A REMARKABLE LESION OF THE NERVE-CENTRES IN LEUCOCYTHÆMIA.

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PHYSICIANS have long been familiar with the fact that hæmorrhage into the substance, or on to the surface, of the brain, may occur in the course of splenic leucocythæmia ; and pathologists have shown that in that disease the capillary blood-vessels of the viscera (liver, kidneys, etc.), are often enormously dilated and distended with white blood-corpuscles ; but, so far as I have been able to ascertain, no case has hitherto been reported in which such a remarkable lesion of the nerve-centres, as was present in this case, has been demonstrated. My old master, the late Professor Hughes Bennett, did, it is true, in his original account of the disease, describe and figure a dilated and distended condition of the blood-vessels and capillaries of the pia mater. (*Leucocythæmia or White-celled Blood*. By John Hughes Bennett, page 11). But, so far as I know, he did not investigate the condition of the nerve-centres themselves. Dr. Donald Mac Alister, who has been kind enough to look into the matter, tells me that he knows of no case in which such an alteration as I am about to describe has been found.

Fig. 1.—Vertical transverse section through the brain in a case of leucocythæmia, showing three large hæmorrhages (A, B, C). (Copied and reduced from a photograph.)

The case came under my observation while I was pathologist to the Edinburgh Royal Infirmary. The patient, a shoemaker, aged 40, died on May 18th, and was examined on May 19th, 1884. He had suffered for some time from the usual symptoms of leucocythæmia, but, shortly before death, had complained of headache, and had become maniacal.

It is unnecessary to detail the exact condition of every organ. Suffice it to say, that the case was, in every way, a typical one. The blood throughout the body was thick, and of a brick-red colour, exactly resembling thick anchovy sauce. On microscopic examination, the

white corpuscles were seen to be quite as numerous as—indeed, in some slides, much more numerous than—the red blood discs ; many of them were of large size, and very granular.

Fig. 2.—Camera lucida drawing of a microscopical section through two convolutions of the brain in a case of leucocythæmia, showing a large hæmorrhage, enormous dilatation of the blood-vessels in the white matter, and numerous minute (microscopical) hæmorrhages. Stained with picricarmin, cleared with alcohol and oil of cloves, and mounted in xylol balsam, $\times$ Hartnack, oc. 2, obj. 1; and drawing reduced from 8 to 44 inches. A, B, dilated blood-vessels in the white matter of the convolutions ; C, a portion of the subjacent white matter, in which there are numerous dilated vessels and microscopical hæmorrhages ; D, a large hæmorrhage, the two sides of which have been torn asunder in the process of mounting ; E, a dilated vessel filled with leucocytes, in a superficial sulcus ; F, a dilated vessel, filled with leucocytes at the bottom of a deep sulcus ; G, G, microscopical hæmorrhages in the white matter.

The spleen weighed 4 lbs. 8 ozs. ; the liver, 10 lbs. 8 ozs. ; the kidneys, 14 and 13½ ozs. respectively ; the pericardium was in a condition of early inflammation, and there were numerous punctiform ecchymoses in the inflamed membrane, under the endocardium, in the pleura, and in the other parts of the body ; the bone-marrow was of the same brick red colour, and thick consistence, as the blood.

The brain weighed 3 lbs. 1 oz., and presented a very remarkable appearance externally ; the vessels on the surface, being enormously distended with the thick, brick-red coloured blood, looked like masses of huge worms ramifying over the surface of the hemispheres. On making vertical sections through the whole brain, innumerable extravasations of blood were found in the brain-substance. Some of them were of large size, the largest being fully of the size of a hen's egg. Others were just visible to the naked eye ; and, on microscopic examination, the whole brain-tissue (more especially the white matter) was riddled with capillary hæmorrhages. The blood-vessels and capillaries throughout the brain were enormously dilated and distended with white corpuscles, multitudes of which had escaped into the lymphatic sheaths surrounding the larger vessels. The vessels of the brain, even the large trunks, were almost entirely destitute of red blood-corpuscles. Collections of red discs were present in the large (naked eye) extravasations, but the large hæmorrhages were for the most part, and the small (microscopic) hæmorrhages were entirely, composed of white corpuscles.

Fig. 3.

Fig. 4.

Fig. 10.

The vessels of the spinal cord were dilated in the same way as the vessels of the brain, and were stuffed with white blood-corpuscles. Several hæmorrhages were seen with the naked eye in the retina; the optic papillæ were much swollen, and, on microscopic examination,

A careful search was made in the brain for micro-organisms, for I have long believed and taught that some forms of leucocythæmia and pernicious anæmia in all probability depend upon the introduction into the body of infective organisms. In this case, no organisms

Fig. 5.—Camera lucida drawing of a section through the white matter of the brain in leucocythæmia, showing the enlarged and dilated capillaries stuffed with leucocytes. Stained with picrocarmine, cleared with alcohol and oil of cloves, and mounted in xylol balsam. $\times$ Hartnack, oc. 3; obj. 8; tube out; and drawing reduced from 11 to 6½ inches. A, B, a minute vessel presenting enormous varicose dilatations, stuffed with leucocytes; C, D, capillaries in transverse and longitudinal section respectively; E, corpuscles in the surrounding white matter.

large numbers of white blood-corpuscles were found scattered between the fibres of the optic discs, and between the bundles of the optic nerves behind the lamina cribrosa.¹

The accompanying figures, which have been drawn with very great care, show the appearances exceedingly well, and render any further description unnecessary.

¹ The lesion in the retina has been described by several previous observers.

Fig. 6.—Camera lucida drawing of a section through the cortical grey matter in leucocythæmia, showing a blood-vessel enormously dilated and distended with leucocytes, and an extravasation of leucocytes into its lymphatic sheath. Stained with picrocarmine, cleared with alcohol and oil of cloves, and mounted in xylol balsam. $\times$ Hartnack, oc. 3; obj. 8; tube out; and drawing reduced from 9 to 4 inches. A, mass of red blood-corpuscles; the other parts of the vessel shown in the drawing are distended with white corpuscles; B, a small branch arising from the large vessel, also distended with leucocytes; C, extravasation of leucocytes into the lymphatic sheath; D, capillary vessels in longitudinal and transverse section respectively, the former containing white corpuscles, the latter empty. Numerous nerve-cells are seen in the grey matter surrounding the large vessel.

were found in the brain, but sections of the superior cervical ganglion of the sympathetic were infiltrated throughout with fine, highly re

Fig. 8.—Section through the white matter of the brain in a case of leucocythæmia, showing a microscopical extravasation of white corpuscles. $\times$ Hartnack, oc. 3; obj. 8; tube drawn out. A, B, vessels stuffed with leucocytes.

fractile, granular particles of uniform size, which exactly resembled unstained micrococci, but which did not take on any of the ordinary dyes (gentian-violet, methyl-violet). Before examination, the sympathetic ganglia had been kept for a considerable time in a solution of gum, sugar, and carbolic acid; whether this solution prevents the staining of micro-organisms, I do not know, but I have on several previous occasions suspected that such was the case. That the fine

Fig. 7.—Camera lucida drawing of a section through the cortical grey matter of the brain in leucocythæmia, showing a blood-vessel (A) enormously distended with leucocytes, and dilated capillaries filled with leucocytes in the surrounding brain-tissue. $\times$ Hartnack, oc. 3; obj. 8; tube out; and drawing reduced from 9 to 6 inches.

granular particles, which looked like micrococci, were not due to the gum and sugar solution I feel quite certain; for, in the course of a research on the normal and pathological condition of the sympathetic ganglia of the neck and abdomen, which has extended over three years, I have examined a very large number of ganglia which had been kept in the same solution, and in no case, except in this one, was this peculiar granular micrococci-like appearance seen. Whether any importance is to be attached to the condition, I feel unable to decide.

Fig. 9.—Transverse section through the lower dorsal region of the spinal cord in leucocythæmia, showing enormous dilatation of the blood-vessels; under a high power, they are seen to be stuffed with leucocytes. A, an empty space, from which a large vessel has become displaced; B, a large vessel passing into the cord; C, posterior median fissure.

Fig. 3.—Camera lucida drawing of a section through a superficial sulcus of the brain, and the two adjacent portions of convolution, showing the blood-vessels enormously dilated and distended with white blood-corpuscles. Stained with picrocarmine, cleared with alcohol and oil of cloves, and mounted in xylol balsam. $\times$ Hartnack, oc. 3; obj. 7; tube in; and drawing reduced from 11 to 6 inches. A, B, the free surfaces of the convolution on each side of the superficial sulcus; C, artery at the top of the sulcus, enormously dilated, and distended with leucocytes—the vessel has been ruptured, and some of the leucocytes have escaped during the process of preparation; D, E, vessels in the sulcus, seen in longitudinal and transverse section; F, large, transversely divided vessel in the brain-substance, distended with leucocytes; G, G, capillary vessels containing leucocytes; H, nerve-cells, each of which has been accurately drawn in its proper position by the aid of the camera.

Fig. 4.—Camera lucida drawing of a longitudinal section through the white matter of the brain in a case of leucocythæmia, showing the minute vessels and capillaries (A, C) distended with leucocytes, and numerous corpuscles infiltrated through the brain-tissue. Stained with picrocarmine, half cleared with alcohol and oil of cloves, and mounted in xylol balsam. $\times$ Hartnack, oc. 3; obj. 8; tube out; and drawing reduced from 8½ to 5½ inches.

Fig. 10.—Longitudinal section through the optic nerve and a portion of the optic papilla in a case of leucocythæmia, showing extravasation of leucocytes between the nerve-bundles and nerve-fibres. A, summit of the optic papilla, the expansions of the retina having become detached in the process of preparation; there are numerous leucocytes between the nerve-fibres. B, central artery; C, choroid; D, sclerotic; E, E, collections of leucocytes between the bundles of the optic nerve-fibres.

THE WOLVERHAMPTON EYE INFIRMARY.—Mr. J. A. Briscoe, the Chairman of the Wolverhampton Eye Infirmary, has issued a circular, stating that a friend, who takes a lively interest in the charity, has offered to erect an infirmary for in-patients at a cost of £4,000, provided another building in connection with it is constructed for out-patients, with consulting-room, waiting-room, dispensary, and other requirements, indispensable for the investigation and treatment of diseases of the eye; and provided, also, that £2,500 be raised for a foundation-endowment. To carry out this plan, £8,000 will be required, and the committee appeal for assistance to enable them to avail themselves of this generous offer.