TUMORS OF THE NERVOUS SYSTEM

Tumor Pathology Loan Collection

KANSAS UNIVERSITY MEDICAL CENTER

KANSAS CITY, KANSAS

The case material herein presented constitutes the fourth in a set of Tumor Loan collections prepared and distributed by the Department of Pathology and Oncology of the University of Kansas Medical School aided by a Cancer Control Grant (CS-9209) from the National Cancer Institute of the National Institutes of Health, United States Department of Health, Education and Welfare.

Tumor Loan Collection
Nervous System Tumors

Case 1
Acoustic neurinoma

University of Kansas Medical Center
Kansas City, Kansas
Surgical Pathology No. 52-3314

Clinical Summary: A 51 year old white female was first seen at Kansas University Medical Center with a chief complaint of headaches, nervousness, and impaired hearing in the right ear. Three years prior to admission this patient complained of ringing in the right ear and gradually began to lose her ability to hear with this ear. Two years prior to admission she began having headaches especially severe above her eyes. Several months prior to admission she began having "blackout spells" which consisted of falling but not losing consciousness. More recently she had been losing her vision.

The essential physical findings were bilateral papilledema, nystagmus to the right, absent right corneal reflex and minimal right sided ataxia.

Laboratory studies were in normal range. Roentgenograms of the skull and chest were normal. Audiometrics revealed decreased hearing in the right ear and caloric responses were not ellicited in the right ear.

A ventriculogram done on 9-14-52 gave positive evidence of tumor. A craniotomy was performed and total removal of a large acoustic neurinoma was accomplished. Postoperatively the patient did quite well. She had total right facial paralysis and some difficulty in swallowing. She was dismissed 9-23-53 improving.

Gross: The specimen consists of multiple fragments of yellowish-gray tissue, the largest fragment measures 3 x 1.7 x .6 cm. The entire specimen weighs 11 grams. The fragments of tissue are soft, friable and appear to contain fat. A few of the fragments are lined along one aspect by a glistening membrane of some sort, but no such capsule is seen on most of the pieces of tissue. Representative fragments are submitted for section.

Follow Up: On 9-22-53 the patient was seen in the clinic. She was doing well with partial return of facial movement on the right.

References: Murray, M. R., and Stout, A. P., Schwann cell versus fibroblast as the origin of the specific nerve sheath tumor: observations upon normal nerve sheath and neurilemomas in general. Am. J. Path., 16:41-60, 1940.

Penfield, W. Tumors of the sheaths of the Nervous System. In his: Cytology and Cellular Pathology of the Nervous System, volume 3, pp. 955-990. New York Paul B. Hoeber, Inc., 1932.

Tumor Loan Collection
Nervous System Tumors

Case 2
Teratoma of pineal

University of Kansas Medical Center
Kansas City, Kansas
Surgical Pathology No. 52-565

History: A 4½ year old white male was admitted to Kansas University Medical Center on 2-5-52 with a chief complaint of trembling of the hands, lethargy and vomiting. This patient was well until October of 1951 when he had mumps followed by chickenpox in November of 1951. Fourteen days after the onset of chickenpox he became lethargic and vomited intermittently. The patient was admitted to another hospital where a diagnosis of chickenpox encephalitis was made. Lumbar punctures done at this time were reported normal. The patient's intermittent vomiting continued; he became more lethargic and his speech became unintelligible. He developed trembling of the hands. For a few weeks prior to admission the boy's parents noticed an increase in the size of the genitalia and the appearance of pubic hair.

On physical examination the patient could be aroused and had a clear sensorium. His speech was difficult to understand. The circumference of his head was 54 cm; the sutures were felt to be separated and there was a positive Macewen's sign. The pupils did not react to light. There was lateral rectus weakness bilaterally. The genitalia were large and there was beginning pubic hair. All extremities were spastic with hyperactive tendon reflexes, bilateral ankle clonus, positive Babinski on the right and positive Hoffman sign on the left. There was a questionable facial weakness and a coarse tremor of both hands especially in movement.

Laboratory studies of blood, urine and spinal fluid were normal. Manometric studies are not recorded. Roentgenograms of the skull showed questionable pineal calcification, and spreading of the coronal, sagittal, and lambdoidal sutures. Ventriculograms made on 2-7-52 showed dilatation of both lateral ventricles and

dilatation of the third ventricle. The pineal gland was calcified and surrounded by a mass. The ventricles were not displaced. A catheter was left in place following ventriculography. X-irradiation therapy was started on 2-11-52 and continued for 3 days during which time the patient's condition deteriorated and he was thought to be decerebrate. The patient was taken to surgery, on 2-14-52 and a right parietal craniotomy was performed. A large tumor mass was found in the region of the pineal; upon it were the right cerebral vein and great vein of Galen which were ligated in removal of the cystic tumor in toto. Immediately postoperatively the patient did well but soon began having respiratory difficulty and expired.

Gross: The specimen consists of a circumscribed and encapsulated tumor presenting irregular nodules and thin-walled serous cysts of various sizes. Total weight is 5.7 grams and greatest measurements are 4.5 x 2 x 1.5 cm. Cut sections reveal circumscribed white tumor nodules alternating with cysts. One tumor nodule appears hyalinized for the most part.

Comment: Tumors of the pineal body are rare and fall into two general categories: pinealomas and teratomas.

References: Bagenstoss, A. H., and Love, J. G., Arch. Neurol. & Psychiat., 41:1187-1206, 1939.

Tumor Loan Collection
Nervous System Tumors

Case 3
Meningioma

University of Kansas Medical Center
Kansas City, Kansas
Surgical Pathology 53-1503

Clinical Summary: A 57 year old white male was admitted to the Kansas University Medical Center on 4-10-53 with a chief complaint of having seizures. Approximately 3½ to 4 years prior to admission this patient began having "seizures" preceeded by a feeling as though something were crawling inside his nose and characterized by a momentary loss of consciousness. On three occasions in the past he had experienced definite jerking motions of his limbs and on one occasion urinary incontinence. These episodes occurred sporadically sometimes as frequently as one week apart.

A left homonymous hemianopsia and optic atrophy, worse on the right, were the essential findings on physical examination. No muscle weakness was noted.

Laboratory studies were within normal limits. Carotid arteriography on 4-13-53 revealed displacement of the right middle cerebral artery anteriorly and superiorly. On 4-14-53 craniotomy was performed and a very large meningioma found along the sphenoid ridge filled the middle fossa and extended into the posterior and anterior fossae. This was removed in pieces with some difficulty. During the procedure the right third nerve was sacrificed. Postoperatively the patient did quite well. For a few days he had considerable hemiparesis on the left but this gradually improved. He was unable to lift his right eye lid. At first he had ataxia but this gradually disappeared. He was discharged on the 4th of May 1953.

Gross: This specimen consists of 49.8 gms. of tumor tissue. The entire tissue has essentially the same gross character. It is a soft, spongy, reddish-pink tissue with evidence of recent hemorrhage throughout as well as occasional bands and nodule-like areas of a more white, firm, fibrous tissue. The tissue is submitted in many

variable sized fragments, the largest of which measures 3.5 x ½ x ½ cm. Large pieces of tissue are soft, rather friable and "cauliflower" in appearance on their surfaces. They are a grey-white to pink color throughout. Occasional pieces are seen to have a more dark reddish-brown color but all have the same gross characteristics. Representative microscopic sections are taken.

Gross cut section through these specimens reveals that they are again, soft, spongy, the same color, and appear to have a very intricate vascular like network.

Follow-Up: The patient was seen in neurosurgery clinic on 5-19-53 with the report of right face pain. On physical examination there was a bilateral optic atrophy; left homonymous hemianopsia, right III, IV, and 1st division of V nerve palsy, left hemiparesis, right motor V weakness.

The patient was seen again on 7-14-53 with the same findings as above with some improvement.

The patient was again seen on 9-11-53. Corneal reflex was returning; sensation over the face was returning. There was improvement of hemiparesis and visual fields.

References: Cushing, H., and Eisenhardt, L. Meningiomas: Their classification, Regional Behavior, Life History, and Surgical End Results. Springfield.- Charles C. Thomas, 1938.

Bailey, P., and Bucy, P. C. The origin and nature of meningeal tumors. Am. J. Cancer, 15:15-54, 1931.

Horning, E. D., and Kernohan, J. W. Meningiomas of the sphenoidal ridge; clinicopathologic study. J. Neuropath. & Exper. Neurol., 9:373-384, 1950.

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Case 4
Hemangioblastoma

University of Kansas Medical Center
Kansas City, Kansas
Surgical Pathology No. 50-3635

Clinical Summary: A 22 year old white male was admitted to Kansas University Medical Center on 11-25-50 with a chief complaint of blurring of vision. The patient was perfectly well until August of 1950 when he noticed progressive blurring of vision. Concomitantly he began to experience occipital headaches and at times felt as though blood were rushing over his head. About three weeks prior to admission the patient noticed impairment of his hearing. Two weeks prior to admission he noticed some unsteadiness in his walk. The patient's staggering and headaches were worse in the morning after getting up. The patient's 15 year old brother had a hemangioblastoma of the cerebellum.

Essential physical findings are ataxic gait, bilateral papilledema with retinal hemorrhage, nystagmus on right lateral gaze, and cerebellar ataxia in the right arm on the finger to nose test.

Laboratory studies were within normal limits.

On 2-2-50 a suboccipital craniectomy was performed. A very large vascular tumor in the right cerebellar hemisphere was found and removed. A total removal was accomplished and no postoperative irradiation therapy was given. The patient was discharged on 12-24-50.

Gross: The specimen consists of a mass of tissue ovoid in shape and measuring 4 x 3.5 x 3 cm. in diameter. The tissue is moderately firm in consistency and cuts with considerable resistance. The cut surface is reddish-gray in color, granular with irregular cyst-like spaces of variable diameter, filled with blood. One large cyst about 1 cm. in diameter has a smooth wall and is filled with clotted

blood. Smaller areas of hemorrhage are present. The wall of the mass is well circumscribed by a thin capsule.

Follow-Up: The patient was seen in the clinic on 7-15-52. He had no complaints and was working full time. There was minimal cerebellar ataxia in touching heel to toe. There were no other cerebellar signs. There was mild secondary optic atrophy.

On 7-3-53 the patient was again seen in the clinic. The findings were similar to above but without objective cerebellar ataxia.

Comment: The hemangioblastomas of the cerebellum associated with retinal hemangioblastomas and cystic malformations in the liver and other organs as reported by von Hippel have a familial tendency. Cushing, however, felt that this type of hemangioblastoma was different from those without the aforementioned associated lesions.

References: Cushing, H., and Bailey, P. Tumors arising from the Blood Vessels of the Brain: Angiomatous Malformations and Hemangioblastomas. Springfield; Charles C. Thomas, 1928.

Bennet, W. A., Primary intracranial neoplasms in military age group. - World War II. Military Surgeon 99:594-652, 1946.

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Case 5
Oligodendroglioma

University of Kansas Medical Center
Kansas City, Kansas
Surgical Pathology No. 52-4148

Clinical Summary: A 50 year old white male was admitted to Kansas University Medical Center on 11-13-52 with a chief complaint of seizures in the left arm and leg. This patient had a five-year history of focal seizure of the left arm and leg associated with numbness and weakness of the arm and leg. He had two to three seizures per year characterized by commencement in the left arm and then involvment of the left leg finally progressing to involve the rest of the body. Concomitant with this the patient had associated nervousness, blurring of vision, and occipital headaches. The day prior to admission he had five seizures of increasing severity and for the first time became unconscious.

The essential physical findings were slight weakness of the left arm and leg, rhythmical tremor of the right arm. The reflexes were normal. There were no sensory changes. There was bilateral papilledema with retinal hemorrhages. Blood pressure was 165/100.

Laboratory studies were within normal limits. Roentgenograms of the skull showed a suggestion of destruction of the right posterior clinoid process. Roentgenograms of the chest showed prominence of the pulmonary artery and outflow area. Electrocardiograms were suggestive of complete right bundle branch block.

On 11-18-52 ventriculogram and craniotomy were performed under general anesthesia. A right frontal craniotomy and partial excision of the right frontal lobe was done. The postoperative course was uneventful except for continuation of the tremors of the upper and lower extremities that the patient had preoperatively. The patient was discharged on 11-30-52.

Gross: Sixty six grams of brain tissue are submitted in four masses, the largest measuring 8 x 3 x 2 cm. the smallest measuring 3 x 2 x 1 cm. This tissue appears to be cerebral cortical tissue primarily tumor. Some of these portions of tumor appear to contain some small cystic spaces, and much of the tumor has a yellowish discoloration from previous hemorrhage. The meninges appear normal. Sections are taken through appropriate areas of each of these tissue masses.

References: Bailey, P., and Cushing, H. A classification of tumors of the Glioma Group on a Histogenetic Basis with a Correlated Study of Prognosis. Philadelphia: J. B. Lippincott Co., 1926.

Earnest, F., III, Kernohan, J. W., and Craig, W. McK. Oligodendrogliomas: a review of 200 cases. Arch. Neurol. & Psychiat., 63:964-976, 1950.

Shenkin, H. A., Grant, F. C., and Drew, J. H. Postoperative period of survival of patients with oligodendroglioma of the brain: report of twenty-five cases. Arch. Neurol. & Psychiat., 58:710-715, 1947.

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Case 6
Retinoblastoma

University of Kansas Medical Center
Kansas City, Kansas
Surgical Pathology No. 53-648

Clinical Summary: A 5 month old white male was admitted to Kansas University Medical Center on 2-10-53 for evaluation of possible tumor of the left eye. One month prior to admission the patient's parents noticed that the child's right eye was larger than the left and that the right pupil was definitely larger than the left. Two weeks prior to admission the patient was seen at another hospital and a right enucleation was performed. There was no history of similar disease in the family. The patient was thought to have a tumor in the left eye and entered the hospital for evaluation.

The patient was a well developed, well nourished infant whose right eye had been removed. The right eyelids were drawn together. The left eye reacted well to light and followed light in all directions. The lids were retracted with difficulty. The fundus was not seen because of an obstructing dark mass.

Laboratory studies were normal.

On 3-5-53 the patient went to surgery and electrocoagulation of the tumor in the left eye was carried out. The patient's postoperative course was not remarkable and the patient was discharged on 3-7-53.

Gross: The specimen, received from another hospital, consists of a formalin fixed right eye which has a vertical measurement of 19 mm., lateral 20, and anterior-posterior of 21 mm. The cornea measures 12 x 11 mm. The pupil is widely dilated; the iris appears partially displaced anteriorly. The temporal and posterior part of the eye fail to transilluminate light. The eye is cut horizontally and reveals

a grey to translucent, nodular mass 11 x 13 mm. which has elevated the retina from the choroid. The tumor mass in part surrounds the optic nerve and extends to the ora serrata and lies in apposition to the lens. The retina is separated from the choroid on the medial aspect of the eye lying in apposition with the upper part of the tumor mass. The tumor appears to be in intimate contact with the retina on the lateral border of the eye, displacing the retina medialward. Orange foci of necrosis are noted throughout the tumor mass.

Follow-Up: The patient was seen in the eye clinic three times and on 5-29-53 tumor was again seen. Enucleation was advised but the parents refused. The patient was last seen in the eye clinic on 9-4-53 and had definite evidence of tumor.

Comment: This tumor has the highest incidence of familial occurrence 20-25 %. The age distribution is between 1 to 4 years. There is involvement of the other eye in 20-25%.

References: Parkhill, E. M. and Benedict, W. L. Gliomas of the Retina Am J Opth., 24, 1354, 1941.

Tumor Loan Collection
Nervous System Tumors

Case 7
Ependymoma of cauda equina

University of Kansas Medical Center
Kansas City, Kansas
Surgical Pathology No. 52-2892

Clinical Summary: A 23 year old white female entered the Kansas University Medical Center for the second time on 8-12-52 with a chief complaint of urinary incontinence and moderate pain in both legs and back. Approximately four years prior to admission the patient developed pain in the right leg with sciatic distribution and by the summer of 1949 both legs were involved. A diagnosis of ependymoma of cauda equina was made and removal of the tumor was carried out followed by a course of deep irradiation therapy at another hospital. In September of 1951 the patient again experienced pain and recurrence of symptoms. At this time partial removal of the cauda equina was carried out; however, no attempt at total removal was made in order to preserve the patient's bowel and bladder control. Following this the patient was rendered paraplegic but retained bladder and bowel control. In July 1952, the patient began having urinary incontinence and constipation.

The essential physical findings were marked atrophy of the lower legs with dull dry skin. There was partial paraplegia from the 3rd lumbar dermatome down.

On 8-14-52 total removal of the entire tumor was done with a block resection of the cauda equina from the 1st to the 5th lumbar vertebrae. It was felt that all the tumor was removed. At the time of dismissal on 10-29-52 the patient was able to crutch walk with braces and had a neurogenic bladder.

Gross: The specimen consists of the cauda equina, submitted in two sections, with the reconstructed specimen measuring 9 x 3 x 2.5 cm. and weighing 26 gms. The tissue is grey to greyish-white in color, and the center consists of granular, friable, somewhat greyish tissue, with numerous white nerve roots emerging from

either side. Multiple cross sections through these specimens reveal only a fibrous, whitish sheath surrounding the specimen with the nerve roots emerging from this sheath. The majority of the tissue is made up of a greyish-white, granular material, apparently tumor, without any segment of normal spinal cord being identifiable. In some areas this tumor has pushed against some of the emerging nerve roots, causing nodular swellings beneath the surrounding tissue sheath.

Follow-Up: Communication from the patient received on May 1, 1953, states that she does normal household tasks and is free from symptoms.

References: Bailey, P. A study of tumors arising from ependymal cells. Arch. Neurol & Psychiat., 11:1-27, 1924.

Globus, J. H. and Kuhlenbeck, H. The subependymal cell plate (matrix) and its relationship to brain tumors of the ependymal type. J. Neuropath. & Eper. Neur. 3:1-35, 1944.

Sveis, H. J., Gates, E. M., and Kernohan, J. W. Spinal subarachnoid implantation associated with ependymoma. Arch. Neurol. & Psychiat., 62:847-856, 1949.

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Case 8
Neuroblastoma

University of Kansas Medical Center
Kansas City, Kansas
Surgical Pathology No. 53-233

Clinical Summary: A 1½ year old white female was admitted to Kansas University Medical Center on 1-11-53 with a chief complaint of weakness of the extremities. Four days prior to admission the patient's parents noted that the child would not use her right leg while walking. On the next day the patient refused to stand on either leg and would cry when the extremities were handled. There was no vomiting, diarrhea or known fever. There was no history of any previous disease.

The patient was a rather thin white female who did not appear acutely ill. The legs were flaccid. The anus and sphincters were intact. The reflexes were absent in the legs. The abdomen was distended from neurogenic ileus. The neck was stiff. The patient responded to pin prick in both feet.

Laboratory studies were within normal limits. On spinal tap no pressure was recorded. There were 54 wbc., 32,196 rbc., 61 mg. sugar and 520 mg. protein. Roentgenogram of the chest showed a fusiform shadow cloaking the upper left heart. Lateral films showed the shadow to be in the posterior position.

On 1-16-53 an attempt was made to do a myelogram but no spinal fluid could be obtained on lumbar puncture. About 8 cc. of air was injected. Roentgenograms were inconclusive because the air could not be visualized in the canal. On 1-17-53 a laminectomy was performed and an extradural soft tumor was removed from T3, 4 and 5. The postoperative course was uneventful. At the time of discharge on 2-5-53 the patient was regaining use of the lower extremities but was unable to void. A course of irradiation therapy was given.

Gross: The specimen is submitted in two parts.

A. Consists of two fragments upon which a frozen section examination was performed. These fragments are grey-red in color, soft in consistency, and measure 0.9 x 0.7 x 0.2 cm. and 0.6 x 0.5 x 0.2 cm. Both fragments are submitted for study.

B. Consists of four main fragments of tissue which are soft and show red hemorrhagic areas with gray tissue intermingled. The fragments vary from 3 x 1 x 1 cm. and 0.5 x 0.5 x 0.5 cm. Representative sections are submitted for study.

Follow-Up: The patient was seen in the clinic on 5-26-53 with a report of slow improvement. The child can sit but cannot stand. There was a spastic paraplegia with spinal reflexes. There was impaired sensation in the legs but not anesthesia. The child had urinary incontinence. There was no clonus or Babinski. Roentgenograms of the chest showed no extension of lesions.

Comment: Sympathicoblastoma (Neuroblastoma) is a tumor of embryonal sympathicoblasts. It is preponderant in infants and young children. It affects the adrenal medulla and the retroperitoneal sympathetic ganglia most often, but may be found anywhere in the chain of sympathetic ganglia from the base of the skull to the coccyx.

This tumor grows rapidly to a relatively large size and metastasizes readily by the blood stream or lymphatics. In some areas of examination of the tumor microscopically there can be seen differentiation into ganglioneuroma.

References: Pack, G. T., Horning, E. D., and Oriel, I. M. Neuroblastoma (sympathicoblastoma) with an analysis of 14 cases and a survey of the literature. J. Neuropath. & Eper. Neurol. 11:235-256, 1952.

Soffer, L. J. Diseases of the adrenals. Philadelphia, Lea & Febiger, 1946.

Lewis, D. and Geschickter, C. F., Tumors of the Sympathetic nervous system, neuroblastoma, paraganglioma, ganglioneuroma. Arch. Surg. 28:16-58, 1934.

Scott, E., Oliver, M. G., and Oliver, M. H. Sympathetic tumors of the adrenal medulla; with report of four cases. AM-J. Cancer 17:396-433, 1933.

Tumor Loan Collection
Nervous System Tumors

Case 9
Astrocytoma of Cerebellum

University of Kansas Medical Center
Kansas City, Kansas
Surgical Pathology No. 53-3182

Clinical Summary: A 6 year old white female was admitted to Kansas University Medical Center on 8-7-53 with a chief complaint of headaches. The headaches at first were rather mild in character and usually occurred in the morning. These headaches were sometimes accompanied by vomiting. The parents noticed that the child had difficulty riding her bicycle.

The essential physical findings were marked bilateral papilledema, slight nystagmus on lateral gaze in either direction, and poor performance of the finger to nose test especially on the right.

Laboratory studies were within normal limits. Roentgenograms of the skull showed separation of the sutures.

On 8-11-53 a ventriculogram was carried out and showed evidence of a posterior fossa lesion. Following ventriculogram a posterior fossa craniotomy was carried out and a large cystic astrocytoma of the right cerebellar hemisphere was removed. The patient did well postoperatively and was discharged on 8-19-53 in good condition.

Gross: The specimen consists of a mass of brain tissue which is irregular in shape, and which measures 6.5 x 3.5 x 2 cm. Some of the tissue is recognized as cerebellum. The bulk of the specimen, however, appears on its surface to be a shiny, solid and cystic mass of tumor tissue. On section the tumor, which is intimately attached to the cerebellum, presents a homogeneous, grey-tan, glistening surface with a multiloculated cyst 1.5 cm. in diameter near the center of the mass. The cystic spaces contain clear fluid. The tumor is soft to rubbery in consistency. Sections are taken through the tumor incorporating some of the cerebellum.

Follow-Up: The patient was seen in the neurosurgery clinic on 9-29-53. At this time she was clinically well. There was no ataxia but minimal nystagmus to the right. The eye grounds were almost normal.

References: Bailey, P., Buchanan, D. N., and Cushing, H. A. Classification of Tumors of the Glioma Group on a Histogenetic Basis with a correlated Study of Prognosis. Philadelphia: J. B. Lippincott Co., 1926.

Bennett, W. A. Primary intracranial neoplasms in military age group - World War II. Military Surgeon, 99:594-652, 1946.

Moersch, F. P., Craig, W. McK., and Kernohan, J. W. Tumors of the brain in aged persons. Arch. Neurol. & Psychiat., 45:235-245, 1941.

Tumor Loan Collection
Nervous System Tumors

Case 10
Astrocytoma

University of Kansas Medical Center
Kansas City, Kansas
Autopsy No. 12

Clinical Summary: A 23 year old white male was admitted to Kansas University Medical Center on 8-12-53 with a chief complaint of convulsions. The patient first had convulsive seizures 2 years prior to admission when he was first seen in the clinic. These episodes had started suddenly and had occurred with varying frequency since their onset. In the 2 weeks prior to admission the patient had convulsive seizures almost daily.

Physical examination was essentially normal and there were no localizing signs or symptoms. Routine laboratory studies were normal.

On 8-21-53 arteriogram was performed and an obvious very large infiltrating tumor extending far medially and posteriorly throughout the left temporal lobe was seen. In view of the size of the lesion a left temporal lobectomy of the anterior 4 cm. was carried out. The procedure was terminated at this point. The patient did well for a short time postoperatively, but his condition deteriorated and he expired on 8-24-52.

Gross: The a utopsy revealed an extensive diffusely infiltrating brain tumor involving principally the left temporal lobe and frontal lobe from the region of the anterior end of the left ventricle and posteriorly to the level of the cerebral peduncles.

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Case 11
Fibrillary astrocytoma

University of Kansas Medical Center
Kansas City, Kansas
Autopsy 183

Clinical Summary: A 41 year old white male was admitted to Kansas University Medical Center in a stuporous state following a grand mal convulsion. Not much was known about his earlier years except that he was not quite equal to his siblings in development. At the age of 12 he was struck by lightning and was semicomatose for 3 days following. Before the age of 12 the patient had "spells" at night during which he was unable to move. At the age of 24 he had bilateral bulging of the eyes which receeded spontaneously over a period of 2 or 3 years. At the age of 27 the patient had a grand mal convulsion; at that time he moved his limbs, became cyanotic, had urinary incontinence and fell into a deep sleep. In 1946 he was weak and nervous and complained of weakness in the left leg and severe abdominal cramps. In August of 1949 he had a grand mal convulsion, with movements of the left arm and muscles of the chest of the left side. At that time he was complaining of abnormal sensations of smell. Since that time the patient had several convulsions a day. In December of 1951 the patient had a grand mal convulsion, with movements in both sides of the body, and biting of the tongue; he became cyanotic. After this episode he was confused for a long period of time and had severe headaches. He was started on dilantin. In June of 1951 he complained of severe headaches and vomiting. In October of the same year he complained of difficulty in swallowing, and trouble with his vision.

The patient's mother died at the age of 42 with a history of fainting spells. One brother died of brain tumor at age 35.

Physical examination on admission revealed a blood pressure of 140/100, pulse 84, temperature 99. The patient was in a semistuporous state, unable to talk, and very slow to respond to painful stimuli. There was decreased muscular tone more marked on the left side, ankle clonus bilaterally, hyperactive deep tendon reflexes more marked on the left, marked stiffness of the neck, diminished gag reflex.

Significant laboratory findings were an elevated white count 19,800, 68% filamented, 1 nonfilamented, lymphs 25, basophils 1, monocytes 5.

The patient was treated by tube feeding, indwelling catheter, dilantin, phenobarbital, penicillin, streptomycin and intravenous glucose. He became progressively worse and expired quietly at 3:20 A.M.

Gross: The brain appears soft and mushy throughout. The vessels appear quite congested. There is on the inferior aspect of the brain involving the left temporal lobe and extending almost to the optic chiasm a white, very soft, mushy, nonencapsulated, undelineated mass of tissue measuring approximately 6 to 6½ cm. by 7 to 7½ cm. It is also a portion of this tissue that seems to extend anteriorly, not so prominent, but definitely different from the normal brain tissue adherent to a softened area of cribriform plate. Representative sections are taken of the tumor.

Tumor Loan Collection
Nervous System Tumors

Case 12
Astroblastoma

University of Kansas Medical Center
Kansas City, Kansas
Surgical Pathology No. 52-1256

Clinical Summary: A 72 year old white male was admitted to the Kansas University Medical Center on 4-4-52 with a chief complaint of headaches and failing vision since October of 1951. In December of 1952 a brain tumor was diagnosed elsewhere but therapy was refused by the patient. Since that time the patient developed weakness of the left side and developed an increased fluid intake and output.

Physical examination on admission revealed a chronically ill white male who was bedridden, mentally confused, and totally blind. There was bilateral papilledema and mild weakness in the left arm without sensory impairment.

Routine blood, urine and serological studies were non contributory.

On 4-8-52 a ventriculogram was done which revealed a large right sided brain tumor. A craniotomy with partial removal of a very large infiltrating glioma of the temporal lobe was carried out. Postoperatively the patient did fairly well but remained mentally confused. It was not felt worthwhile to give irradiation therapy. The patient was then returned home essentially unchanged for terminal care.

Gross: The specimen consists of 43 grams of brain tissue received in fragments. The largest and main mass, measures 5 x 4.5 x 3 cm. and shows an infiltrative neoplasm composed of extremely friable somewhat firm yellowish tissue surrounded by a thin rim of brain tissue. Other similar smaller fragments are present.

Tumor Loan Collection
Nervous System Tumors

Case 13
Colloid cyst of 3rd ventricle

University of Kansas Medical Center
Kansas City, Kansas
Surgical Pathology No. 53-2578

Clinical Summary: A 63 year old white male was admitted to Kansas University Medical Center on 6-20-53 with a chief complaint of weakness and dizziness for 19 years. These episodes were brought on by change of position of the head. The patient had an eight year history of weakness of the legs. One year prior to admission the patient began having episodes of twitching motions of the left arm and leg and of the left part of the face.

Physical examination was essentially normal with the exception of slight exopthalmos.

Cerebrospinal fluid studies were within normal limits. Pneumoencephalogram on 6-25-53 showed dilation of the ventricles. There was poor filling and no definite diagnosis could be made. Ventriculograms done on 6-27-53 showed a tumor mass arising from the 3rd ventricle about 3 cm. in diameter. On 6-27-53 the patient underwent exploratory craniotomy and a colloid cyst of the third ventricle was removed. The patient did well postoperatively and was discharged on 7-5-53.

Gross: The specimen consists of two portions of whitish, somewhat gelatinous appearing tissue, the largest piece of which measures 2 cm. across. Some areas are quite firm, others gelatinous. Representative sections are taken from this material and the cyst wall.

Follow-Up: The patient was seen in the clinic on 8-5-53 and was markedly improved. The family states that he is bright and mentally alert. He had had no headache or attacks of unconsciousness.

Tumor Loan Collection
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Case 14
Medulloblastoma with meningeal implants

University of Kansas Medical Center
Kansas City, Kansas
Surgical Pathology No. 52-4137

Clinical Summary: A 9 year old white female was admitted to the Kansas University Medical Center on 11-15-52 with a chief complaint of vomiting. This patient was previously admitted because of vomiting of four months' duration. Studies on that admission showed a low-grade hydrocephalus. Spinal-fluid studies were in keeping with the diagnosis of tuberculous meningitis. The patient was discharged with that diagnosis. After four days at home she complained of a severe headache and had several episodes of vomiting. The day of admission she became stuporous.

Physical examination revealed a thin, stuporous, acutely ill white female. There was bilateral papilledema and stiff neck. The patient was areflexic and there was a right sixth nerve palsy.

Lumbar puncture done on admission showed a pressure of over 600. Decompression was done. On 11-17-52 a ventriculogram was performed through the catheter. There was a questionable displacement of the right vermis into the roof of the upper portion of the 3rd ventricle.

On 11-17-52 a suboccipital craniotomy was performed and a diagnosis of medulloblastoma with meningeal implants was made. The postoperative course was complicated by pneumonia which responded slowly to antibiotic therapy. A course of irradiation therapy was given the patient and her condition improved as treatments progressed. She was discharged from the hospital on 1-10-53.

Gross: Six fragments of brain tissue are submitted. These are irregular in size and shape, the largest measuring 1.5 x 1.5 x 1 cm. The smallest measuring 2 x. mm. Each of these masses of tissue is rather firmer than the usual consistency of brain

tumor. Each has a somewhat granular appearance. Cross section discloses the presence of hyperemia of various portions of this tissue. Representative sections are taken.

Follow-Up: The patient was seen in the clinic on February 20, 1953. She was bright, alert and free from headaches. She had moderate cerebellar ataxia with nystagmus, and secondary optic atrophy. She still vomited occasionally.

The patient was again seen in the clinic on May 22, 1953 with very little cerebellar ataxia. There was thus far no clinical evidence of recurrence of the tumor.

References: Bailey, P. and Cushing, H. A Classification of Tumors of the Glioma Group on a Histogenetic Basis with a Correlated Study of Prognosis. Philadelphia: J. B. Lippincott Co., 1926.

Tumor Loan Collection
Nervous System Tumors

Case 15
Glioblastoma Multiforme

University of Kansas Medical Center
Kansas City, Kansas
Surgical Pathology No. 53-2833

Clinical Summary: A 52 year old white male was admitted to the Kansas University Medical Center on 6-20-53. On the day of admission he suddenly fell to the floor and had a generalized grand mal convulsion. He remained cyanotic and unconscious for ½ hour and was taken to another hospital where he regained consciousness. His "tongue was thick," and he could remember nothing that happened since the morning of the seizure. There were no associated symptoms except mild headache over the top of the head. There was no previous history of convulsive disorders. The patient was thought to have a myocardial infarction and a cerebral lesion. He was discharged 6-26-53 with recommendation to return in 5 weeks for study of the central nervous system.

Three weeks later on 9-13-53 the patient was readmitted to the Medical Center because of progressive personality change, increasing drowsiness and stupor. For the 2 weeks prior to admission he suffered increasingly severe vertex headaches.

Physical examination was difficult because of the patient's drowsiness and confusion. There was blurring of the left disc. No other cranial nerve deficit was noted. The patient's gait was unsteady, and he tended to fall more to the right. There was a generalized increase of muscular tone, more rigidity than spasticity. Reflexes were hyperactive throughout but much more on the right. There were bilateral Babinski and Oppenheim reflexes. Pin prick was perceived throughout. The patient was also mildly dehydrated.

On 7-15-53 a ventriculogram was obtained. This showed a shift of the ventricular system to the left and some depression of the lateral ventricle on the right.

A frontal flap was turned revealing a large friable necrotic tumor filling the entire right frontal lobe. At the time of operation it was felt that this tumor invaded the corpus callosum, septum pellucidum and hypothalamus.

Postoperatively the patient had labored breathing and tracheostomy was done. The patient improved somewhat and irradiation therapy was begun. It was discontinued after four days because of deterioration of the patient. He developed bronchopneumonia and died on 8-2-53.

Gross: Specimen consists of an elliptical mass of brain tissue measuring 6.5 x 4 x 1.3 cm. and weighing 28 gms. One surface is covered by pia arachnoid, and is convoluted. Numerous irregular areas of hemorrhage are seen beneath the pia arachnoid and throughout the substance of the specimen. Representative sections are taken.

Comment: Slide A obtained from the periphery of the lesion more closely resembles an astrocytoma. Slide B obtained from the central portion is more typical of glioblastoma multiforme.

Tumor Loan Collection
Nervous System Tumors

Case 16
Papilloma of choroid

University of Kansas Medical Center
Kansas City, Kansas
Autopsy 258

Clinical Summary: An 8 month old white male was admitted to the Kansas University Medical Center on 3-25-53 for the second time. The patient was hospitalized 3 days earlier at which time he had a ventriculogram and was diagnosed as having a congenital hydrocephalus. He was readmitted because he became dull, developed fever and had a seizure; he was thought to have meningitis.

Pregnancy was full term, delivery normal, and birth weight 7 lb. 10 oz. The mother had German measles at the 3-4th month of pregnancy. No abnormalities were noted in growth and development. The family doctor did note, however, that the child's head was large. Three months prior to admission the patient had an episode of pneumonia which cleared up after treatment with antibiotics. One month later the child had another episode of pneumonia treated successfully with aureomycin.

On physical examination the child was thin, small and stuporous. The head was obviously enlarged and the anterior fontanelle was tense and bulging. There were no other physical abnormalities.

Laboratory studies were within normal limits. A lumbar puncture on the evening of admission indicated increased pressure although this was not accurately measured. The shunting operation was decided on. Accordingly on 3-31-53 he was taken to surgery and subarachnoidal drainage with polyethylene tube was established. Postoperatively he seemed to get along fairly well; he took his food on the morning of 4-7-53 but when the nurse returned one hour later the patient was in extremis. He expired at 7:45 A.M. on 4-7-53.

Gross: The brain weighs 900 gms. (normal 489 gms.) and its external surface appears

normal except for moderate flattening of the convolutions. Multiple coronal sections, however, show marked dilatation of both lateral ventricles, and compression of the basal ganglia and internal capsules on both sides. The right lateral ventricle, which measures 5 x 7 cm. in cross sectional dimensions at its most dilated point is approximately twice the size of the left and is almost completely filled by a papillary mass of friable tissue which resembles choroid plexus. This mass, in fact, replaces the choroid plexus in the right lateral ventricle and has the same venous drainage as the normal choroid. The midline is shifted to the left. The third ventricle and aqueduct are only slightly dilated and no obstructing lesion is found at any point in the ventricular system.

References: Van Wagenen, W. P., Papilloma of the choroid plexus, Archives of Surgery: 20:199, February, 1930.

Braunstein H. & Martin, F., Jr. Congenital papilloma of choroid plexus; report of a case, with observations on pathogenesis of associated hydrocephalus. A.M.A. Arch. Neur. Psychiat. 68:4, 475-480, 1952.

Tumor Loan Collection
Nervous System Tumors

Case 17
Ganglioneuroma

University of Kansas Medical Center
Kansas City, Kansas
Surgical Pathology No. 51-1700 and
51-592

Clinical Summary: A 3 year old white female was admitted to the University of Kansas Medical Center for the first time on 1-31-51 because she was losing control of her legs. This was first noticed about 1-1-51. There was a gradual increase of disability until 1-12-51 when her legs collapsed. At this time she was hospitalized elsewhere for 6 days, during which time spinal tap was done and showed only increased pressure. Roentgenogram of the chest showed a shadow filling most of the upper right chest. She had an incidental bout of fever and upper respiratory infection.

On physical examination the chest was dull to percussion in the right apex, anteriorly and posteriorly; breath sounds were also diminished in this area. The knee jerks and Achilles reflexes were hyperactive bilaterally. There was bilateral ankle clonus and positive Babinski reflexes. The child was unable to stand without bending hips and knees. There were decreased abdominal reflexes.

Laboratory studies were within normal limits. A spinal tap was done on 2-2-51, no cells were seen; total protein was 66.7 mg. Myelogram showed a picture of obstruction of the canal at the level of the 3rd and 4th dorsal vertebrae.

On 2-6-51 a laminectomy T1 through T5 with gross removal of intraspinal tumor was done. The postoperative course showed rapid improvement. The child was walking 6 days after surgery. On 2-16-51 a right 5th rib thoractomy was done removing the large tumor 6 x 8 inches extending across the mediastinum and superiorly into the brachial plexus. An extrapleural dissection was done. The postoperative course was uneventful. The patient was discharged on 2-25-51.

On 5-6-51 the patient was again admitted to this hospital. She had developed a right Horner's syndrome a week before. It was felt at the time of the first operation that there was tumor in the cervical area. The patient was readmitted on this occasion for removal of the mass in the cervical area.

Physical examination showed a mass in the right lower cervical area and a right Horner's syndrome was present.

On 5-8-51 a local excision of the lesion of the neck was accomplished. This appeared to be a discrete mass and appeared to be attached to a cervical ganglion. There was a small lymph node adjacent to the mass which was removed and submitted as a separate specimen. The patient did well and was discharged on 5-13-51.

Gross: Obtained from thoracotomy of 1st hospital admission. Specimen A. consists of a pale yellow mass of tissue weighing 275 gms. It is a flabby circular mass measuring 12 cm. in diameter and 5 cm. in thickness. On section the cut surface is an uniform light yellow with an occasional cystic area 1 cm. in diameter that contains clear fluid.

Specimen B. consists of dense fibrous tissue measuring 2.5 cm. in length and 1 cm. in thickness. There are no distinguishing gross characteristics.

Representative sections are taken from each specimen.

Obtained from cervical area on 2nd hospital admission. Specimen A consists of a flattened spherical mass measuring 4 x 4 x 1.8 cm. It appears to be well encapsulated, consisting of a grey fibrous capsule that is marked by vessels and attached lobules of fat. At one end there appears to be a stalk or pedicle. On cut section the tissue is soft and spongy with areas of hemorrhage.

Specimen B is a flat spherical mass of white tissue measuring 1.5 x 1 x .6 cm. It is firm in consistency and has attached some lobules of fat. On cut section it

is homogeneously yellowish white.

Follow-Up: The patient was seen in the clinic on 7-18-51. At this time she had a residual Horner's syndrome and keloid formation over cervical scar. Chest roentgenograms did not show extension of lesions or new lesions. A small nodule 3/4 x 1/2 cm. which was thought to be a cervical node was felt along the border of the trapezius in the posterior cervical area.

The patient was again seen in the clinic on 2-13-52 with a report of no evidence of recurrence.

On 6-29-53 a report from an examination by the local doctor stated that the child showed no evidence of recurrence of tumor.