cytes with occasional polynuclear leucocytes and eosinophiles.

Microscopical examination. — *Adrenals:* The central portions are in their entire extent converted into a diffuse homogeneous material, which stains poorly. Beneath the capsule there is an extensive heaping up of lymphocytes with an occasional scattered polynuclear leucocyte. Only in one or two small isolated areas does the normal columnar grouping of cells remain. In many places along the edge of the homogeneous caseating center there are well-preserved giant cells. Toward the extremity of the organ there are several small areas which show necrosis and giant cells with surrounding lymphocytic infiltration and beyond this newly formed connective tissue. Scrapings from the cut surfaces of the glands contain many tubercle bacilli.

Lungs: Sections from the posterior portions show the alveoli filled with red blood cells in various stages of degeneration, scattered leucocytes and occasional epithelia cells. The capillaries are much congested and in many places broken through into the alveoli. Sections from the apices and elsewhere reveal only normal lung tissue.

Heart muscle: Normal.

Kidneys: Lining epithelium of the tubules well preserved. Glomeruli not unduly congested. No connective tissue overgrowth.

Thymus gland: Cellular elements for the most part collected into compact areas of considerable size, the intervening substance being made up of fat and connective tissue. Hassall's corpuscles numerous and well preserved.

Pancreas: Negative.

Spleen: Negative.

Thyroid gland: Not remarkable.

Lymph nodes: Not remarkable.

Cerebral cortex: The diagnosis can readily be made of general paresis in the sense of a chronic meningo-encephalitis showing lymphocyte and plasma-cell infiltration of the vessel walls, irregular nerve cell destruction and corresponding gliosis. The picture in the frontal region is especially characteristic. The plexiform layer contains an excess of neuroglia cells.

XIV.

A CASE OF AUTOCHTHONOUS SINUS THROMBOSIS.

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THE following is a study of a case of extensive sinus thrombosis of the cerebral sinuses. It is of interest because of the extent of the thrombus and the slowness of its development; also because of the probable origin in a focus of sclerotic vessels in one of the lateral sinuses.

The present history has been condensed from notes taken during the service of the writer at the Danvers State Hospital. The case was studied while on the wards of Dr. H. W. Mitchell.

Clinical history. — The patient was a merchant, forty-nine years of age. His family history was good. He had been a rugged healthy man, having had but one illness, an attack of tonsillitis six years previous, but during the last year he had suffered frequently from headaches, at times severe, though not so as to interfere with his business. He smoked excessively, but did not use alcohol. Syphilis and gonorrhea were denied.

On April 1, 1905, after attempting to suppress a sneeze, he complained of a sensation of something having given way in the left side of his head. A few minutes later a very severe headache developed. This headache was chiefly on the left side of the head and was accompanied shortly by nausea and excessive vomiting. Vomiting, pain in the head and epigastrium, persisted for twelve hours before any relief was obtained.

The second day he appeared dazed and confused, his speech was thick and difficult to understand, probably at times incoherent and periods of semi-consciousness developed when he could scarcely be aroused. There was very little change in this condition for four weeks. His temperature during this time varied from 97° to 99°.

In the fifth week a gradual change developed. He grew emotional, frequently crying when he attempted to speak with friends. He was also very restless and irritable. Visual hallucinations became prominent and in reaction to these he made vicious attacks on his nurses. It became difficult to restrain him and he was committed to the Danvers Insane Hospital on May 6.

When admitted he was in a stuporous state, lying with eyes closed, quiet or mumbling to himself and could not be aroused to answer questions with intelligence.

Physical examination. — Patient was a man of large frame, exceptionally well developed and nourished. The lungs showed moderate dullness and a few râles at both bases. The heart sounds were faint. The radial and temporal arteries were soft. The pulse was regular but showed very poor tension; rate, 96. The tongue was dry and heavily coated. The urine was concentrated, showing a trace of albumin, but no renal elements were found.

Neurological examination. — The patient had little general muscular strength and all movements were feeble and uncertain. There were no paralyses, but weakness was more evident on the right side. The cranial nerves in general, as far as could be tested with patient's lack of co-operation, were unaffected. The tongue protruded in the median line, but was turned to the left with difficulty. There was no marked difference in the labio-nasal folds.

Reflexes. — Knee jerks, right very lively; left, sluggish. The Achilles tendon reflexes were obtained on both sides. Ankle clonus and Babinsky reflex were absent. The right elbow jerk was more lively than the left. The pupils were equal and regular and reacted promptly to light and accommodation.

Sensations. — The right leg and foot were much cooler to the touch than the left. Reaction to pin pricks appeared equal on both sides and response was fairly prompt and active. Temperature, variable, 98° to 100.8°.

Note. May 9, 1905. The condition of the patient has been variable; for the most part he has been restless and active, pulling at the bedclothes and attempting to climb out of bed. He occasionally calls out for somebody in a loud voice. In reaction to an hallucination he made an attack on an attendant, accusing him of killing some one. He became quiet with small doses of veronal. At intervals he makes intelligent response to questions, showing a fair orientation for time,

but is confused for place and persons. His speech is very difficult to understand, remaining thick and paraphasic. Tests show both motor and sensory aphasia and a disturbance of the stereognostic sense, objects being fairly well recognized in the right hand, but not in the left. Hallucinations are constant, particularly visual. Pulls and searches the bed-clothes, makes diving and dodging motions and sees relations sitting beside him. On being examined by physician he showed partial insight into his condition and made some attempt to follow out directions. Cries frequently when mention is made of his condition and also without any apparent cause. Occasionally flinches and cries out as if in pain when being moved, though no tenderness can be elicited. Takes nourishment only upon urging. Temperature not above 99.2°. Blood examination shows hemoglobin 95%, red count 6,400,000, white count 8,000.

May 13. Much weaker and less restless. Lies in a stupor most of the time, with head and eyes turned to the right. Pupils are small. Reflexes are lively throughout, right side possibly more so than left. The left arm is apparently spastic on motion. No Babinsky reflex or ankle clonus are present. When disturbed he cries out and becomes quite resistive.

May 17. Breathing has become stertorous and it has become difficult to arouse him from stupor. He rarely moves his extremities. The right arm and leg are flaccid on passive motion. Yesterday a Babinsky reflex was obtained on the right, otherwise there is no change in reflexes. Fundus examination shows marked injection of vessels, but was otherwise negative. A cough has developed and symptoms of bronchopneumonia. Temperature varies from 99.4° to 101°. Coma became deeper and he died on the afternoon of this date.

Clinical summary. — A rugged, healthy man of forty-nine, with history of frequent severe headaches for a year, has an attack of sudden onset, with violent headache and vomiting lasting over twelve hours. Periods of somnolence, aphasia and increasing weakness of the right side follow, with temperature chiefly subnormal. Later hallucinations, delirium, hemiplegia, deepening stupor and coma, death at the end of six weeks.

Autopsy eight hours post-mortem by Dr. A. M. Barrett showed an acute purulent bronchitis and pulmonary hypostasis with areas of consolidation. Cultures from the heart's blood and spleen were negative, but from the liver the streptococcus pyogenes and a colon-like bacillus were obtained.

The brain weighed 1460 gm. The diploe in the lateral parts of the calvarium were moderately congested. The dura was lightly adherent over the frontal region. The left sigmoid and transverse sinus was filled with a mixed red and gray clot, apparently filling the entire lumen and intimately adherent to the dura. This continued into the longitudinal sinus, but here the clot was narrower, only partially filling the lumen; it was more reddish than gray and less adherent than lower down. Save for slight congestion of the cancellous tissue, the temporal bone was not notable. The pia mater was clear except for a few small hazy flakes along the course of the larger vessels. The vessels of the pia were moderately congested. The basal arteries were free from gross changes. The brain was of good consistency. The ependyma of the fourth ventricle was finely uneven. Save for a general pinkish coloration of the cortex and slight congestion of the vessels of the white substance, the brain was not notable.

Microscopical examination. Sections from the thrombus show a fairly well-organized blood clot, with numerous new formed blood vessels and many phago-

cytes filled with coarse brownish-yellow granules. Areas of fresh hemorrhage appear in the sinus wall as well as in the thrombus. Leucocytes do not appear in any numbers. In the sinus wall are a few small arteries with quite marked arteriosclerotic changes, some of which show a proliferation of the endothelium almost obliterating the lumen.

Cortex (superior, frontal, precentral, temporal, calcarine, regions studied, E. E. S.). — The blood vessels of the cortex are dilated and much congested everywhere. No marked sclerotic changes are observed either in the larger arteries of the white matter or the small cortical vessels.

Study of the neuroglia and nerve cells show chronic and acute changes. There is a mild degree of cellular gliosis of the white matter, also a mild fibrillary gliosis forming the extreme outer shell of the subpial layer (Heidenhain stain). Of the more acute changes, the best examples are found in the layer of large external pyramidal cells and in the substellate layer were numerous cells more or less replaced by satellites. This later change seems to be focally more severe.

Nissl preparations demonstrate cell bodies of a spongy yellowish appearance due to a form of pigment scattered diffusely through the cell body. This pigment was especially studied in Heidenhain preparations, which demonstrate varying degrees of change. This pigment appears in varying amounts in and around many of the blood vessels. The same regions which exhibit the most marked satellitosis tend to show in Heidenhain preparations the most marked intracellular pigmentation, i.e., the layer of large external pyramids and the substellate region.

The nuclei are only occasionally destroyed. Very few definite examples of axonal reaction are shown. For example, in the motor area the large motor cells show great variation in staining quality, size, appearance of nuclei and Nissl bodies, but axonal reactions are almost never in evidence.

Anatomical summary. — Bronchopneumonia, a well-organized thrombus filling the left sigmoid and transverse sinus and extending into the longitudinal sinus. Moderate congestion of the vessels of the cerebrum. Focal sclerotic changes occurring in the walls of the affected sinus.

Chronic cellular and fibrillary gliosis in the cortex, chronic perivascular cell pigmentation, acute changes in the nerve cells with general intracellular pigmentation and satellitosis. The layer of large external pyramids and the substellate regions in general exhibit the most severe changes.

Discussion. — The case was clinically doubtful. The most likely diagnoses made in life were brain tumor, apoplexy and meningitis. Upon review of the complete history, it seems that brain abscess, encephalitis and sinus thrombosis might well be considered in similar cases. The true diagnosis of sinus thrombosis was not seriously thought of by any of the physicians dealing with the case in life.

Considering these possible diagnoses more fully, we had in favor of brain tumor the subacute course with stupor, gradually developing weakness and aphasia. On the other hand, the sudden onset with headache and vomiting more severe at first, while later disappearing; and also the absence of optic neuritis were strongly against this disease. The same considerations applied largely to brain abscess. The majority of cases of brain abscess occur by extension from some purulent or destruc-

tive process, most commonly otitic in origin. No primary focus of infection was evident in the examination of this case. The character of the pulse might have helped in deciding against brain abscess. As in the latter condition, the pulse is generally slow. This case had rapid pulse.

Encephalitis may run a very similar course, particularly the acute hemorrhagic encephalitis (Strümpell type). An acute onset without prodromal symptoms is the rule, though generally the course is short, fulminating and characterized by high temperature. Also this condition is rare in adults.

The evidence for meningitis was slight in the absence of the common phenomena of muscular rigidity and contractures. Also important was the absence of pyrexia until late in the course of this disease (explainable by pulmonary complication).

Apoplexy was not likely with the history of this case unless one considered the onset of severe headache and vomiting in the light of prodromal symptoms, followed later by periods of semiconsciousness due to hemorrhage. The aphasia and hemiparesis, as well as the mental disturbance, were consistent with such a diagnosis. But strongly against the diagnosis of apoplexy was the markedly low tension pulse.

In this case the symptom most characteristic of sinus thrombosis was missing, i.e., congestion of the veins of the cranium and face. Oppenheim states that, in the absence of this symptom, no positive diagnosis can be made.

Bertier distinguishes between surgical thrombosis, which is usually due to some local cause, suppurative in nature and limited in extent, and medical thrombosis, which arises from general blood states or causes acting from a distance and which is non-suppurative and widespread in character. He says in adults chlorosis acts as the most important predisposing factor for medical thrombosis. Many authorities agree that a lesion of the endothelial lining of a vein is essential to the formation of a thrombus. In most cases this is undoubtedly of organismal origin, but one cannot affirm that all are due to an infective agent. In this case no focus of infection was found and the microscopic appearance of the thrombus does not favor it.

Talley and Wimmer each report very similar cases. Talley's case was of a woman of forty-six who had constant headaches for two years. Headaches became rapidly worse and were accompanied by nausea and vomiting. There was extreme distention of the veins of the head and neck. The arteries were hard, pulse was slow, 40-60. Her temperature varied between 96° and 99° throughout. The persistent headache gave way only to begin coma. Death occurred three weeks after the acute onset. An extensive partially organized sinus thrombus was found at autopsy. No seat of infection was discovered.

Wimmer's case was a man of fifty-two, suddenly seized at work with paralysis of the right arm and general trembling, followed by weakness in the right leg and the same evening twitching in the

right side of the face. There was no loss of consciousness during the first day. Convulsive attacks beginning in the right arm, followed by a condition of coma, lasting half an hour, developed and recurred at frequent intervals, death in four days. There was found thrombosis of all the large sinuses, of the minute pial veins and small hemorrhages. The cortical arteries were unaffected.

Sinus thrombosis in adults is productive of quite complex symptoms. According to Bertier, violent headache, followed at varying intervals by cerebral vomiting, vertigo, epileptic seizures, paralyses, delirium and coma, would constitute a typical case resulting from severe chlorosis. Hyperpyrexia may occur two or three days before the disease is fatal. Organization of the clot, with consequent hydrocephalus or paralyses, may occur. It is certain from a study of this case that absorption of the thrombus with complete recovery may occasionally take place.

The arteriosclerotic vessels in the sinus wall suggests a probable cause. A weak vessel gave way under the increased blood pressure and a small hemorrhage occurred. This led to other hemorrhages, starting a vicious circle similar to the condition found in internal hemorrhagic pachymeningitis. The fresh hemorrhages in the thrombus help to confirm this idea.

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XV.

THE DIAGNOSIS OF FRACTURED SKULL AIDED BY THE FINDING OF BRAIN TISSUE IN THE VOMITUS.

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THE following case illustrates a curiosity in the diagnosis of skull fracture, based on the finding of brain material in the gastric contents.

An electric car conductor, thirty-five, sustained a fracture of the skull from collision with a telegraph-post while on the running-board of his car. On removal to the Lawrence General Hospital, two hours after the accident, the patient showed an obvious depressed fracture of the right frontal bone, and while on the accident table began to vomit bloody fluid. The vomiting was extensive (1 to 6 oz.) and lasted eight hours. At the third or fourth attack of vomiting, a bit of material was observed on the blanket which macroscopically suggested fresh brain tissue. This suggestion was later microscopically confirmed. The patient died sixty-five hours after the accident. The patient spoke no words while in the hospital, but was restless, spontaneously arising from bed, was without paralysis and