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CEREBELLAR TUMOR.

RECOGNIZED CLINICALLY, DEMONSTRATED BY THE X-RAY, AND PROVED BY AUTOPSY.

By Archibald Church, M.D.,

PROFESSOR OF CLINICAL NEUROLOGY, NORTHWESTERN UNIVERSITY MEDICAL SCHOOL (CHICAGO MEDICAL COLLEGE); PROFESSOR OF NEUROLOGY, CHICAGO POLYCLINIC; NEUROLOGIST TO ST. LUKE'S HOSPITAL, ETC.

Any means of investigation which will facilitate the diagnosis of intracranial disease will be welcomed. Many investigators have sought the assistance of the X-ray apparatus in this connection; but, aside from its value in placing bony formations, bullets, and similar foreign bodies, it has failed to render any particular assistance. Obici and Ballici[1] were enabled to get trace of a growth by the X-ray in the case of a boy who had died from brain tumor, the examination being made post mortem. Subsequently, upon introducing tumors of various sorts within the brain-mass of cadavers, they satisfied themselves that localizing shadows could sometimes be secured. Similar experiments previously made by others had given negative results.

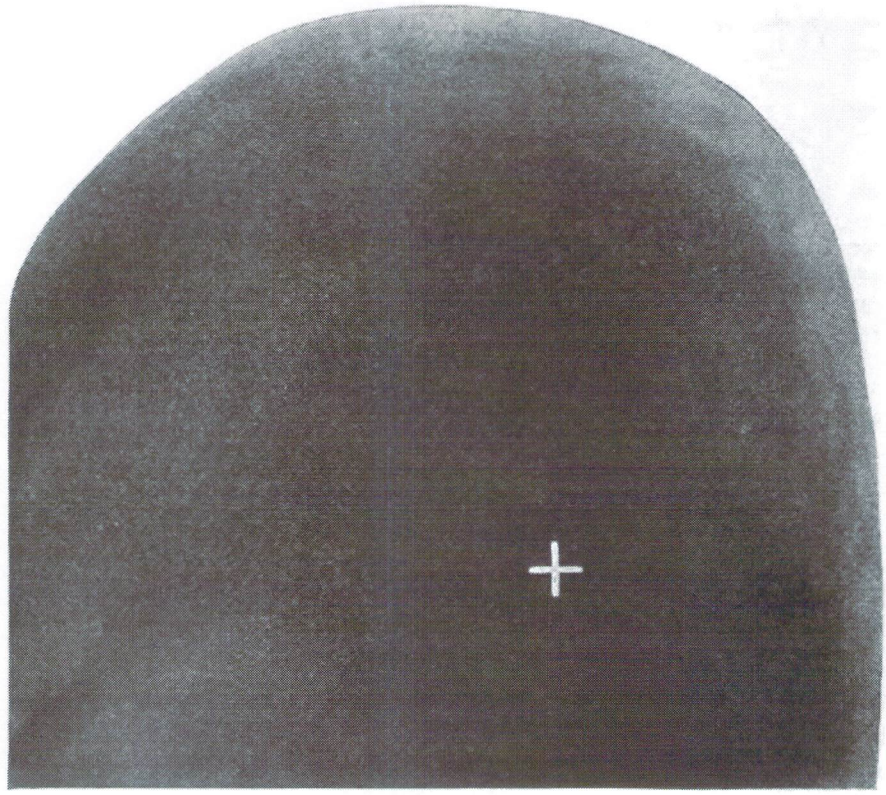
Through the courtesy and unusual skill of Mr. W. H. Fuchs, of Chicago, I was enabled in the case which is here briefly reported to secure two X-ray pictures which seemed to indicate strongly the presence of a growth in the right posterior cranial fossa. The case presented many of the classical symptoms of cerebellar tumor, enabling

[1] Rivista di Patholog., October, 1897.

me to make a diagnosis of such a growth, located probably on the right side, as indicated by the greater asthenia of the right limbs.

Upon reference to the skiagrams, Fig. 1 indicates the picture that might be seen as upon the fluoroscopic screen, the observer standing behind the patient. In Fig. 2 the observer would stand to the left of the patient, the light being on the right side of the head. The divergence of the rays from the luminous point will account for the extent of the shadow in these pictures when compared with the tumor subsequently obtained by section and represented in Fig. 3.

FIG. 1.

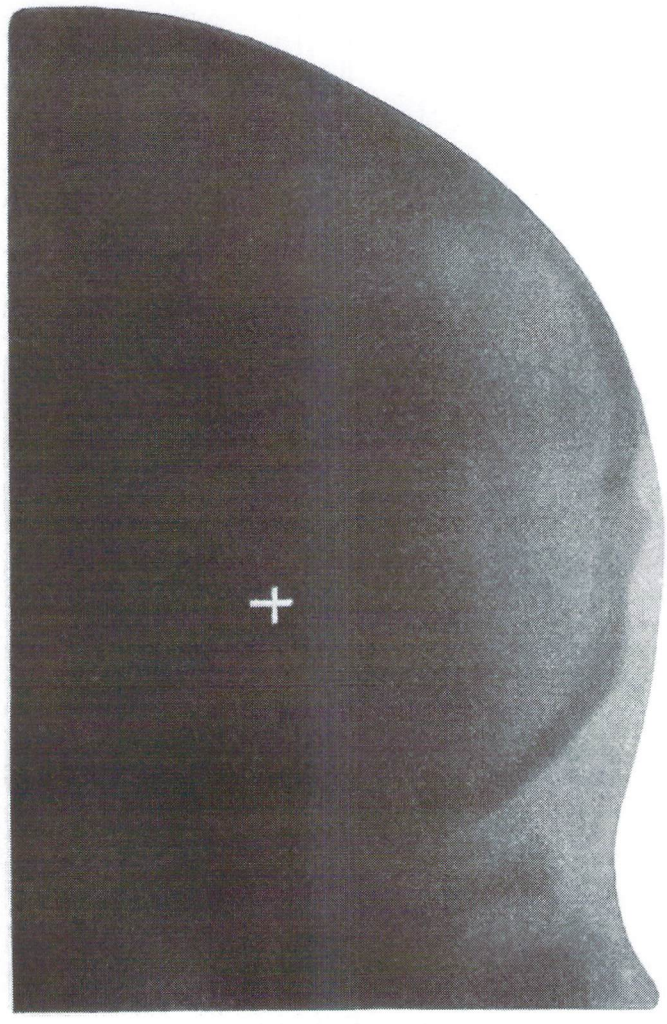


X-ray picture showing shadow made by right-sided cerebellar tumor. The white + is at about the centre of the shadow.

This boy was exhibited before a class of physicians at the Northwestern University Medical School in June, 1898, and the pictures were presented at that time as serving to prove the presence of the tumor and at the same time the value of the X-ray as a diagnostic agent. The supposition was expressed that the shadow could not be produced by a growth of a character homogeneous with that of the surrounding brain-tissue, and that in all probability it must be one of a highly vascular character, as it was presumed the blood in the tissues

of the tumor gave the shadow. This supposition was seemingly confirmed at the autopsy, as the tumor was found to be highly vascular, the seat of a number of old hemorrhages, and also to contain a considerable

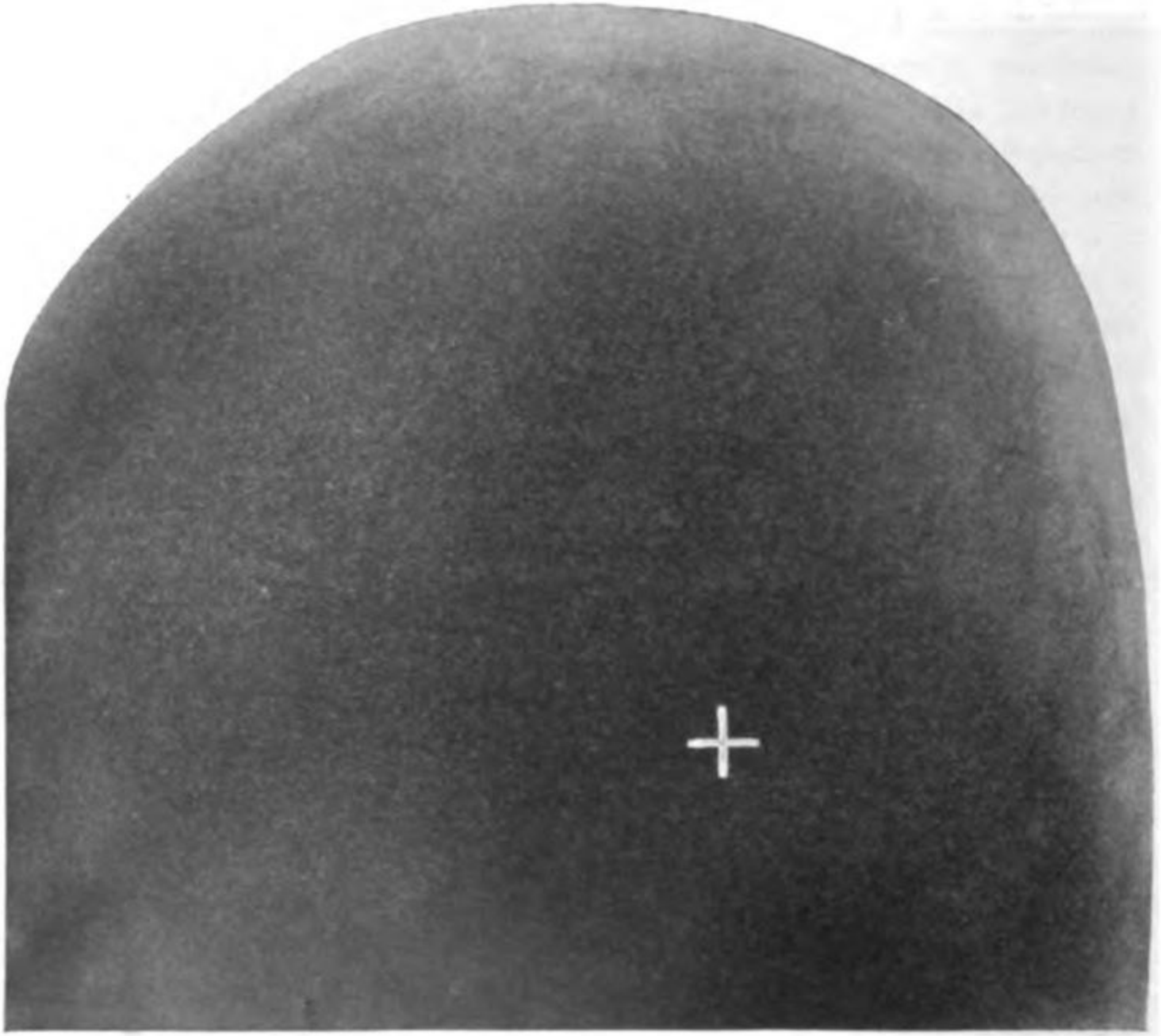
FIG. 2.



X-ray picture showing shadow made by lemon-sized right-sided cerebellar tumor. The white + is at about the centre of the shadow.

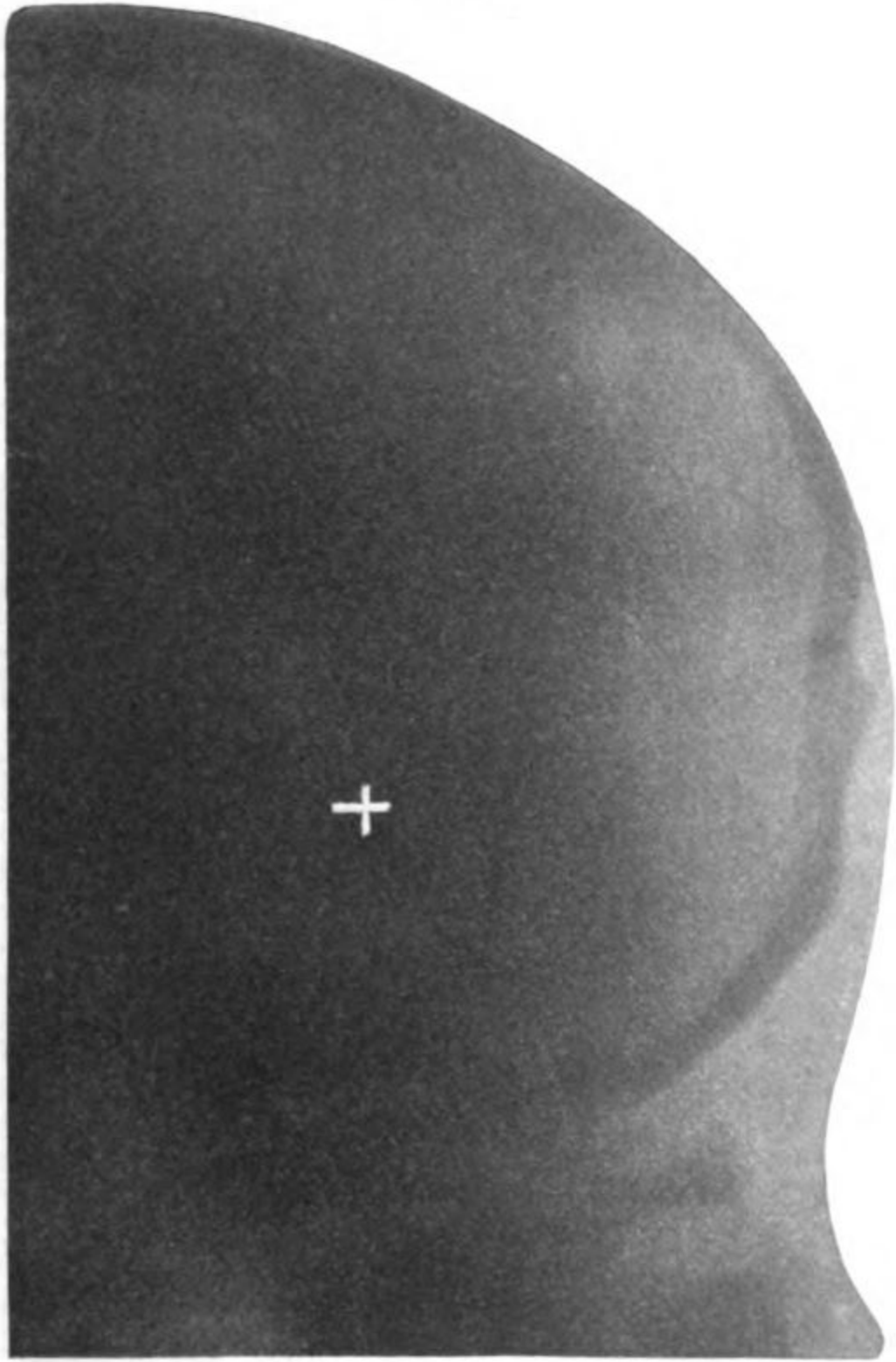
sized clot of recent origin, the development of which had probably been the cause of the boy's sudden death. Calcareous masses would certainly give a shadow; and tuberculomata, dense fibromatous tumors, and thickly encapsulated abscesses and tumors might do so.

FIG. 1.



X-ray picture showing shadow made by right-sided cerebellar tumor. The white + is at about the centre of the shadow.

FIG. 2.



In each skiagraphic cut the centre of the shadow is indicated by a white cross, and it is interesting to note that on the negative of Fig. 2 a lobulated outline could be clearly distinguished and can also be seen upon the better prints made from the negative. A similar outline is seen in the transverse section of the tumor in Fig. 3. The tumor, from its relation to the fourth ventricle, was inoperable.

Mr. Fuchs states that it is important to make an exposure of proper duration, in order to secure these results; that under-exposure or over-

FIG. 3.

Photograph of brain containing cerebellar tumor, seen from above. The lateral ventricles have torn open. The tumor has been incised longitudinally.

exposure produces an entirely different picture. An ordinary focussing tube of proper vacuum was employed at a distance of eighteen inches from the photographic plate on which the head rested. The exposure was three and a half minutes.

John C. H., aged fifteen years, a schoolboy, was admitted to the Florence ward of St. Luke's Hospital, in the service of Dr. Church, March 7, 1898. The family history contained nothing noticeable in reference to this patient. His mother stated that previous to two years before the time of admission the boy's general health had been perfectly good; that he had been an active, intelligent, and energetic lad, strong and well developed. At the time indicated he had a number of attacks of vomiting, which usually came on early in the morning, preceded by a headache and attended by a cough. There did not seem to be a great deal of nausea, and the vomitus usually consisted of a quantity of thick,

yellow fluid. About seven months previous to hospital admission, the parents had noticed that he was uncertain on his feet, with a slight tendency to drag the right foot. The gait became more and more impaired, and at the time of admission was of the staggering variety, with perhaps a slight tendency to deviate to the right in walking forward. On the 14th of January previous he had a convulsion in the night. It lasted about half an hour, and as far as could be learned involved all four extremities about equally. On the 18th of that month, and on February 13th following, he had two other convulsions of a similar character; the muscles were rigid, and all four limbs were affected. He did not bite his tongue or froth at the mouth, but was extremely pale and entirely unconscious. Following the attacks he was sleepy, depressed, and apathetic for two or three days. Headaches of a severe character were a frequent complaint, the point of greatest intensity being usually in the occipital region, but sometimes the pains were frontal in location.

Upon admission the boy was noted to be a well-grown, rather flabby, pale, apathetic-looking individual, who was content to spend most of his time in bed, and usually complained of headache. He walked with a drunken stagger, departing about equally to the right and left, and was quite unable to walk a straight line. The control of the legs seemed to be quite inadequate, and the feet did not seem to be securely attached at the ankle-joint. Although he did not drag his toes, he was inclined to stumble over slight obstacles. The muscular strength in all four extremities seemed to be reduced about 50 per cent. as compared with that of another lad of the same size, and the right hand and leg were weaker than the left, though the lad was naturally right-handed. All tendon-jerks were greatly reduced, and the knee-jerks could not be obtained even by reinforcement. Cutaneous sensation and sphincteric control were normal. There was a slight tendency to lateral nystagmus when the eyes were directed strongly to the right or to the left, and the boy admitted that he had at times seen double. Pupils normal, slight inability to converge. The ophthalmoscope showed a slight blurring of the margins of the disk. No tenderness or localized elevation of the temperature over the cranium. The percussion note was practically the same on both sides. Hearing normal, smell and taste normal, tongue clean, physical functions well performed.

Under iodide of sodium, during the next three months, the boy made considerable improvement in his gait, was brighter, had but one or two slight convulsions, the vomiting subsided, and the headaches were much better. The knee-jerks reappeared. X-ray photographs made in April, 1898, gave the results shown in the accompanying cuts. On account of the improvement and the unfavorable location of the tumor, the idea of operation was not entertained.

In November, 1898, examination showed the following conditions: Pupils present a tendency to dilate, but respond promptly to light and accommodation; knee-jerks slightly exaggerated, but diminished upon attempts at reinforcement, equal on both sides; muscular power symmetrical and normal. Station fairly firm, but walking and standing with eyes closed very difficult; sudden turning to the right or the left induces a staggering, cerebellar gait, which is also manifest to a less degree in walking with open eyes. General sensation and special senses normal. Complains of a feeling of weakness in the legs, and has been having slight convulsions about once a month. These,

according to the observation of internes and nurses, are general in character. At times he complains of a slight frontal headache, usually upon waking in the morning. No apparent change in the eye-grounds.

On November 28th, after a day of headache, a severe convulsion occurred and the patient suddenly died.

For the following post-mortem notes I am indebted to Dr. F. X. Walls, pathologist to St. Luke's Hospital:

The bones of the cranial vault are very thin, averaging perhaps 4 mm. in thinnest portion, and are unusually translucent. Meninges and venous sinuses negative. Brain substance very tense.

In the posterior fossa of the skull was found a tumor of the right cerebellar hemisphere, about the size of a lemon, occupying the superior and anterior surface of the right hemisphere and tensely bulging in all directions, more especially forward and upward. The anterior part of the tumor was free from cerebellar substance, and was covered with a very thin layer of plastic lymph, which exudate extended downward and toward the median line, matting the tissues in the region of the foramen of Magendie. The remainder of the tumor was buried in the substance of the right cerebellum.

On sectioning the tumor its centre was found to contain about an ounce of clear fluid that was slightly blood-stained. Surrounding this central cavity the tumor-tissue was deeply infiltrated with blood that evidently was a recent hemorrhage. The rest of the tumor was of solid consistency and had the characteristic gelatinous appearance so suggestive of glioma, and especially marked was the infiltration of the tumor-tissue into the cerebellar substance at the periphery of the growth, so that a distinct line of demarcation between the neoplasm and the normal tissue was not to be made out in the fresh specimen.

The lateral ventricles were dilated and distended with over a litre of clear fluid, which would readily be explained from a consideration of the size and location of the tumor.

The other organs showed subserous punctate ecchymoses and visceral congestion, such as occur in death during convulsion.

Histologically, the study of the tumor has not been completed, but, from a consideration of a teased specimen in which branched neuroglia cells can be demonstrated, we can affirm that the tumor is a glioma. A specimen stained in hæmatoxylin and eosin shows a cellular tumor with abundant small nuclei, mostly round or oval, surrounded by a granular protoplasm; the branching of the cells is not to be made out, but this we hope to be able to demonstrate later by special staining methods.

The bloodvessels through the periphery of the growth are not numerous, but their walls are slightly thickened, while toward the centre of the tumor the bloodvessels are unusually numerous, have very thin walls, and are very much dilated with red blood-cells, giving in places the appearance of a cavernous hemangioma.

The tissue lining the central cavity is much denser than the rest of the neoplasm, fewer cells are present, and the tumor here has a wavy, homogeneous, colloidal appearance. In this tissue are areas of recent hemorrhagic infiltration and also dense masses of blood-pigment, the vestiges of ancient hemorrhages.