aortic normal. There was a noticeable diffuse sclerotic degeneration of the peripheral arteries. The pulse was feeble, the circulation much impaired. The deep reflexes were exaggerated, the knee-jerk particularly showing a crossed reflex.

The muscles offered a certain plastic resistance on flexion and extension, which apparently was involuntary. No inquiry into the condition of the special senses could be made.

Resistance was obstinately offered to all attempts at examination. Constant automatic movements of the extremities were made. The mental reduction was very great, and no coherent statements concerning the patient's personal history could be obtained. The urine showed traces of albumin, as well as granular and hyaline casts.

Under improved alimentation and rest in bed, the man's strength improved somewhat, but soon after he relapsed, the lower extremities became oedematous, and on the morning of February 19, 1898, he was paralyzed (right hemiplegia) and died within a few hours.

Autopsy (summary) February 20, 16 hours after death. There was marked rigor mortis of all the limbs. Pupils evenly dilated. Purplish discoloration of dependent portions of the body. Lower extremities oedematous as high up as the ankle. Abdomen contained some fluid.

Brain.—Weight, with soft membranes, 1430 grams (oedematous). Beneath the dura mater on the left side was an extensive blood clot, covering the whole convexity of the cerebrum, and extending to the base of the brain. The dura was not thickened; the pia over the right half of the cerebrum was gelatinous, milky, with numerous contorted vessels visible in it. On section, beneath the thickest portion of the blood-clot, the cerebral substance was pinkish; elsewhere the normal gray appearance of the cortical matter was preserved. The ventricles were considerably dilated and were surrounded by white matter much denser and harder than that of the adjacent tissues. The basal and meningeal arteries were somewhat thickened and showed here and there foci of atheromatosis.

Thoracic cavity.—The pleura was adherent to the lung over nearly the whole of the left side; both lungs were emphysematous, the bases congested but crepitant throughout; the pericardial cavity contained about 20 cc. of clear fluid.

The heart weighed 270 grams. Tricuspid valves coaptated, but showed patches of atheroma. The mitral valve admitted two

fingers with difficulty; the left segment was thickened and covered with calcareous patches. The walls of the coronary arteries were sclerotic. Left ventricle wall 13 mm. thick; the right 4 mm. on cross measurement.

Abdominal cavity.—There was considerable fluid in the dependent portions. The spleen weighed 85 grams, the parenchyma was resistant to the knife and showed an overgrowth of connective tissue. The liver weighed 1040 grams. It was hard to the touch and nodular upon the surface. On section it was tough and quite light in appearance. The right kidney weighed 75 grams, the left 95 grams. The surface felt hard and nodular. The capsule was firmly adherent. The pyramids were partly obliterated, cortex 3 mm. in thickness. The suprarenal capsules were large and normal in aspect.

Atheroma was not pronounced in the aorta and large vessels, but there was an universal diffuse thickening of their walls, especially of the inner lining. In the arteries surrounding the cerebral ventricles there were numerous points of annular atheromatosis, which in a few had proceeded to complete obliteration of the lumen in segments of the vessels.

Microscopic Examination.—Various portions of the cortex from both hemispheres were preserved in 96 per cent alcohol and in Müller's fluid for after-examination.

Nissl Methylene Blue.—There had been during life an oedematous condition of the cortex, and, as a consequence, the prolongations of the nerve cells are apparently larger than normal and can be traced a longer distance than usual from the parent body.

Among the smaller pyramidal cells, as well as those of polymorphous shape in the lowermost layers, no definite alterations of the neurones can be demonstrated. They absorb a fair quantity of the coloring matter, have the granula distinctly stained, and in the great majority the nucleus and nucleolus are clearly defined. In a small proportion the nuclear ring is not sharply differentiated from the protoplasm, while the nucleolus does not take up any of the dye.

With the larger pyramidal cells of the second and third layers these alterations are more definite as well as constant. The bodies of the cells contain large masses of coarsely granular

metaplastic material, sometimes located at the basal end of the cells, at others situated near the origin of the apical dendrite. The nucleus often lies excentrically. In such cells the whole of the central region of the body is filled with a finely granular dust, which takes up but little of the stain. Along the periphery of the cells are sparingly located stichochrome granula, very deeply stained, yet with the component molecules visible. The nucleus in none of these altered nerve bodies has the usual sharpness of contour; the nuclear membrane, when it can be determined by careful shading, is thickened, while the nucleolus is unstained. In some nuclei two or three fairly large vacuoles appear.

In others of the large cells the alterations are not so definite, the chromatic particles in the central region staining somewhat better, while the nucleus and particularly the nucleolus is perfectly distinct.

Eosin-haematoxylin Sections.—The vessels now come into greater prominence. The straight arteries and arterioles have suffered comparatively little, the intima and media hardly being thickened at all. The nuclei of the muscular sheath, while rather infrequent, are distinct and well stained. The adventitia also has but little nuclear proliferation, and can hardly be said to be tumefied. The capillaries, densely filled with blood cells, are twisted upon themselves, and look as if their walls were ridged, though their nuclei are neither proliferated nor diminished in numbers.

The pathological changes in the veins are much more distinct than in the arterial channels. A morbid process is not everywhere present, but is confined to scattered vessels of medium and large calibre in every level of the cortex.

The lumina of these veins are filled with blood cells; some have corpuscular bodies uniformly scattered through the coagulated mass, while in others the fibrin and cells have separated, the coagula, from the presence of fibrin threads, looking as if the thrombotic plugging had taken place before death. The internal laminæ of these vessels have no observable departure from normal conditions beyond being somewhat thickened. Outwardly there is no trace of muscular tissue, but in the place of this layer a greatly hypertrophied tunic of connective tissue elements, entirely devoid of any nuclei, is found. Still outwardly there is a

thinner layer of a less dense character, in part separated from the middle one by a lymph space. This most external layer is fibrillar in character and holds a few round nuclei deeply stained by hæmatoxylin. Along the margin of the extravascular lymph space, and penetrating into the external layer are deposits of hematoidin crystals.

The lymph spaces around all the cortical vessels are much dilated and contain quantities of hematoidin and granular debris. The vascular neuroglia system is also implicated, the bodies of the cells being swollen and unusually distinct, while the pseudopods attached to the margin of the perivascular spaces are numerous and unusually visible.

The cytoplasmic bodies of the pyramidal cells stained by eosin-hæmatoxylin offer nothing of a distinctly pathological character. In a considerable proportion of the pyramidal cells the position of the nucleus is eccentric. It also has a thickened membrane which absorbs unusual quantities of the dye. The nucleolus takes up neither hæmatoxylin nor eosin, but appears as a vacuole. The chromatin threads, passing from the central regions to the periphery, on the other hand, are distinctly stained by hæmatoxylin.

Safranin.—While the majority of the large nerve cells of the cortex have a nucleus showing a membrane, clear caryoplasm, nucleolus and chromophilic particles; others absorb too large an amount of the dye and appear as homogeneous bodies. In these the membrane is irregularly shrunken, the caryoplasm deeply stained, the chromatin particles are invisible. Frequently the whole nucleus is driven to the periphery of the cell.

In the cellular protoplasm quite as definite alterations may be noted. The substance has shrunken within the lymph space to an unusual extent, though showing little coarse granulation. The largest cells have masses of metaplastic material, occupying, in many instances, from one-half to two-thirds of the cell body, while the remaining portions of the cell have the protoplasm ill defined and granular. The periphery of the cytoplasm also shows a greater absorption of the dye than elsewhere. Vacuoles were now and then discovered.

Hæmatoxylin-Safranin.—With this stain, like the foregoing one, nuclear alterations assume a considerable importance. In

a majority of the cells the nucleus is normal, but in another and very considerable proportion the vesicle is shrunken, irregular, even of longish shape and is dyed an uniform deep blue-black. In other cells not so far degenerated, the caryoplasm is tinged blue and has a glassy homogeneous appearance, in which an indistinct chromatin thread may now and then be noticed. The nucleolus is very deeply stained and is large. The nuclear membrane is indented and thickened.

Chrome-silver staining shows less of the tumefaction of the podasteroid glia than hæmatoxylin sections. The long-rayed glia elements are apparently not proliferated nor is there any other noticeable alteration in them.